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The Asiago Database on Photometric Systems (ADPS)⋆

I. Census parameters for 167 photometric systems

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Abstract. The Asiago Database on Photometric Systems (ADPS) is a compilation of basic information and reference data on 167 optical, ultraviolet and infrared photometric systems. Thirty-four additional systems are briefly described. In compiling this census we have relied on published information only. In Paper II the photometric systems will be inter-compared, calibrated and parameterised by means of synthetic photometry using uniform criteria and the same set of input spectra and extinction laws.

Key words: photometry — astronomical data bases — surveys

1. Introduction

When we became involved in the design of the photometric system for GAIA, which is under evaluation by ESA as the next Cornertone 5 mission, we realized how useful it would have been to have a nearly complete census of the existing ground-based and space-born photometric systems. The completion of the Asiago proposal for the GAIA photometric system (Munari 1998) was originally conceived to follow the realization of the *Asiago Database on Photometric Systems* (ADPS), but actually the reverse happened because the preparation of ADPS has been a tougher task than anticipated. This paper intends to summarise this extensive census in an interesting way for the general reader.

Some compilations of photometric systems have already been presented, among others by Lamla (1982), Bessell (1993), in the books by Golay (1974) and Straižys (1995) and on the *world wide web* by Mermilliod et al. (1997). The latter focuses mainly on the data collected in various photometric systems (with entries for more than $2\ 10^5$ stars). At the same time, the Mermilliod et al. *www* version available at the time of submission of the ADPS provides a census of photometric systems by listing and describing 82 of them. Even if our compilation was independent, we undoubtedly benefited by checking against Mermilliod et al.'s work.

In compiling the ADPS we have tried to be as complete as possible for the optical region (from 0.3 to 1.0 μm, where GAIA is currently planned to collect data), but effort has also been made to include ultraviolet as well as infrared photometric systems (even if at a lower degree of completeness). The ADPS *www* site will be regularly updated as new information becomes available.

In this paper we rely only on data from literature (instrumental set-ups, transmission curves, calibration and transformation functions, zero points, etc.), with preference for those provided by the authors of the photometric systems in the original papers. Unfortunately, accurate and complete information is available only for a small minority of the surveyed systems. We have been able to locate in literature (or derive ourselves from published graphs) the tabular band transmission profiles for 105 systems. Calibration and transformation functions with any kind of accuracy have been published only for a fraction of the 167 surveyed systems. Even when calibration and transformation functions are available, it is not always easy to inter-compare them because of the heterogeneous methods adopted by the different authors (see Sect. 2). As a contribution toward a clarification of the whole issue, in a forthcoming Paper II we will inter-compare, calibrate and parameterise the systems by means of synthetic photometry using uniform criteria and the same set of synthetic and observed input spectra and extinction laws.

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⋆ The ADPS is reachable at
http://ulisse.pd.astro.it/Astro/ADPS/ or via
http://www.pd.astro.it/

GAIA is a candidate ESA Cornerstone 5 mission designed to obtain extremely precise astrometry (in the *micro*-arcsec regime), multi-band photometry and medium/high resolution spectroscopy for a large sample of stars. The goals as depicted in the mission *Red Book* call for astrometry and broad band photometry to be collected for all stars down to $V \sim 20$ mag over the entire sky ($\sim$1 10^9 stars), with brighter magnitude limits for spectroscopy and intermediate band photometry. Each target star should be measured over a hundred times during the five year mission life-time, in a fashion similar to the highly successful *Hipparcos* operational mode. The astrophysical guidelines of the GAIA mission are discussed by Gilmore et al. (1998, and references therein) and Perryman (1999). An overview of the GAIA payload and spacecraft is presented by Mérat et al. (1998).

2. The Database

The 167 systems included in the ADPS are listed in Table 1, in order of publication year. The systems are documented by individual figures that conform to the common layout.

The reference sources are given in square brackets for all the information provided with a given photometric system and are also listed in Table 2. No information is entered if not present in literature. The information provided with the systems surveyed in the ADPS are grouped into five main blocks:

System Code Name. This is formed from the system name generally used in the literature, the author(s) name(s) and the year of publication of the original paper introducing the system. A short sentence describing the system main usage or aim follows (normally as given by the authors themselves).

General Information. The authors of the system (not listed for space missions), the telescope and detector originally adopted, and the main reference article are given here. The main reference article is generally the one introducing the photometric system; however, some of these historical articles contain little information and in such cases a more recent, informative paper is taken instead.

System Description. Basic information like the filters used, the wavelength and width of the bands, the zero points and the flux calibrations are reported here. The literature is heterogeneous regarding these parameters, with values sometimes referring only to the filters, or to the filters+detector combination or also including the contribution of the telescope optics and atmosphere. So different quantities as $\lambda_{\rm peak}$ (peak transmission), $\lambda_{\rm c}$ (unspecified band "*centre*"), $\lambda_{\rm eff}$ (generally without specification of the energy distribution of the input source weighting the transmission profile) or λ_0 (again unspecified) are provided by the authors of the photometric systems as the wavelength of the bands. The situation is somewhat more confused when it comes to the width of the bands: the authors have used values ranging from the $FWHM$ of a Gaussian approximation to the band, to something resembling the full width at zero transmission, or half of the total width at 50% transmission, or even unspecified concepts as "*band-width*", "*band-pass*" or "*half width*". There are cases where the values given for the wavelength and width of the bands are missing or they disagree with the plotted and/or tabulated transmission profiles. In such cases we have computed on the transmission profiles two quantities and reported them in the *ADPS* with the aim of clarifying the situation: the *WHM* (width at half maximum: the full wavelength span between the points where the transmission reaches half of the maximum value) and $\lambda_{\rm c}$ (central lambda: the wavelength halfway between these half-maximum transmission points). In Paper II we plan to homogenise and standardise the situation regarding the wavelength and width of the bands for all systems with published transmission curves by means of synthetic photometry against the same set of observed and synthetic spectra. Finally, for some systems references are also provided to papers specifically devoted to the porting of the system to a different detector (like photographic plates or CCDs for systems originally designed for photo-multipliers).

System Analysis. This section deals with assorted information like the most frequently used colour indices and their aim (preserving as much as possible the terminology used by the original authors), reddening-free parameters, reddening ratios and transformation to other systems. Transformations are only to chronologically earlier systems in order to avoid duplication.

Transmission Curves. The last section is devoted to the presentation of the band transmission profiles both in graphical and tabular form. The transmission curves are not plotted and tabulated if they refer to square bands (essentially flat 1.0 transmission within the band and 0.0 outside), such as those provided by diaphragms placed on the focal plane of a spectrograph in front of a photo-multiplier tube or the square bands synthesised from fluxed digital spectra. When the transmission curves have been plotted but not tabulated by the authors, we have reconstructed them by measuring the plotted profile. In such a case, the reader is warned by a sentence like "As derived from Fig. Y of [XXX]".

3. Additional systems

In this section 34 additional systems are briefly described. These systems do not appear in the main article body because – to our own judgment – they (*a*) lack some or most of the basic information, and/or (*b*) have been poorly documented, and/or (*c*) had little or no follow-ups in the literature, and/or (*d*) have been applied to very few objects, if not to just a single one. Finally, (*e*) some

Table 1. List of the photometric systems included in the *Asiago Database on Photometric Systems* (ADPS). The fourth column gives the number of bands, the fifth the figure which describes the system and the sixth lists if the band transmission profiles are given in the ADPS (the systems with square bands are labelled "*sqr*")

system	year	authors	n. of bands	fig.	res.
C_1	1940	Stebbins *et al.*	2	1	
UVBGRI	1943	Stebbins and Withford	6	2 a,b	yes
RGU	1946	Becker	3	3 a,b	yes
RI	1951	Kron and Smith	2	4 a,b	yes
BCD	1952	Chalonge and Divan	3	5	
UBV	1953	Johnson and Morgan	3	6 a,b,c	yes
POSS I	1955		2	7	yes
PV	1955	Eggen	2	8 a,b	yes
Aerobee UV-55	1955		2	9	yes
*uvbyH*β	1956	Strömgren and Crawford	6	10 a,b,c	yes
Aerobee UV-57	1957		1	11	
U_cBV	1958	Arp	3	12 a,b	yes
ubgyri	1958	Bahng	6	13 a,b	yes
UV BG R	1958	Tifft	5	14 a,b	yes
5 colors	1959	Borgman	5	15 a,b	yes
KLMNPQR	1960	Borgman	7	16 a,b	yes
	1960	Deeming	3	17	sqr
UBV	1960	Eggen and Sandage	3	18	
	1960	Griffin and Redman	6	19	sqr
USNO	1960	Kron and Mayall	3	20	
VBLUW	1960	Walraven and Walraven	5	21 a,b	yes
	1961	Griffin	3	22	sqr
8 colors	1961	Tifft	8	23 a,b	yes
*H*γ	1962	Bappu *et al.*	3	24	
Geneva	1962	Golay	7	25 a,b	yes
$ubvr_{20}$	1963	Sandage and Smith	4	26 a,b	yes
	1964	Barbier and Morguleff	8	27	sqr
*H*γ	1964	Beer	3	28	sqr
*H*α	1964	Peat	1	29	sqr
Aerobee UV-64	1964		4	30	
*H*α,β,γ,δ	1965	Abt and Golson	8	31	
RI	1965	Eggen	2	32	
UBVRI(JHKLMN)	1965	Johnson	11	33 a,b,c	yes
	1965	Miner	7	34	
Vilnius	1965	Straižys *et al.*	8	35 a,b	yes
UVBY	1966	Kruszewski	4	36 a,b	yes
4 colors	1966	Neff and Travis	4	37	yes
	1966	Scarfe	22	38	sqr
ubVt	1966	Smak	6	39	yes
ubvr	1966	Westerlund	4	40	
12 colors	1966	Wood	12	41 a,b,c	yes
ri	1967	Argue	2	42 a,b	yes
	1967	Boyce	6	43	sqr
62 65 102	1967	Eggen	3	44 a,b	yes
LPL	1967	Johnson *et al.*	8	45 a,b	yes
27 colors	1967	Wing	27	46	sqr
Hα	1968	Andrews	3	47	sqr
DDO	1968	McClure and Van den Bergh	7	48 a,b,c	yes
*H*β,γ	1968	Sinnerstad *et al.*	4	49 a,b	yes
u'ubvv'	1968	Smith	5	50	
jhk	1969	Bahng	3	51	
Ca II K	1969	Henry	2	52	sqr
	1969	Newell *et al.*	4	53 a,b	yes

Table 1. continued

system	year	authors	n. of bands	fig.	res.
	1969	Spinrad and Taylor	33	54	sqr
*H*α,β	1969	Tebbe	4	55	
gnkmfu	1970	Dickow *et al.*	6	56	
Uppsala	1970	Häggkvist and Oja	3	57	
RI	1970	Jacobsen	2	58 a,b	yes
nh	1970	Landolt	2	59	
	1970	Morguleff *et al.*	12	60	sqr
OAO2 WEP	1970		16	61	
Hγ	1971	Häggkvist	3	62	
DAO	1971	Hill *et al.*	6	63	sqr
5 colors	1971	Lockwood and Wing	5	64	
	1971	Mendoza	3	65	yes
	1971	Williams *et al.*	9	66	sqr
8 colors	1971	Wing	8	67	
Aerobee IR-71	1971		4	68	
	1972	Jones and Dixon	4	69	
*H*α,β	1972	Peton *et al.*	5	70 a,b	yes
$u_A b_A \beta_A y_A$	1972	Wickramasinghe and Strittmatter	4	71	
TD1	1972		25	72	sqr
24 colors	1973	Chapman *et al.*	24	73	
10 colors	1973	Faber	10	74	
JHKL SAAO	1973	Glass	7	75 a,b	yes
WBVR	1973	Straižys	4	76 a,b	yes
MSSO	1973	Thomas *et al.*	11	77	
	1974	Alexander and Branch	3	78	
UBVR	1974	Cathey	4	79	
*H*α,β,γ	1974	Feinstein	6	80	
UBVRI	1974	Fernie	5	81	
*H*α,β	1974	Guinan and McCook	4	82	
NQ	1974	Low and Rieke	2	83	yes
Hα	1974	Vidal	2	84	yes
ANS	1974		6	85 a,b	yes
Hα	1975	Dachs and Schmidt-Kaler	2	86	
	1975	Helt and Gyldenkerne	9	87	
UBViyz	1975	Jennens and Helfer	6	88	
8 colors	1975	Morguleff *et al.*	8	89	sqr
ri	1975	Weistrop	2	90	
D2B AURA	1975		4	91	sqr
Washington	1976	Canterna	4	92 a,b,c	yes
RI	1976	Cousins	2	93 a,b,c	yes
uvby	1976	Eggen	4	94	
13 colors	1976	Johnson and Mitchell	13	95 a,b,c	yes
$vbyg_1g_2$	1976	Maitzen	5	96 a,b	yes
uvgr	1976	Thuan and Gunn	4	97 a,b	yes
Apollo-Soyuz	1976		5	98	
Trieste	1977	Cester *et al.*	8	99 a,b	yes
JHK H_2O *CO*	1977	Persson *et al.*	6	100 a,b	yes
ubVr	1978	Sandage and Visvanathan	4	101	
8 colors	1978	White and Wing	8	102	
U'JF	1979	van der Kruit	3	103 a,b	yes
BVRI	1979	Kunkel and Rydgren	4	104	
ri	1979	Wade *et al.*	2	105	
$B_J R_F$	1980	Couch and Newell	2	106 a,b	yes
UBVRI	1980	Neckel and Chini	5	107	
uvgr 39_B 39_N	1980	Zinn	6	108 a,b	
VJHKLM ESO	1981	Engels *et al.*	6	109	
Δ*a*	1981	Joncas and Borra	3	110	yes

Table 1. continued

system	year	authors	n. of bands	fig.	res.
	1981	Jones *et al.*	4	111 a,b	yes
Hα	1981	Strauss and Ducati	2	112	
JHKL CTIO	1982	Elias *et al.*	4	113	
JHKL MSO	1982	Jones and Hyland	3	114	yes
VilGen	1982	North *et al.*	7	115 a,b	yes
	1982	Solheim *et al.*	10	116 a,b	yes
8 colors	1982	Tedesco *et al.*	8	117	
JHKL' AAO	1983	Allen and Cragg	4	118	
UBVRI	1983	Landolt	5	119 a,b	yes
griz	1983	Schneider *et al.*	4	120	yes
RGU	1983	Trefzger *et al.*	3	121	yes
IRAS	1983		5	122 a,b	yes
VWFSC Spacelab 1	1983		3	123	yes
JHKLMNQ OAN	1984	Roth *et al.*	13	124	
WBVR	1985	Khalliullin *et al.*	4	125 a,b	yes
$J_nK_nL_nM_n$	1986	Leggett *et al.*	4	126 a,b	yes
	1986	Park and Lee	5	127 a,b	yes
	1987	Kenyon and Fernandez-Castro	8	128	sqr
ψ(25)	1987	Mendoza	3	129	yes
VJHKLL'M	1988	Bessell and Brett	8	130 a,b	yes
77 81	1989	Cook and Aaronson	2	131	
$g_4r_4i_4z_4$	1989	Schneider *et al.*	4	132	yes
FOC HST	1989		44	133 a,b	yes
WFPC1 HST	1989		21	134 a,b	yes
Hipparcos	1989		3	135 a,b	yes
UBVRI	1990	Bessell	5	136 a,b	yes
JHKL SAAO	1990	Carter	4	137	
Guide Star Catalogue	1990	Lasker *et al.*	4	138	
UIT	1990		12	139 a,b	yes
JHKL'M ESO	1991	Bouchet *et al.*	5	140 a,b	
POSS II	1991	Reid *et al.*	3	141	yes
CaII	1991	Twarog *et al.*	2	142	yes
20 colors	1992	Bastiaansen	20	143 a,b	yes
MACHO	1992		2	144	yes
SCAS	1993	Clark *et al.*	7	145 a,b	yes
WFPC2 HST	1993		41	146 a,b,c	yes
JHKL' CST	1994	Alonso *et al.*	4	147 a,b,c	yes
DENIS	1994	Epchtein *et al.*	3	148 a,b	yes
JHKL MSSSO	1994	McGregor	4	149 a,b	yes
IRTF NSFCAM	1994	Shure *et al.*	18	150 a,b	yes
FPBS	1995	Brewer *et al.*	4	151	
ISOCAM ISO	1995		21	152 a,b,c	yes
BATC	1996	Fan *et al.*	15	153 a,b	yes
Sloan DSS	1996	Fukugita *el al.*	5	154 a,b	yes
StrömVil	1996	Straižys *et al.*	7	155 a,b	yes
ESO MIR	1996	Van der Bliek *et al.*	5	156	
ESO NIR	1996	Van der Bliek *et al.*	5	157	
MANIAC	1997	Böker *et al.*	14	158	
	1997	Damineli *et al.*	3	159	yes
TNG	1997	Marchetti *et al.*	8	160	
$UBV(RI)_{MW}$	1997	Sandage	5	161	
UWTAT	1997	Strassmeier *et al.*	13	162	
NICMOS HST	1997		32	163 a,b,c	yes
STIS HST	1997		16	164 a,b	yes
	1998	Royer *et al.*	5	165	
Asiago GAIA	1998	Munari	10	166 a,b,c	yes
Geneva GAIA	1999	Grenon *et al.*	14	167 a,b	yes

systems based on spectral scanner data seem to resemble the classification of very-low dispersion spectra more than the conventional photometric techniques.

After the author name, year of publication and the reference paper (for the reference code numbers see Table 2), for each of the 34 additional systems three types of basic information are given. "*Instr:*" reports if the system has been obtained with a photometer (+filters) or if it has been designed on spectral scanner data. "*Features:*" lists the system's goals and the lines/bands/continuum the system is aimed to. Finally, "*Bands:*" gives the wavelength and width of the system bands.

Kraft - 1960 [170] *Instr:* photometer. *Features:* G-band in $F-G$ stars. *Bands:* at 4305 ($\Delta\lambda = 10$ Å) and 4290 Å ($\Delta\lambda = 200$ Å).

Gutierrez-Moreno et al. - 1967 [129] *Instr:* spectral scanner. *Features:* Hβ, Hγ, Hδ in B-A stars. *Bands:* set by the $50 \div 80$ Å slit width.

McNamara et al. - 1970 [205] *Instr:* photometer. *Features:* CaII K, Hδ and G-band in RR Lyr stars. *Bands:* at 3933, 4100 and 4305 Å ($\Delta\lambda = 30$ Å for all of them).

Wawrukiewicz - 1971 [268][315] *Instr:* photometer. *Features:* TiO and CN in M stars. *Bands:* at 7125 ($\Delta\lambda = 55$ Å), 7170 ($\Delta\lambda = 302$ Å) and two at 7935 Å ($\Delta\lambda = 135$ and 500 Å).

Lutz and Lutz - 1972 [194] *Instr:* photometer. *Features:* Hγ in O-F stars. *Bands:* two at Hγ ($\Delta\lambda = 30$ and 150 Å).

Seeds - 1972 [265] *Instr:* photometer. *Features:* C_2 in Carbon stars. *Bands:* at 5165, 5635, 5300 and 5780 Å ($\Delta\lambda = 100$ Å for all of them).

Caplan - 1973 [59] *Instr:* spectral scanner. *Features:* Hα in G-M stars. *Bands:* at 6548 ($\Delta\lambda = 24$ Å), 6563 ($\Delta\lambda = 4.9$ Å) and 6577 Å ($\Delta\lambda = 24$ Å).

Cherepashchuk and Khaliullin - 1973 [67] *Instr:* photometer. *Features:* continuum in Wolf Rayet stars. *Bands:* at 4244 ($\Delta\lambda = 49.5$ Å), 4789 ($\Delta\lambda = 61$ Å), 5806 ($\Delta\lambda = 95$ Å), 6320 ($\Delta\lambda = 91$ Å) and 7512 Å ($\Delta\lambda = 109$ Å).

Jones and Carrick - 1973 [159] *Instr:* spectral scanner. *Features:* Hα and Hβ in early type stars. *Bands:* at 4761, 4861, 4961, 6487, 6563 and 6642 Å ($\Delta\lambda = 30.6$ Å for all of them).

Khozof et al. - 1973 [165] *Instr:* photometer. *Features:* H^- opacity in A-M stars. *Bands:* h' (1.58 μm), h'' (1.70 μm) and k (2.15 μm).

Faÿ et al. - 1974 [104] *Instr:* spectral scanner. *Features:* Na I, C_2 and CN in carbon stars. *Bands:* 20 Å-width bandpasses between 5000 and 7000 Å, with 5610, 5710, 5730, 5820 and 6780 as the most relevant wavelengths.

Gustafsson et al. - 1974 [127][128][231] *Instr:* echelle spectrophotometer. *Features:* Metallicity and microturbolence in F-G-K stars. *Bands:* at 4794.5, 4799.5, 4897.0, 4911.0, 5801.5 and 5805.5 Å ($\Delta\lambda = 3$ Å for all of them).

Nissen - 1974 [232][233] *Instr:* echelle spectrophotometer. *Features:* HeI (4026 Å) in B dwarfs. *Bands:* at 4016 ($\Delta\lambda = 6$ Å), 4026 ($\Delta\lambda = 14$ Å) and 4036 ($\Delta\lambda = 6$ Å).

Sorvari - 1974 [274] *Instr:* photometer. *Features:* OI 7772 Å in A-F stars. *Bands:* two at 7772 Å ($\Delta\lambda = 10$ and 60 Å).

Greenstein - 1976 [121] *Instr:* multichannel spectrophotometer. *Features:* classification of WDs. *Bands:* at 3571, 4255, 4717, 5405, 6579, 6944, 8000 and 10000 Å. [168] adopted somewhat different wavelengths.

Mould - 1976 [217] *Instr:* spectral scanner. *Features:* CaH and TiO in M dwarfs. *Bands:* at 6540, 6830, 7035, 7100, 7500, 7812 and 8130 Å. [218] has slightly modified the bands to investigate T Tau stars of the M type.

Dzervitis - 1977 [89] *Instr:* photometer. *Features:* classification of carbon stars via CN and C_2 absorption bands. *Bands:* at 5135 ($\Delta\lambda = 70$ Å), 5300 ($\Delta\lambda = 200$ Å), 6775 ($\Delta\lambda = 250$ Å), 7785 ($\Delta\lambda = 170$ Å), 8025 ($\Delta\lambda = 250$ Å) and 8850 Å ($\Delta\lambda = 300$ Å).

Yamashita et al. - 1977 [333] *Instr:* multichannel spectrophotometer. *Features:* Classification of Carbon stars via BaII, LiI, NaI lines and CN, C_2 bands. *Bands:* at 4160 ($\Delta\lambda = 80$ Å), 4227 ($\Delta\lambda = 10$ Å), 4234 ($\Delta\lambda = 30$ Å), 4237 ($\Delta\lambda = 30$ Å), 4554 ($\Delta\lambda = 10$ Å), 4575 ($\Delta\lambda = 10$ Å), 5150 ($\Delta\lambda = 10$ Å), 5193 ($\Delta\lambda = 10$ Å), 5893 ($\Delta\lambda = 15$ Å), 5893 ($\Delta\lambda = 150$ Å), 6708 ($\Delta\lambda = 8$ Å) and 6708 Å ($\Delta\lambda = 30$ Å).

Mould and McElroy - 1978 [219] *Instr:* spectral scanner. *Features:* CaH and TiO bands in M dwarfs. *Bands:* at 7540 ($\Delta\lambda = 50$ Å), 6880 ($\Delta\lambda = 80$ Å), 7120 ($\Delta\lambda = 60$ Å) and 10175 Å ($\Delta\lambda = 280$ Å).

Pedersen and Rudkjøbing 1978 [241] *Instr:* echelle spectrophotometer. *Features:* Ca II K in B-F stars. *Bands:* at 3929.4 ($\Delta\lambda = 4.3$ Å), 3933.7 ($\Delta\lambda = 4.3$ Å), 3938.0 ($\Delta\lambda = 4.3$ Å) and at 3925.9 ($\Delta\lambda = 7.8$ Å), 3933.7 ($\Delta\lambda = 7.8$ Å), 3941.5 Å ($\Delta\lambda = 7.8$ Å).

Pilachowski - 1978 [246] *Instr:* photometer. *Features:* CO in cool giants. *Bands:* at 2.17 ($\Delta\lambda = 0.098$ μm), 2.2 ($\Delta\lambda = 0.40$ μm) and 2.41 μm ($\Delta\lambda = 0.088$ μm).

Cohen - 1979 [72] *Instr:* spectral scanner. *Features:* NaI and C_2 in Carbon stars. *Bands:* at 5165, 5185, 5220, 5635, 5660, 5720, 5893, 6070, 6168, 6192, 6195, 6206, 6260, 6615, 6880 and 7830 Å ($\Delta\lambda = 7$ Å for all of them).

Mould and Aaronson - 1980 [1][220] *Instr:* digital spectra. *Features:* C_2 and TiO in M giants and Carbon stars. *Bands:* at 4930, 5615, 5690, 6150, 6250 and 6540 Å ($\Delta\lambda = 15$ Å for all of them).

Avetisyan et al. - 1981 [13] *Instr:* photometer. *Features:* Continuum away from absorption bands in Carbon stars. *Bands:* at 3600, 3700, 4800, 5200, 5670, 6160 and 6690 Å ($120 \leq \Delta\lambda \leq 200$ Å).

Wing and Rinsland - 1981 [330] *Instr:* infrared spectral scanner ($\lambda/\Delta\lambda = 450$). *Features:* energy distribution of the continuum and the CO, CN, C_2, OH, H_2, SiO absorption bands in late type stars. *Bands:* 13 bandpasses in the $1-4$ μm range including bands at 1.04, 1.29, 2.10, 2.28 and 4.00 μm.

Avetisyan and Melik-Alaverdyan - 1982 [14] *Instr:* photometer. *Features:* H_2O and CO bands in M giants. *Bands:* at 0.98 ($\Delta\lambda = 0.03$ μm), 1.47 ($\Delta\lambda = 0.03$ μm), 1.54 ($\Delta\lambda = 0.03$ μm), 1.72 ($\Delta\lambda = 0.04$ μm), 1.75 ($\Delta\lambda = 0.03$ μm), 1.98 ($\Delta\lambda = 0.05$ μm), 2.02 ($\Delta\lambda = 0.05$ μm), 2.17 ($\Delta\lambda = 0.05$ μm), 2.29 ($\Delta\lambda = 0.06$ μm) and 2.39 μm ($\Delta\lambda = 0.04$ μm).

Yorka - 1983 [334] *Instr:* spectral scanner. *Features:* NH, CN, CH and C_2 in Carbon stars. *Bands:* at 3366, 3410, 3875, 3908, 4305, 4325, 4702, 4766, 5630 and 5655 Å ($\Delta\lambda = 20$ Å for all of them).

Hartwick et al. - 1984 [134] *Instr:* spectral scanner. *Features:* CaH and TiO absorption bands in M dwarfs. *Bands:* at 6540 ($\Delta\lambda = 32$ Å), 6830 ($\Delta\lambda = 32$ Å), 7099 ($\Delta\lambda = 30$ Å) and 7500 Å ($\Delta\lambda = 32$ Å).

McWilliam and Lambert - 1984 [206] *Instr:* photometer. *Features:* CO in M giants. *Bands:* at 2.17 and 2.40 μm.

Nersisian - 1984 [226] *Instr:* photometer. *Features:* continuum in Carbon and S stars. *Bands:* at 4020 ($\Delta\lambda = 120$ Å), 4200 ($\Delta\lambda = 120$ Å), 4660 ($\Delta\lambda = 110$ Å), 4910 ($\Delta\lambda = 130$ Å), 5167 ($\Delta\lambda = 120$ Å), 5670 ($\Delta\lambda = 120$ Å), 5830 ($\Delta\lambda = 100$ Å), 6160 ($\Delta\lambda = 110$ Å) and 6360 Å ($\Delta\lambda = 120$ Å).

Herbst et al. - 1987 [138] *Instr:* photometer. *Features:* Hα in K and M stars. *Bands:* a wide ($\Delta\lambda = 150$ Å) and a narrow ($\Delta\lambda = 30$ Å) band centered on Hα. A third, narrower filter ($\Delta\lambda = 8$ Å) has been added by [139].

Faulkner et al. - 1988 [103] *Instr:* photometer. *Features:* molecular opacity in the violet continuum on Carbon stars. *Bands:* at 3410 ($\Delta\lambda = 90$ Å), 3500 ($\Delta\lambda = 314$ Å), 3676 ($\Delta\lambda = 130$ Å), 3792 ($\Delta\lambda = 116$ Å), 4090 ($\Delta\lambda = 168$ Å) and 4520 Å ($\Delta\lambda = 111$ Å).

Elsner et al. - 1999 [98] *Instr:* binning of λ-dispersed fringes by a Fizeau interferometer. *Features:* photometry by the DIVA astrometric satellite. *Bands:* 32 or 66 Gaussians (monochromatic instrumental PSF), generously overlapping and covering the whole $3500 - 11000$ Å range.

Vansevičius et al. - 1999 [308] *Instr:* CCD. *Features:* Mg in galaxies. *Bands:* two at 5190 Å ($\Delta\lambda = 80$ and 450 Å).

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*C*1 - Stebbins *et al.* - 1940

Colors of stars. Interstellar reddening.

GENERAL INFORMATION

AUTHORS	J. Stebbins, C. M., Huffer, A. E. Whitford
TELESCOPE	0.38m (refractor), Madison Obs.; 1.52m and 2.54m (reflectors), Mount Wilson Obs.
DETECTOR	potassium cells
MAIN ARTICLE	Stebbins, J., Huffer, C. M., Whitford, A. E. 1940, ApJ 91, 20

SYSTEM DESCRIPTION

BANDS DESCRIPTION [285], pg. 189

band	λ_0 (Å)	bandpass (Å)
violet	4260	3600 - 4800
blue	4770	4000 - 5600

ZERO POINT: The zero point is set by standard stars of the Polar Sequence. [276]

SYSTEM ANALYSIS

RELATIONS WITH OTHER SYSTEMS [150]

UBV - Johnson and Morgan - 1953

$(B-V)$	=	$+0.30 + 2.06\,C_1$	for reddened and unreddened O and B0 Ia - B2 Ia stars
$(B-V)$	=	$+0.18 + 1.76\,C_1$	for unreddened B1-A7 main sequence stars
$(B-V)$	=	$+0.27 + 1.37\,C_1$	for yellow giant stars

Fig. 1. The photometric system C_1 – Stebbins et al. – 1940

UVBGRI - Stebbins and Whitford - 1943

General purpose system. Reddening law from O and B stars. Later revised by Stebbin and Kron [279].

GENERAL INFORMATION

AUTHORS	J. Stebbins and A. E. Whitford
TELESCOPE	1.52 m (reflector), Mount Wilson; 0.91 m Crossley (reflector), Lick Observatory
DETECTOR	Western Electric D97087 cesium-oxide cell
MAIN ARTICLE	Stebbins, J., Whitford, A. E. 1943, ApJ 98, 20

SYSTEM DESCRIPTION

BANDS DESCRIPTION					
band	filter [277]	λ_{peak} (Å)[230]	half-width (Å) [117], pg. 113	*WHM* (Å)	λ_c (Å)
U	2mm UG1	3530	$\sim$ 800	415	3465
X (#)	2mm UG1+ 2mm RG1				
V	3mm BG12+2mm GG13	4220	$\sim$ 800	805	4185
B	2mm Corning 038 + 5mm Corning 430	4880	$\sim$ 800	1120	4800
G	2mm Corning 338 + 2mm BG18	5700	$\sim$ 800	1090	5550
R	2mm RG1 + 3mm Corning 396	7190	$\sim$ 1500	1680	6960
I	2mm Corning 254	10300	$\sim$ 1500	1805	10115

(#) It measures the red leak of the *U* band.
Starting with [278] the *X* band was unnecessary because the *U* band included a red-leak suppressor.

SYSTEM ANALYSIS

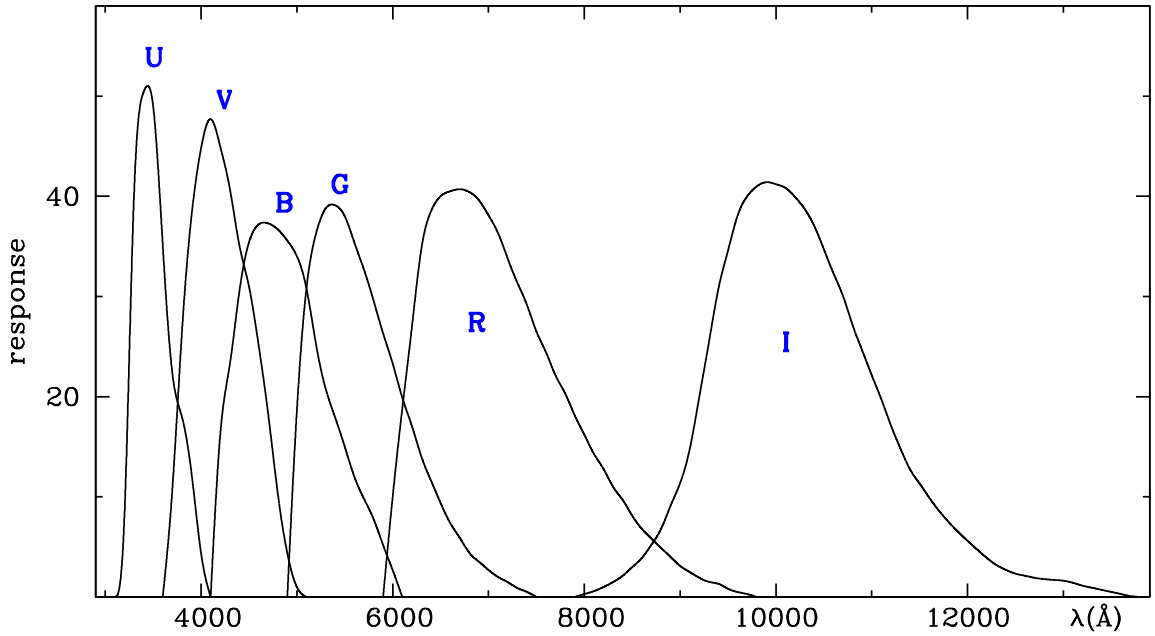
RELATIONS WITH OTHER SYSTEMS [86]

UBVRI(JHKLMN) - Johnson - 1965

$$(R-I)_{Johnson} = 0.842\ (\pm 0.010)\ (R-I)_{St-Whit} + 0.38\ (\pm 0.003)$$

Fig. 2. The photometric system *UVBGRI* – Stebbin and Withford – 1943

TRANSMISSION CURVES [211]



U		*V*		*B*		*G*		*R*				*I*			
λ (A)	ϒ (%)	λ (A)	ϒ (%)	λ (A)	ϒ (%)	λ (A)	ϒ (%)	λ (A)	ϒ (%)	λ (A)	ϒ (%)	λ (A)	ϒ (%)	λ (A)	ϒ (%)
3100	0.0	3600	0.0	4100	0.0	4900	0.0	5900	0.0	8900	4.0	7900	0.0	10900	24.6
3200	8.0	3700	10.7	4200	16.2	5000	18.6	6000	10.0	9000	3.1	8000	0.3	11000	22.1
3300	40.0	3800	26.4	4300	23.2	5100	30.8	6100	18.8	9100	2.5	8100	0.6	11100	19.7
3400	50.4	3900	38.0	4400	30.5	5200	36.3	6200	26.9	9200	1.9	8200	1.0	11200	17.1
3500	49.0	4000	44.8	4500	35.4	5300	38.8	6300	34.8	9300	1.5	8300	1.5	11300	14.8
3600	35.2	4100	47.7	4600	37.2	5400	39.1	6400	38.5	9400	1.3	8400	2.1	11400	12.7
3700	22.4	4200	45.0	4700	37.3	5500	38.0	6500	40.0	9500	0.8	8500	3.0	11500	11.3
3800	18.0	4300	40.8	4800	36.7	5600	35.4	6600	40.5	9600	0.5	8600	3.9	11600	9.9
3900	12.4	4400	35.1	4900	35.6	5700	32.7	6700	40.7	9700	0.3	8700	5.2	11700	8.6
4000	4.4	4500	31.0	5000	34.0	5800	29.6	6800	40.4	9800	0.0	8800	6.8	11800	7.5
4100	0.0	4600	25.2	5100	30.8	5900	26.3	6900	39.6			8900	9.1	11900	6.5
		4700	18.3	5200	25.2	6000	23.3	7000	38.1			9000	11.4	12000	5.6
		4800	10.4	5300	20.8	6100	19.9	7100	36.3			9100	14.8	12100	4.7
		4900	4.4	5400	17.9	6200	17.1	7200	33.8			9200	20.0	12200	3.9
		5000	1.0	5500	15.0	6300	14.0	7300	31.4			9300	25.4	12300	3.2
		5100	0.0	5600	12.0	6400	11.6	7400	29.2			9400	30.8	12400	2.7
				5700	9.8	6500	9.4	7500	26.5			9500	34.6	12500	2.3
				5800	7.8	6600	7.4	7600	24.4			9600	38.1	12600	2.1
				5900	5.2	6700	5.9	7700	22.1			9700	40.0	12700	1.9
				6000	2.7	6800	4.4	7800	20.3			9800	41.0	12800	1.8
				6100	0.0	6900	3.5	7900	18.1			9900	41.4	12900	1.7
						7000	2.7	8000	16.2			10000	41.2	13000	1.6
						7100	2.0	8100	14.3			10100	40.8	13100	1.4
						7200	1.5	8200	12.8			10200	39.9	13200	1.1
						7300	0.9	8300	11.0			10300	38.7	13300	0.9
						7400	0.5	8400	9.7			10400	37.0	13400	0.7
						7500	0.0	8500	8.1			10500	34.7	13500	0.5
								8600	6.8			10600	32.3	13600	0.3
								8700	5.8			10700	30.0	13700	0.1
								8800	4.9			10800	27.1	13800	0.0

Fig. 2. continued

RGU - Becker - 1946

Broad-band photographic system. Revised in 1967 and 1973.

GENERAL INFORMATION

AUTHORS	W. Becker
DETECTOR	photographic plates
MAIN ARTICLE	Becker, W. 1946, Veröff. Univ. Strernwarte Göttingen 79

SYSTEM DESCRIPTION

BANDS DESCRIPTION [54]							
band	emulsion [178]	filter [178]	λ_0 (Å)	λ_{eff} (Å) (#)	half-width (Å)	*WHM* (Å)	λ_c (Å)
1967							
U	103aO	2mm UG2	3599	3634	520		
G	103aO	2mm GG 5	4685	4657	475		
R	103aE	2mm RG 610	6435	6419	425		
1973							
U	103aO	2mm UG2	3593	3628	530	535	3600
G	103aO	2mm GG 5	4658	4630	495	500	4670
R	103aE	2mm RG 610	6407	6393	430	430	6418

(#) For a A0V star.

ZERO POINT: $(U-G) = (G-R) = 0.00$ for B0V stars. [285], pg. 195

SYSTEM ANALYSIS

REDDENING RATIOS [117], pg 110

$E(U-G) \,/\, E(G-R) = 0.70$ $\quad$ $A_G = 2.69\, E(G-R)$

RELATIONS WITH OTHER SYSTEMS [55]

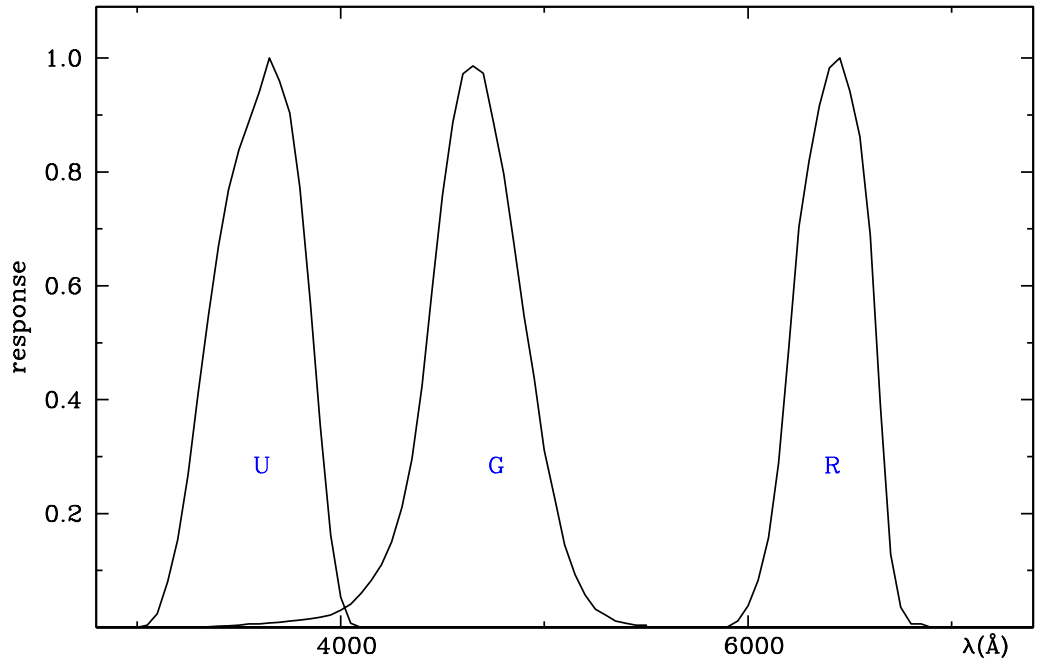
UBV - Johnson and Morgan - 1953

For O-K, population I stars. Values of Δ_i are tabulated in [55]

$(U-G)$	=	$1.17\,(U-B) + 0.15\,(B-V) + 1.31 + \Delta_1$
$(G-R)$	=	$1.27\,(B-V) - 0.04\,(U-B) + 0.34 + \Delta_2$
G	=	$V + 0.63\,(B-V) - 0.01\,(U-B) + \Delta_3$
U_{RGU}	=	$U_{UBV} + 0.16\,(U-B) - 0.22\,(B-V) + 1.31 + \Delta_4$
R	=	$V - 0.64\,(B-V) + 0.03\,(U-B) - 0.34 + \Delta_5$

Fig. 3. The photometric system *RGU* – Becker – 1946

TRANSMISSION CURVES [54]



U		*G*				*R*	
λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ
3000	0.000	3300	0.000	4450	0.598	5850	0.000
3050	0.004	3350	0.001	4500	0.759	5900	0.001
3100	0.024	3400	0.002	4550	0.887	5950	0.011
3150	0.080	3450	0.003	4600	0.972	6000	0.038
3200	0.154	3500	0.004	4650	0.986	6050	0.083
3250	0.268	3550	0.006	4700	0.973	6100	0.157
3300	0.411	3600	0.006	4750	0.888	6150	0.288
3350	0.548	3650	0.008	4800	0.797	6200	0.487
3400	0.670	3700	0.009	4850	0.676	6250	0.704
3450	0.769	3750	0.011	4900	0.546	6300	0.819
3500	0.839	3800	0.013	4950	0.438	6350	0.916
3550	0.889	3850	0.015	5000	0.311	6400	0.983
3600	0.941	3900	0.018	5050	0.228	6450	1.000
3650	1.000	3950	0.022	5100	0.145	6500	0.942
3700	0.960	4000	0.030	5150	0.093	6550	0.862
3750	0.903	4050	0.041	5200	0.057	6600	0.689
3800	0.773	4100	0.060	5250	0.032	6650	0.392
3850	0.573	4150	0.082	5300	0.022	6700	0.128
3900	0.354	4200	0.110	5350	0.011	6750	0.035
3950	0.163	4250	0.150	5400	0.007	6800	0.006
4000	0.053	4300	0.211	5450	0.004	6850	0.006
4050	0.007	4350	0.296	5500	0.004	6900	0.000
4100	0.000	4400	0.424	5550	0.000		

Fig. 3. continued

RI - Kron and Smith - 1951

General purpose red and near-infrared photometry.

GENERAL INFORMATION

AUTHORS	G. E. Kron and J. L. Smith
TELESCOPE	0.60m (refractor) and 0.91m Crossley (reflector), Lick Obs.; 1.52m and 2.54m (reflectors), Mount Wilson Obs.
DETECTOR	Continental Electric type CE25A/B *j* and *e* photocells
MAIN ARTICLE	Kron, G. E., Smith, J. L. 1951, ApJ 113, 324

SYSTEM DESCRIPTION

BANDS DESCRIPTION (#)					
band	filter [172]	λ_{eff} (Å) [31]	bandpass (Å) [31]	*WHM* (Å	λ_c (Å)
R	2mm Schott OG1 + 2mm Schott BG21 + 1mm Schott BG17	6500	5600 - 7400	2340	6780
R_{diff}	2mm Schott OG2 − *I* band			1610	6690
I	cemented gelatin Wratten 88A	8250	7500 - 9000	1540	8275

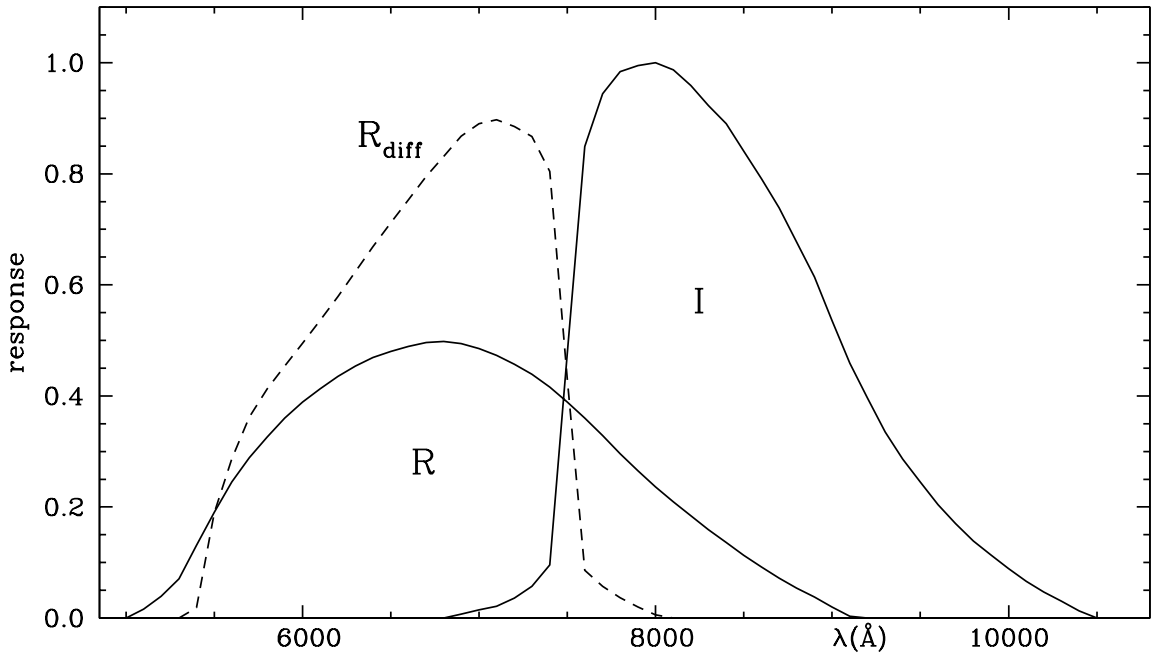
(#) Up to Oct 16, 1949 the *R* band has been obtained as the *difference* between the readings through the 2mm Schott OG2 filter and the Wratten 88A (the latter defining the *I* band). In this way the infrared transmission of the OG2 filter was accounted for and eliminated. After that date the *R* band has been obtained via the combination of 2mm Schott OG1 + 2mm Schott BG21 + 1mm Schott BG17 which provided infrared leak suppression.

ZERO POINT: The magnitude scale is linked to the Polar Sequence, and the (*R*-*I*) color is zero for unreddened A0V stars. [172]

Fig. 4. The photometric system *RI* – Kron and Smith – 1951

TRANSMISSION CURVES

As derived from Fig. 2 of [172].



R				R_{diff}				*I*			
λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ
5000	0.000	7200	0.457	5300	0.000	7500	0.431	6800	0.000	9000	0.536
5100	0.016	7300	0.439	5400	0.019	7600	0.086	6900	0.007	9100	0.459
5200	0.039	7400	0.416	5500	0.190	7700	0.057	7000	0.015	9200	0.397
5300	0.071	7500	0.389	5600	0.287	7800	0.037	7100	0.021	9300	0.335
5400	0.131	7600	0.360	5700	0.362	7900	0.020	7200	0.036	9400	0.286
5500	0.191	7700	0.329	5800	0.413	8000	0.006	7300	0.057	9500	0.245
5600	0.245	7800	0.296	5900	0.454	8100	0.000	7400	0.096	9600	0.204
5700	0.289	7900	0.265	6000	0.495			7500	0.476	9700	0.170
5800	0.326	8000	0.236	6100	0.536			7600	0.849	9800	0.139
5900	0.360	8100	0.209	6200	0.579			7700	0.944	9900	0.114
6000	0.389	8200	0.184	6300	0.624			7800	0.984	10000	0.089
6100	0.413	8300	0.159	6400	0.669			7900	0.995	10100	0.066
6200	0.435	8400	0.136	6500	0.712			8000	1.000	10200	0.047
6300	0.454	8500	0.113	6600	0.753			8100	0.987	10300	0.030
6400	0.469	8600	0.092	6700	0.795			8200	0.959	10400	0.013
6500	0.480	8700	0.072	6800	0.831			8300	0.923	10500	0.000
6600	0.489	8800	0.054	6900	0.868			8400	0.890		
6700	0.496	8900	0.038	7000	0.890			8500	0.841		
6800	0.498	9000	0.020	7100	0.897			8600	0.791		
6900	0.494	9100	0.003	7200	0.885			8700	0.739		
7000	0.485	9200	0.000	7300	0.867			8800	0.677		
7100	0.473			7400	0.804			8900	0.614		

Fig. 4. continued

BCD - Chalonge and Divan - 1952

Classification of early type stars from the region around the Balmer jump as recorded on prismatic spectra.

GENERAL INFORMATION

AUTHORS	D. Chalonge and L. Divan
TELESCOPE	Cassegrain coudè focus, Jungfraujoch Observatory
DETECTOR	Ilford Zènith and Kodak 103a-O plates
MAIN ARTICLE	Chalonge D., Divan L. 1952, Ann. Astron. 15, 201

SYSTEM DESCRIPTION

Three quantities (D, λ_1 and Φ_b) are defined over the 3300-4600 Å portion of photographic prism spectra.

D measures the magintude of the Balmer discontinuity, λ_1 indicates the effective location of the Balmer discontinuity in the spectrum and Φ_b is related to the slope of the continuum in the blue region of the spectrum longward of the Balmer discontinuity (3800 - 4800 Å) [65].

SYSTEM ANALYSIS

RELATIONS WITH OTHER SYSTEMS [26]

UBV - Johnson and Morgan - 1953

$D = 0.525\,(Q+1)$ for stars O9 - A2, lum. class V

Fig. 5. The photometric system BCD – Chalonge and Divan – 1952

UBV - Johnson and Morgan - 1953

General purpose system. Due to problems in the reconstruction of the original system, two versions have become popular: the USA [198] and the Vilnius [15].

GENERAL INFORMATION

AUTHORS	H. L. Johnson and W. W. Morgan
TELESCOPE	0.33m and 2.08m (reflectors) Mc Donald Observatory
DETECTOR	RCA 1P21 (about refrigeration see [149])
MAIN ARTICLE	Johnson H.L., Morgan W.W. 1953, ApJ 117, 313

SYSTEM DESCRIPTION

BANDS DESCRIPTION [178], pg. 50						FLUX CALIB. (#)
band	filter	alternative	λ_0 (Å)	λ_{eff} (Å) (#)	*WHM* (Å)	λ_c (Å)	(erg cm^{-2} sec^{-1} Å^{-1})
photoelectric USA							
U	Corning 9863	2mm UG2	3600		700	3500	3.98 10^{-9}
B	Corning 5030 + 2mm GG13	1mm BG12 + 2mm GG13	4400		985	4380	6.95 10^{-9}
V	Corning 3384	2mm GG11	5500		870	5465	3.63 10^{-9}
photoelectric Vilnius							
U					400	3660	4.22 10^{-9}
B					1000	4405	6.40 10^{-9}
V					825	5425	3.75 10^{-9}
photographic							
	plate	filter					
U	103a-O	2mm UG2			630	3475	
B	103a-O	2mm GG13			1115	4385	
V_G	103a-G	2mm GG11			580	5440	
V_D	103a-D	2mm GG11			1400	5725	

(#) For an unreddened A0V star with V = 0.00. [178], pg. 50-54

ZERO POINT: The mean colors of the six unreddened A0 V stars α Lyr, γ UMa, 109 Vir, α CrB, γ Oph and HR 3314 are $U-B = B-V = 0.00$. [156]

PHOTOGRAPHIC VERSION: Bell, R. A. 1972, MNRAS 159, 357

SYSTEM ANALYSIS

REDDENING-FREE PARAMETERS [285], pg. 241

$$Q_{UBV} = (U-B) - [E(U-B)/E(B-V)]\,(B-V)$$

REDDENING RATIOS

$$E(U-B)/E(B-V) = 0.72 + 0.05E(B-V)$$ [285], pg. 227

$$A_U = 4.40\,E(B-V) \qquad A_B = 4.10\,E(B-V) \qquad A_V = 3.10\,E(B-V)$$ [258]

Fig. 6. The photometric system *UBV* – Johnson and Morgan – 1953

TRASMISSION CURVES [211]

The photographic bands are derived from Fig. 1 of [29].

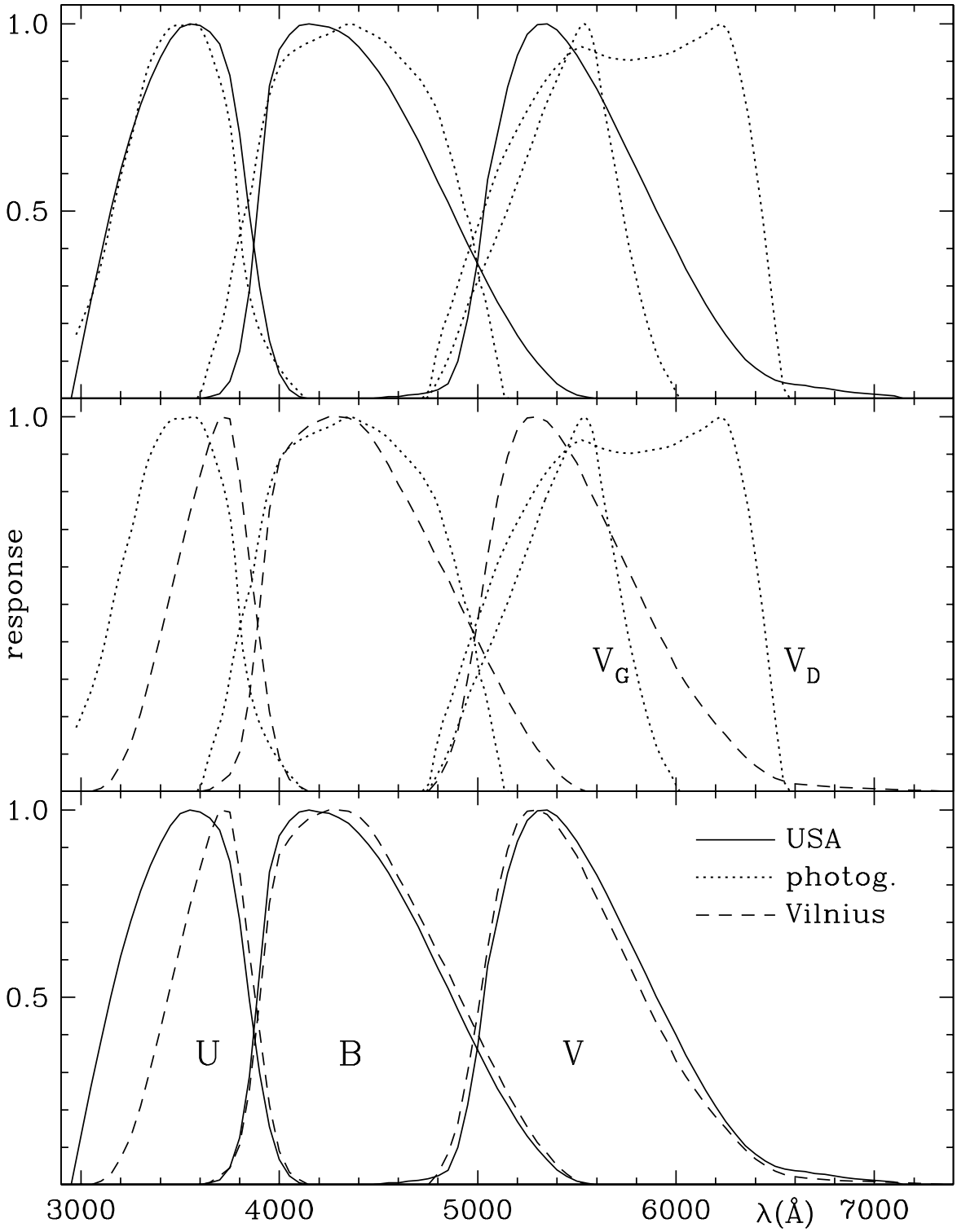


Fig. 6. continued

USA						Vilnius						Photographic							
U		*B*		*V*		*U*		*B*		*V*		*U*		*B*		V_G		V_D	
λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ
2950	0.000	3600	0.000	4450	0.000	3050	0.000	3600	0.000	4750	0.000	2975	0.171	3585	0.000	4740	0.000	4720	0.000
3000	0.131	3650	0.005	4500	0.002	3100	0.009	3650	0.006	4800	0.030	2995	0.195	3610	0.024	4760	0.011	4755	0.022
3050	0.260	3700	0.013	4550	0.005	3150	0.028	3700	0.023	4850	0.084	3015	0.220	3635	0.074	4780	0.030	4790	0.115
3100	0.384	3750	0.046	4600	0.005	3200	0.071	3750	0.045	4900	0.163	3035	0.246	3660	0.119	4800	0.049	4825	0.190
3150	0.502	3800	0.126	4650	0.009	3250	0.128	3800	0.106	4950	0.301	3055	0.275	3685	0.159	4820	0.070	4860	0.239
3200	0.609	3850	0.290	4700	0.012	3300	0.209	3850	0.254	5000	0.458	3075	0.307	3710	0.198	4840	0.093	4895	0.297
3250	0.703	3900	0.568	4750	0.016	3350	0.309	3900	0.492	5050	0.630	3095	0.344	3735	0.255	4860	0.118	4930	0.356
3300	0.784	3950	0.834	4800	0.023	3400	0.417	3950	0.752	5100	0.780	3115	0.387	3760	0.338	4880	0.144	4965	0.410
3350	0.852	4000	0.931	4850	0.039	3450	0.527	4000	0.881	5150	0.895	3135	0.436	3785	0.402	4900	0.174	5000	0.461
3400	0.911	4050	0.971	4900	0.100	3500	0.635	4050	0.923	5200	0.967	3155	0.486	3810	0.462	4920	0.205	5035	0.511
3450	0.958	4100	0.995	4950	0.213	3550	0.744	4100	0.955	5250	0.997	3175	0.536	3835	0.512	4940	0.236	5070	0.566
3500	0.990	4150	1.000	5000	0.371	3600	0.844	4150	0.977	5300	1.000	3195	0.583	3860	0.555	4960	0.264	5105	0.617
3550	1.000	4200	0.995	5050	0.548	3650	0.934	4200	0.990	5350	0.988	3215	0.625	3885	0.640	4980	0.290	5140	0.658
3600	0.995	4250	0.991	5100	0.705	3700	1.000	4250	1.000	5400	0.958	3235	0.661	3910	0.718	5000	0.314	5175	0.695
3650	0.978	4300	0.980	5150	0.831	3750	0.995	4300	1.000	5450	0.919	3255	0.698	3935	0.782	5020	0.338	5210	0.730
3700	0.946	4350	0.964	5200	0.916	3800	0.834	4350	0.997	5500	0.877	3275	0.743	3960	0.828	5040	0.362	5245	0.764
3750	0.862	4400	0.938	5250	0.972	3850	0.616	4400	0.984	5550	0.819	3295	0.793	3985	0.865	5060	0.387	5280	0.797
3800	0.705	4450	0.907	5300	0.998	3900	0.408	4450	0.958	5600	0.765	3315	0.840	4010	0.894	5080	0.412	5315	0.828
3850	0.492	4500	0.872	5350	1.000	3950	0.213	4500	0.916	5650	0.711	3335	0.879	4035	0.912	5100	0.438	5350	0.855
3900	0.297	4550	0.832	5400	0.984	4000	0.090	4550	0.871	5700	0.657	3355	0.907	4060	0.923	5120	0.464	5385	0.878
3950	0.154	4600	0.786	5450	0.954	4050	0.033	4600	0.820	5750	0.602	3375	0.928	4085	0.932	5140	0.490	5420	0.898
4000	0.067	4650	0.739	5500	0.916	4100	0.014	4650	0.775	5800	0.545	3395	0.949	4110	0.940	5160	0.518	5455	0.917
4050	0.023	4700	0.688	5550	0.872	4150	0.000	4700	0.723	5850	0.488	3415	0.968	4135	0.947	5180	0.546	5490	0.931
4100	0.005	4750	0.633	5600	0.826			4750	0.672	5900	0.434	3435	0.983	4160	0.953	5200	0.575	5525	0.938
4150	0.000	4800	0.578	5650	0.775			4800	0.617	5950	0.386	3455	0.991	4185	0.959	5220	0.603	5560	0.932
		4850	0.524	5700	0.722			4850	0.569	6000	0.331	3475	0.995	4210	0.965	5240	0.631	5595	0.923
		4900	0.467	5750	0.668			4900	0.511	6050	0.289	3495	0.995	4235	0.970	5260	0.659	5630	0.916
		4950	0.412	5800	0.613			4950	0.457	6100	0.250	3515	0.995	4260	0.976	5280	0.689	5665	0.910
		5000	0.359	5850	0.559			5000	0.402	6150	0.214	3535	0.997	4285	0.983	5300	0.720	5700	0.906
		5050	0.307	5900	0.503			5050	0.347	6200	0.181	3555	0.999	4310	0.991	5320	0.751	5735	0.904
		5100	0.257	5950	0.450			5100	0.299	6250	0.151	3575	1.000	4335	0.998	5340	0.779	5770	0.903
		5150	0.212	6000	0.399			5150	0.244	6300	0.120	3595	0.994	4360	1.000	5360	0.805	5805	0.905
		5200	0.168	6050	0.346			5200	0.199	6350	0.093	3615	0.978	4385	0.996	5380	0.829	5840	0.908
		5250	0.130	6100	0.297			5250	0.154	6400	0.069	3635	0.952	4410	0.988	5400	0.852	5875	0.911
		5300	0.095	6150	0.251			5300	0.113	6450	0.051	3655	0.922	4435	0.981	5420	0.876	5910	0.914
		5350	0.066	6200	0.209			5350	0.084	6500	0.036	3675	0.891	4460	0.975	5440	0.901	5945	0.918
		5400	0.040	6250	0.169			5400	0.051	6550	0.027	3695	0.858	4485	0.969	5460	0.926	5980	0.923
		5450	0.022	6300	0.135			5450	0.029	6600	0.021	3715	0.821	4510	0.960	5480	0.953	6015	0.933
		5500	0.009	6350	0.104			5500	0.010	6650	0.018	3735	0.779	4535	0.950	5500	0.977	6050	0.944
		5550	0.004	6400	0.081			5550	0.000	6700	0.016	3755	0.723	4560	0.937	5520	0.994	6085	0.954
		5600	0.000	6450	0.063					6750	0.014	3775	0.630	4585	0.923	5540	1.000	6120	0.963
				6500	0.049					6800	0.012	3795	0.494	4610	0.909	5560	0.990	6155	0.975
				6550	0.042					6850	0.011	3815	0.384	4635	0.895	5580	0.958	6190	0.990
				6600	0.037					6900	0.010	3835	0.319	4660	0.881	5600	0.902	6225	1.000
				6650	0.035					6950	0.009	3855	0.262	4685	0.866	5620	0.833	6260	0.987
				6700	0.030					7000	0.008	3875	0.220	4710	0.850	5640	0.767	6295	0.930
				6750	0.028					7050	0.007	3895	0.190	4735	0.829	5660	0.709	6330	0.849
				6800	0.023					7100	0.006	3915	0.164	4760	0.806	5680	0.655	6365	0.751
				6850	0.019					7150	0.005	3935	0.141	4785	0.783	5700	0.597	6400	0.623
				6900	0.016					7200	0.004	3955	0.121	4810	0.748	5720	0.531	6435	0.487
				6950	0.014					7250	0.003	3975	0.102	4835	0.701	5740	0.469	6470	0.326
				7000	0.012					7300	0.002	3995	0.085	4860	0.656	5760	0.415	6505	0.169
				7050	0.009					7350	0.001	4015	0.070	4885	0.612	5780	0.365	6540	0.029
				7100	0.007					7400	0.000	4035	0.056	4910	0.556	5800	0.318	6575	0.000
				7150	0.000							4055	0.043	4935	0.505	5820	0.274		
												4075	0.031	4960	0.471	5840	0.232		
												4095	0.020	4985	0.400	5860	0.192		
												4115	0.009	5010	0.312	5880	0.156		
												4135	0.000	5035	0.270	5900	0.124		
														5060	0.208	5920	0.098		
														5085	0.138	5940	0.076		
														5110	0.077	5960	0.058		
														5135	0.005	5980	0.040		
														5160	0.000	6000	0.017		
																6020	0.000		

Fig. 6. continued

POSS I - 1955

First photographic Palomar Observatory Sky Survey.

GENERAL INFORMATION

TELESCOPE 1.2m Schmidt, Palomar Obs.
MAIN ARTICLE Lund, J. M., Dixon, R. S. 1973, PASP 85, 230

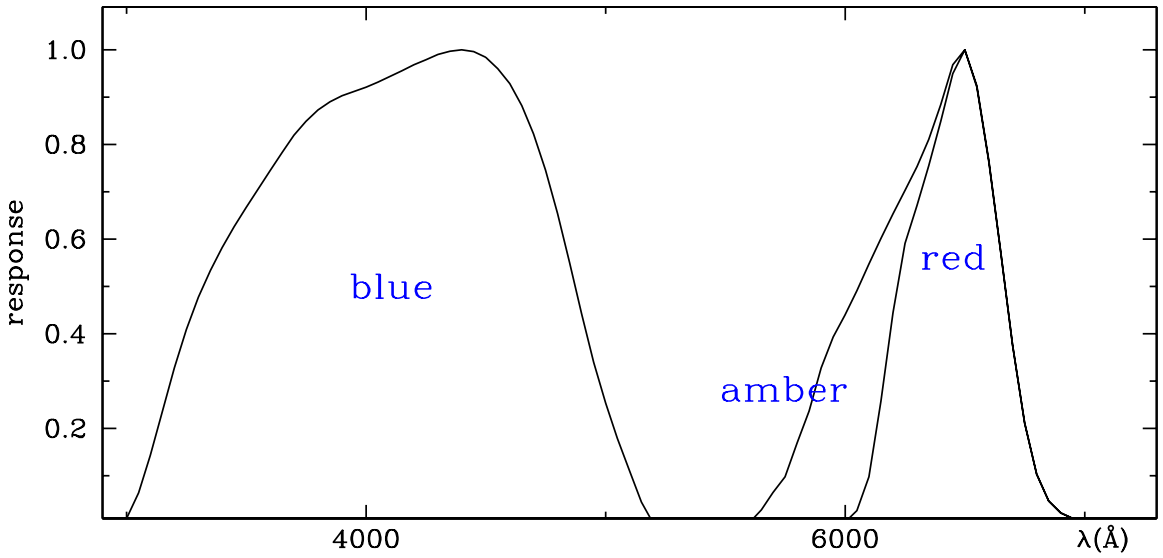
SYSTEM DESCRIPTION

BANDS DESCRIPTION [192]		
band	emulsion	lter
blue	Eastman 103a-O	none
amber (#)	Eastman 103a-E	amber Plexiglas
red	Eastman 103a-E	red Plexiglas 2444

(#) Used in the so called “Whiteoak Estension” to declination zones –36° and –42°.

TRANSMISSION CURVES

As derived by combining the sensitivity/trasmission of photographic plates, lters, atmosphere and BK-7 glass [5], [167], [263]



blue								*amber*						*red*			
λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ
2950	0.000	3550	0.706	4100	0.943	4700	0.822	5600	0.000	6200	0.653	6800	0.104	5950	0.000	6550	0.924
3000	0.010	3600	0.745	4150	0.955	4750	0.746	5650	0.028	6250	0.703	6850	0.047	6000	0.002	6600	0.765
3050	0.064	3650	0.783	4200	0.968	4800	0.654	5700	0.065	6300	0.753	6900	0.021	6050	0.026	6650	0.570
3100	0.143	3700	0.819	4250	0.979	4850	0.550	5750	0.098	6350	0.810	6950	0.010	6100	0.098	6700	0.376
3150	0.235	3750	0.849	4300	0.990	4900	0.442	5800	0.169	6400	0.884	7000	0.004	6150	0.258	6750	0.211
3200	0.328	3800	0.873	4350	0.997	4950	0.340	5850	0.237	6450	0.968	7050	0.002	6200	0.444	6800	0.103
3250	0.409	3850	0.890	4400	1.000	5000	0.253	5900	0.328	6500	1.000	7100	0.000	6250	0.591	6850	0.047
3300	0.477	3900	0.903	4450	0.996	5050	0.179	5950	0.393	6550	0.921			6300	0.671	6900	0.022
3350	0.534	3950	0.912	4500	0.984	5100	0.111	6000	0.439	6600	0.762			6350	0.755	6950	0.010
3400	0.582	4000	0.921	4550	0.960	5150	0.044	6050	0.491	6650	0.569			6400	0.849	7000	0.004
3450	0.626	4050	0.931	4600	0.928	5200	0.000	6100	0.547	6700	0.376			6450	0.949	7050	0.000
3500	0.667			4650	0.882			6150	0.601	6750	0.212			6500	1.000		

Fig. 7. The photometric system POSS I – 1955

PV - Eggen - 1955

General purpose system.

GENERAL INFORMATION

AUTHORS	O. J. Eggen
TELESCOPE	0.30m (refractor), Mt. Hamilton; 0.23m (refractor), Mt. Stromlo
DETECTOR	1P21
MAIN ARTICLE	Eggen, O.J. 1955, AJ 60, 65

SYSTEM DESCRIPTION

BANDS DESCRIPTION [91]				
band	filter	λ_{peak} (Å)	*WHM* (Å)	λ_c (Å)
P_{5330}	Corning 5330	4000	1025	4175
P_{5562}	Corning 5562	4200	1015	4280
V	Corning 3385	5300	670	5290

P_{5330} and P_{5562} are two versions of the same P band, the first realized in late 40's with a Corning 5330 filter, the second in early 50's with a Corning 5562 filter.

ZERO POINT: The *PV* system is defined by the magnitudes of six Polar Sequence stars listed in [91]

SYSTEM ANALYSIS

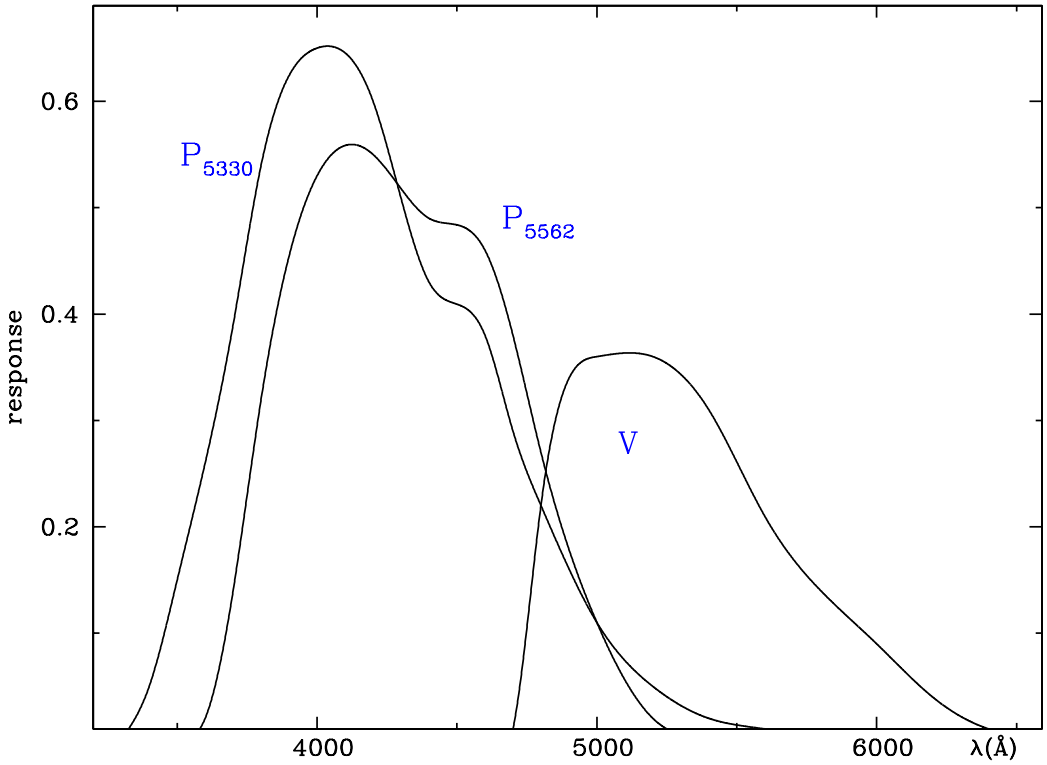
RELATIONS WITH OTHER SYSTEMS [91]

UBV - Johnson and Morgan - 1953

V_J	=	V_E	
$(B-V)_J$	=	$0.964\,(P-V)_E + 0.120$	for $(B-V)_J < +1.0$
$(B-V)_J$	=	$1.19\,(P-V)_E - 0.10$	for $+1.0 < (B-V)_J < +1.5$ dwarfs

Fig. 8. The photometric system PV – Eggen – 1955

TRANSMISSION CURVES [91]



P				*V*	
P_{5330}		P_{5562}			
λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ
3300	0.00	3500	0.00	4600	0.00
3400	0.05	3600	0.02	4700	0.01
3500	0.15	3700	0.14	4800	0.22
3600	0.26	3800	0.32	5000	0.36
3700	0.39	4000	0.53	5200	0.36
3800	0.54	4200	0.55	5400	0.31
4000	0.65	4400	0.49	5600	0.21
4200	0.60	4600	0.46	5800	0.14
4400	0.43	4700	0.38	6000	0.09
4600	0.38	4800	0.27	6200	0.04
4700	0.29	5000	0.11	6400	0.01
4800	0.22	5200	0.02	6600	0.00
5000	0.11	5400	0.00		
5200	0.05				
5400	0.02				
5600	0.01				
5800	0.00				

Fig. 8. continued

Aerobee UV-55 -1955

Ultraviolet observations by an Aerobee rocket o wn on November 17, 1955.

GENERAL INFORMATION

DETECTOR UV photon counter

MAIN ARTICLE Kupperian, J. E. Boggess, A., Milligan, J. E. 1958, ApJ 128, 45

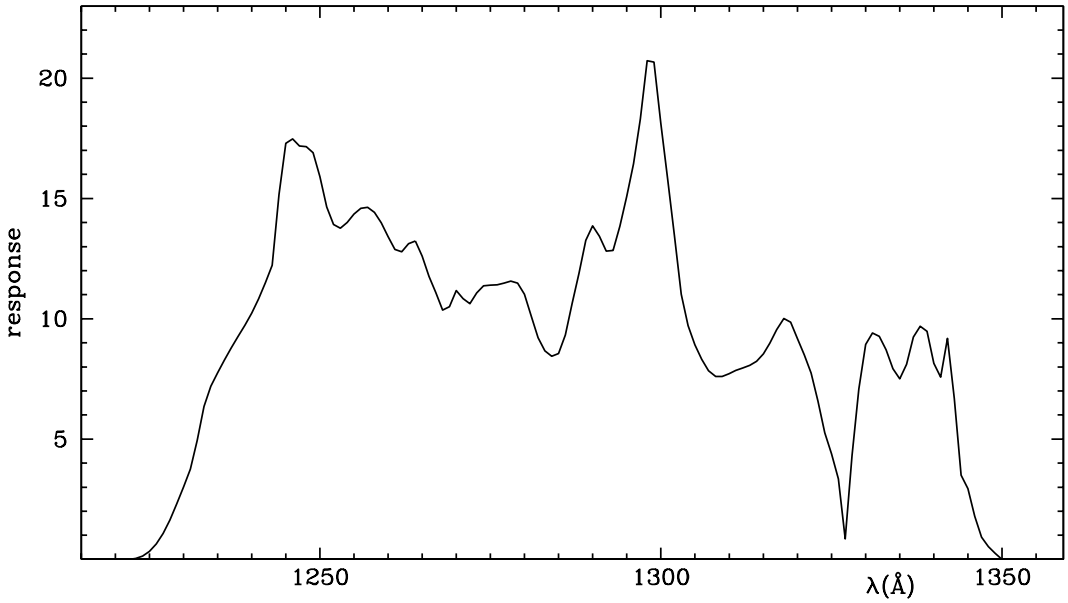
SYSTEM DESCRIPTION

BANDS DESCRIPTION [37]	
band	bandwidth (A)
120	1100 - 1340
130	1225 - 1350

The *120* band was found to be useless because of the strong geocoronal Lyα (1216A) contamination.
The wavelength limits of the *130* band are set by the calcium oride window of the tube (transparent to $\lambda > 1225$A) and the photosensitive gas in the tube (nitric oxide ionized by photons of $\lambda < 1350$A).

TRANSMISSION CURVES

As derived from Fig 1 of [177]



130

λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ
1220	0.0	1244	13.6	1262	12.7	1280	10.9	1297	18.7	1314	8.3	1329	6.3	1344	4.5
1226	0.6	1244	15.1	1264	13.2	1281	9.6	1298	21.0	1317	9.4	1330	8.3	1345	3.0
1228	1.5	1244	16.6	1266	12.1	1284	8.4	1300	19.0	1318	10.0	1331	9.4	1346	1.5
1230	3.0	1247	17.2	1267	10.8	1286	9.0	1301	16.6	1320	9.0	1333	8.7	1348	0.6
1232	4.5	1249	16.6	1269	10.2	1287	10.5	1301	15.1	1322	7.5	1336	7.9	1350	0.0
1233	6.0	1251	15.1	1270	11.2	1288	12.1	1302	12.7	1323	6.0	1336	8.6		
1235	7.5	1252	13.8	1272	10.6	1289	13.7	1304	9.7	1325	4.5	1338	9.7		
1238	9.0	1255	14.2	1273	11.2	1293	12.8	1306	8.5	1326	3.0	1339	9.0		
1241	10.5	1257	14.6	1275	11.4	1294	13.6	1307	7.7	1327	1.2	1341	7.5		
1243	12.1	1260	13.6	1277	11.5	1295	15.7	1311	7.8	1328	3.6	1342	9.0		

Fig. 9. The photometric system Aerobee UV-55 – 1955

uvby Hβ - Strömgren and Crawford - 1956

Classification of F stars, later extended to other spectral types.

GENERAL INFORMATION

AUTHORS	B. Strömgren and D. L. Crawford
TELESCOPE	0.80m (reflector), Haute-Provence Obs.
DETECTOR	RCA 1P21 (refrigerated)
MAIN ARTICLE	Strömgren, B. 1956, Vistas in Astronomy 2, 1337

SYSTEM DESCRIPTION

BANDS DESCRIPTION [178] pg 58					FLUX CALIBRATION [178] pg 58
band	filter	λ_{peak} (Å)	half-width (Å)	λ_{eff} (Å)	(erg cm^{-2} sec^{-1} Å^{-1}) (#)
u	8mm SchottUG11 + 1mm SchottWG3	3500	300	3450	3.25 10^{-9}
v	interference	4110	190	4110	7.18 10^{-9}
b	interference	4670	180	4670	5.81 10^{-9}
y	interference	5470	230	5480	3.70 10^{-9}
[79] $H\beta_{narrow}$	KPNO 212	4859	30		
	KPNO 9	4858	29		
	KPNO 216	4868	26		
[79] $H\beta_{wide}$	KPNO 214	4890	145		
	KPNO 10	4850	136		
	KPNO 225	4870	210		

(#) Fluxes for an A0V star with $V_{Johnson} = 0.00$ and $E(B-V) = 0.00$.

For α Lyr: $(b-y) = 0.004$, $m_1 = 0.157$, $c_1 = 1.089$, $\beta = 2.903$. [187]

SYSTEM ANALYSIS

COLOR INDICES AND PARAMETERS [117], pg 182-190

$(b-y)$: temperature indicator.

$c_1 = (u-v)-(v-b)$: measures the Balmer discontinuity; T_{eff} indicator in O-A stars, and luminosity indicator in A-F stars.

$m_1 = (v-b)-(b-y)$: measures the blocking by metallic lines.

$\beta = H\beta_{wide} - H\beta_{narrow}$: luminosity indicator in O-A stars and T_{eff} indicator in A-G stars.

REDDENING-FREE PARAMETERS [117], pg. 183

$$[c_1] = c_1 - \frac{E(c_1)}{E(b-y)}(b-y) = c_1 - 0.20\,(b-y)$$

$$[m_1] = m_1 - \frac{E(m_1)}{E(b-y)}(b-y) = m_1 + 0.18\,(b-y)$$

Fig. 10. The photometric system *uvbyHβ* – Strömgren and Crawford – 1956

$$[u-b] = (u-b) - \frac{E(u-b)}{E(b-v)}(b-y) = (u-b) - 1.84\,(b-y)$$

$$[u-b] = [c_1] + 2[m_1]$$

REDDENING RATIOS [294]

$$E(b-y) = 0.7E(B-V)_{Johnson}$$

RELATIONS WITH OTHER SYSTEMS

UBV - Johnson and Morgan - 1953 [307]

$(U-B)$	=	$0.675\,(\pm0.002)\,(u-b) - 0.938\,(\pm0.002)$	for stars O-B I-V, A-F III-V
$(B-V)$	=	$1.584\,(\pm0.007)\,(b-y) + 0.681\,(\pm0.014)\,m_1 - 0.116\,(\pm0.002)$	for stars O-B I-V, A III-V

U_CBV - Arp - 1958 [76]

$(B-V)$	=	$1.662\,(b-y) - 0.860\,m_1 - 0.134 - 0.027\,E(B-V)$	$(B-V) < 0.05$
$(B-V)$	=	$1.520\,(b-y) + 0.604\,m_1 - 0.092 - 0.015\,E(B-V)$	$0.05 < (B-V) < 0.70$

TRANSMISSION CURVES [211]

H^w_β and H^n_β are derived from Fig 1 of [79].

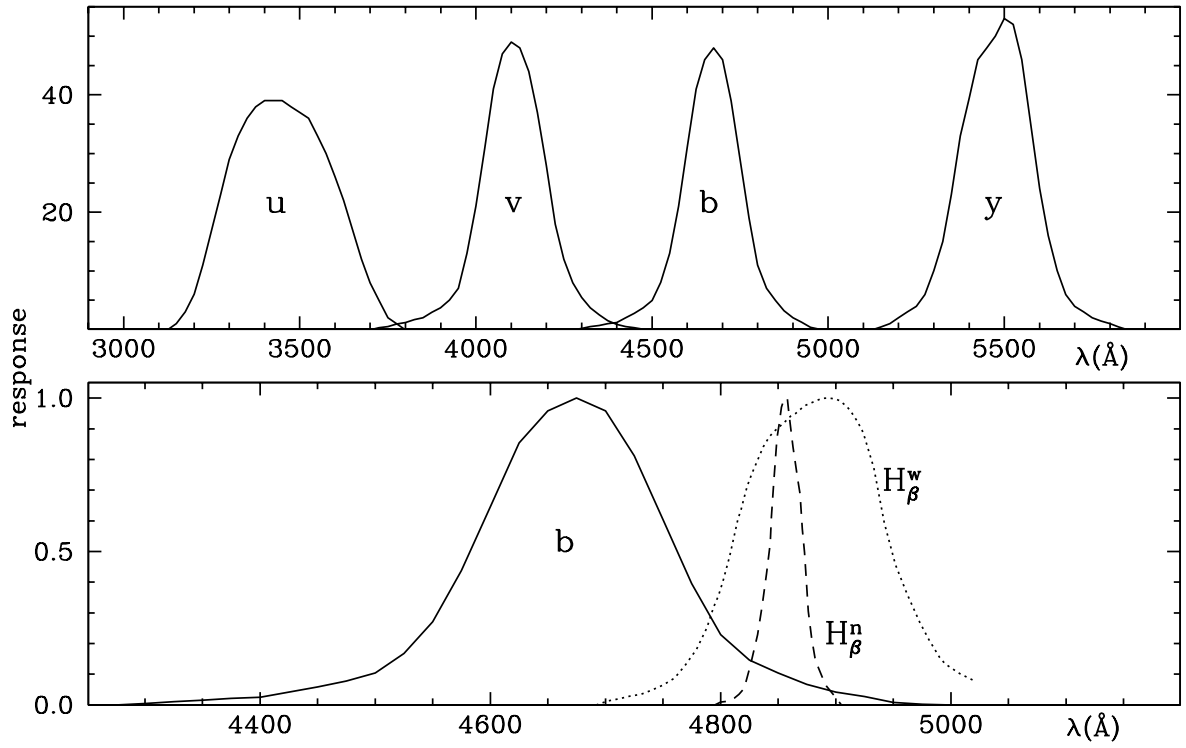


Fig. 10. continued

u		*v*		*b*		*y*		$H\beta_{wide}$		$H\beta_{narrow}$	
λ (Å)	ϒ (%)	λ (Å)	ϒ (%)	λ (Å)	ϒ (%)	λ (Å)	ϒ (%)	λ (Å)	ϒ	λ (Å)	ϒ
3125	0.0	3700	0.0	4275	0.0	5125	0.0	4692	0.000	4795	0.000
3150	1.0	3725	0.3	4300	0.2	5150	0.5	4702	0.013	4800	0.009
3175	3.0	3750	0.5	4325	0.5	5175	1.0	4712	0.020	4806	0.012
3200	6.0	3775	1.0	4350	0.7	5200	2.0	4721	0.028	4812	0.023
3225	11.0	3800	1.2	4375	1.0	5225	3.0	4731	0.034	4816	0.034
3250	17.0	3825	1.7	4400	1.2	5250	4.0	4740	0.047	4820	0.053
3275	23.0	3850	2.0	4425	2.0	5275	6.0	4750	0.064	4822	0.076
3300	29.0	3875	3.0	4450	2.8	5300	10.0	4760	0.087	4826	0.130
3325	33.0	3900	3.7	4475	3.7	5325	15.0	4769	0.128	4832	0.229
3350	36.0	3925	5.0	4500	5.0	5350	23.0	4779	0.181	4836	0.321
3375	38.0	3950	7.0	4525	8.0	5375	33.0	4788	0.252	4840	0.428
3400	39.0	3975	13.0	4550	13.0	5400	41.0	4794	0.319	4843	0.527
3425	39.0	4000	21.0	4575	21.0	5425	46.0	4798	0.356	4844	0.611
3450	39.0	4025	31.0	4600	31.0	5450	48.0	4802	0.403	4846	0.719
3475	38.0	4050	41.0	4625	41.0	5475	50.0	4808	0.484	4849	0.870
3500	37.0	4075	47.0	4650	46.0	5500	53.0	4815	0.604	4851	0.916
3525	36.0	4100	49.0	4675	48.0	5525	52.0	4818	0.638	4853	0.970
3550	33.0	4125	48.0	4700	46.0	5550	46.0	4820	0.672	4855	0.996
3575	30.0	4150	44.0	4725	39.0	5575	35.0	4823	0.712	4857	1.000
3600	26.0	4175	37.0	4750	29.0	5600	24.0	4827	0.752	4858	0.996
3625	22.0	4200	28.0	4775	19.0	5625	16.0	4831	0.789	4859	0.962
3650	17.0	4225	18.0	4800	11.0	5650	10.0	4837	0.840	4861	0.901
3675	12.0	4250	12.0	4825	7.0	5675	6.0	4842	0.873	4863	0.840
3700	8.0	4275	8.0	4850	5.0	5700	4.0	4846	0.890	4867	0.733
3725	5.0	4300	5.5	4875	3.2	5725	3.0	4856	0.923	4869	0.687
3750	2.0	4325	3.7	4900	2.0	5750	2.0	4861	0.941	4871	0.573
3775	1.0	4350	2.5	4925	1.3	5775	1.5	4865	0.950	4873	0.496
3800	0.0	4375	1.5	4950	0.4	5800	1.0	4873	0.975	4875	0.382
		4400	0.9	4975	0.1	5825	0.5	4885	0.994	4876	0.305
		4425	0.5	5000	0.0	5850	0.0	4888	0.999	4879	0.218
		4450	0.3					4894	1.000	4882	0.153
		4475	0.1					4900	0.997	4884	0.130
		4500	0.1					4904	0.990	4888	0.092
		4525	0.0					4910	0.970	4892	0.061
								4913	0.957	4900	0.024
								4916	0.940	4905	0.000
								4919	0.923		
								4923	0.893		
								4925	0.873		
								4933	0.772		
								4942	0.594		
								4952	0.457		
								4962	0.362		
								4973	0.269		
								4981	0.212		
								4990	0.155		
								4995	0.134		
								5000	0.121		
								5008	0.101		
								5019	0.081		

Fig. 10. continued

Aerobee UV-57 - 1957

Ultraviolet observations from an Aerobee rocket flown on March 28, 1957.

GENERAL INFORMATION

DETECTOR	UV photon counter
MAIN ARTICLE	Boggess, A., Dunkelmann, L. 1958, AJ 63, 303

SYSTEM DESCRIPTION

BANDS DESCRIPTION [39]

band	λ_c (Å)	bandwidth (Å)
270	2700	350

A chemical filter has been used to isolate the band.

Fig. 11. The photometric system Aerobee UV-57 – 1957

U_cBV - Arp - 1958

Realization of the *UBV - Johnson and Morgan - 1953* system with a refractor at Cape Town.

GENERAL INFORMATION

AUTHORS	H. C. Arp
TELESCOPE	0.60m Mc Clean (refractor), Royal Observatory
DETECTOR	EMI photocell
MAIN ARTICLE	Arp, H. C. 1958, AJ 63, 118

SYSTEM DESCRIPTION

BANDS DESCRIPTION [12]			
band	lter	*WHM (A)*	λ_c (A)
U_C	2mm Corning 9863	320	3920
B	2mm GG 13 + 2mm BG 12	765	4320
V	2mm Omag 302	580	5300

ZERO POINT: Colors set to 0.00 for unreddened A0V stars. [178], pg. 74

SYSTEM ANALYSIS

REDDENING-FREE PARAMETERS [285], pg. 290

$Q_{UcBV} = (U_C - B) - 0.36\,(B - V)$

TRANSMISSION CURVES [211]

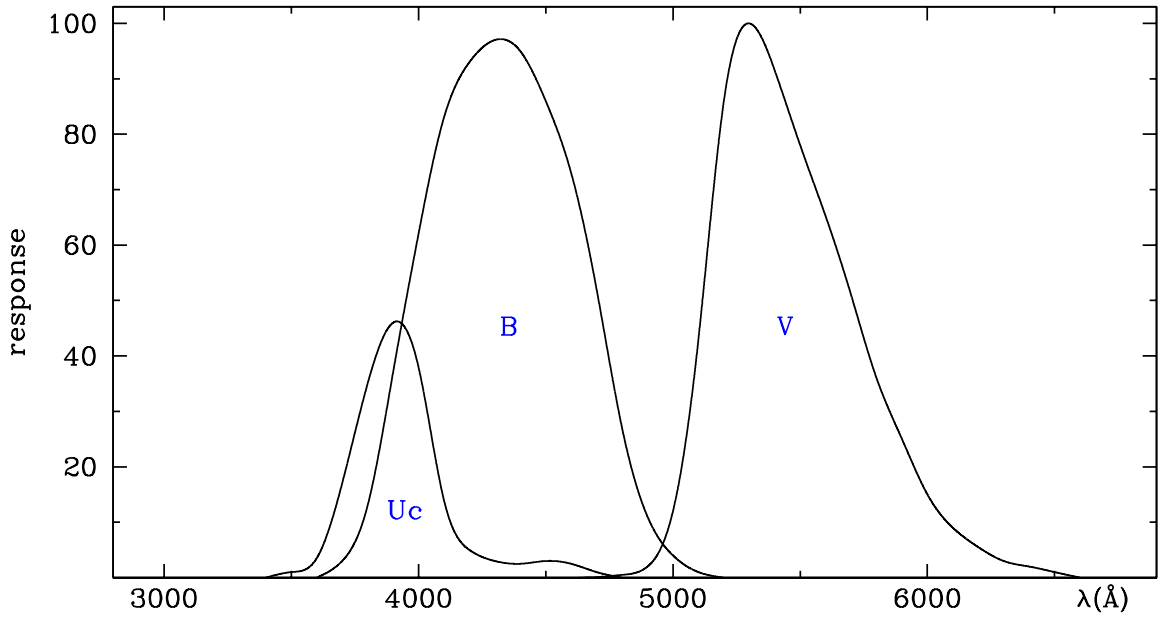


Fig. 12. The photometric system U_cBV – Arp – 1958

U_C		B		V	
λ (Å)	ϒ (%)	λ (Å)	ϒ (%)	λ (Å)	ϒ (%)
3400	0.000	3600	0.000	4600	0.000
3450	0.606	3650	1.162	4650	0.023
3500	1.000	3700	3.000	4700	0.100
3550	1.369	3750	6.387	4750	0.279
3600	3.500	3800	13.000	4800	0.500
3650	8.998	3850	23.927	4850	0.832
3700	17.000	3900	37.000	4900	2.000
3750	26.127	3950	49.788	4950	5.073
3800	35.000	4000	62.000	5000	12.000
3850	42.170	4050	73.539	5050	24.565
3900	46.000	4100	83.000	5100	43.000
3950	44.901	4150	89.183	5150	65.799
4000	38.000	4200	93.000	5200	86.000
4050	25.860	4250	95.600	5250	97.117
4100	14.000	4300	97.000	5300	100.000
4150	7.539	4350	96.918	5350	97.294
4200	5.000	4400	95.000	5400	91.500
4250	3.736	4450	91.125	5450	84.770
4300	3.000	4500	86.000	5500	78.000
4350	2.583	4550	80.202	5550	71.590
4400	2.500	4600	73.000	5600	65.200
4450	2.745	4650	63.544	5650	58.381
4500	3.000	4700	52.000	5700	51.000
4550	2.934	4750	39.120	5750	43.213
4600	2.500	4800	27.000	5800	36.000
4650	1.768	4850	17.604	5850	30.168
4700	1.000	4900	11.000	5900	25.000
4750	0.432	4950	6.713	5950	19.740
4800	0.000	5000	4.000	6000	15.000
		5050	2.169	6050	11.495
		5100	1.000	6100	9.000
		5150	0.360	6150	7.090
		5200	0.000	6200	5.500
				6250	4.082
				6300	3.000
				6350	2.394
				6400	2.000
				6450	1.529
				6500	1.000
				6550	0.490
				6600	0.000

Fig. 12. continued

ubgyri - Bahng - 1958

General purpose system. Photometry of stars with composite spectra.

GENERAL INFORMATION

AUTHORS	J. D. R. Bahng
TELESCOPE	0.30m (reflector), Washburn Observatory
DETECTOR	1P21 (for *u, b, g* bands)
	C7160 (for *y, r, i* bands)
MAIN ARTICLE	Bahng, J.D.R. 1958, MNRAS 14, 572

SYSTEM DESCRIPTION

BANDS DESCRIPTION [16]				
band	filter	λ_{eff} (Å)	*WHM* (Å)	λ_c (Å)
u	3mm Corning 9863 + 1mm clear glass (#), cemented	3521	480	3578
b	2mm Schott BG 12 + 2mm Schott GG 13, cemented	4184	830	4232
g	3mm Corning 3384	5405	825	5385
y	2mm Corning 3385 + 2.5mm Corning 9788, cemented	5587	1360	5588
r	2mm Schott RG 2 + G125 interference (#)	7246	1785	7725
i	3.5mm Schott RG 10	8772	1565	8805

(#) Bausch & Lomb

ZERO POINT: Defined by 10 Lac (O9V) and α Vir (B1V):

10 Lac : $(u-g) = -0.88$, $(b-g) = -0.92$, $(r-y) = +0.38$, $(i-y) = +1.38$
α Vir: $(u-g) = -0.82$, $(b-g) = -0.95$, $(r-y) = +0.40$, $(i-y) = +1.44$ [16]

SYSTEM ANALYSIS

RELATIONS WITH OTHER SYSTEMS [16]

UBV - Johnson and Morgan - 1953

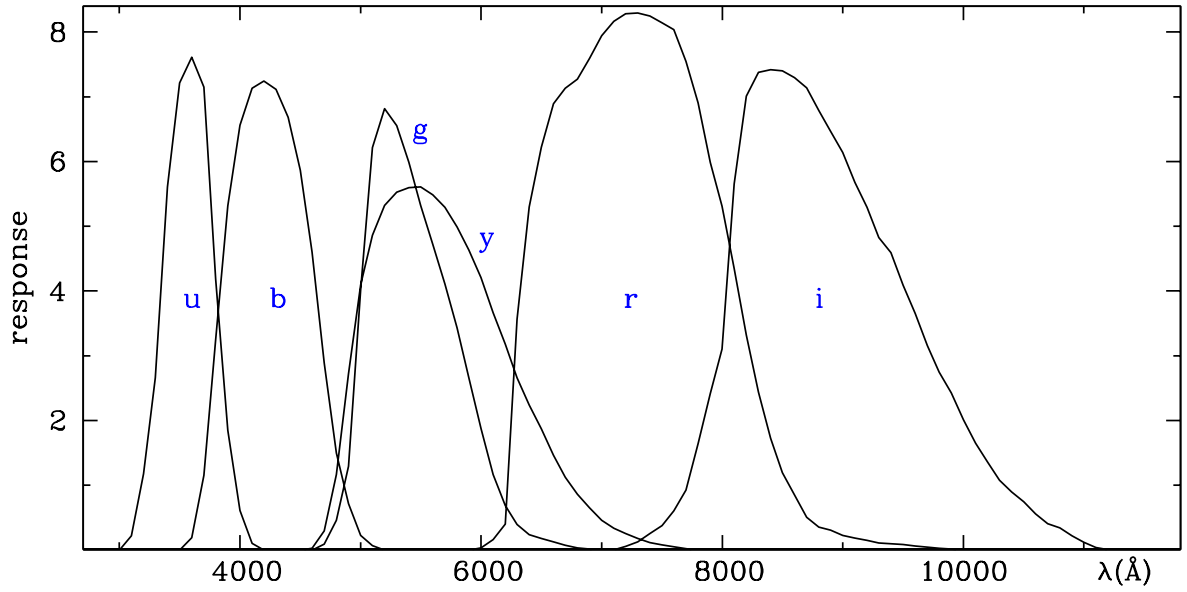
$$(B-V) = +0.834\ (\pm 0.046)\ (b-g) + 0.585\ (\pm 0.007)$$
$$(U-V) = +1.028\ (\pm 0.049)\ (u-g) - 0.308\ (\pm 0.055)$$

UVBGRI - Stebbins and Whitford - 1943

$$(I-G) = +1.107\ (\pm 0.087)\ (i-y) - 0.192\ (\pm 0.038)$$
$$(R-G) = +0.856\ (\pm 0.088)\ (r-y) + 0.321\ (\pm 0.029)$$
$$(V-G) = +1.086\ (\pm 0.075)\ (b-g) - 0.122\ (\pm 0.006)$$
$$(U-G) = +1.046\ (\pm 0.148)\ (u-g) - 1.159\ (\pm 0.114)$$

Fig. 13. The photometric system *ubgyri* – Bahng – 1958

TRANSMISSION CURVES [211]



u		*b*		*g*		*y*		*r*				*i*			
λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ
3000	0.000	3500	0.000	4600	0.000	4500	0.000	5900	0.000	9300	0.108	6900	0.000	10300	1.076
3100	0.218	3600	0.189	4700	0.092	4600	0.028	6000	0.034	9400	0.099	7000	0.001	10400	0.897
3200	1.177	3700	1.154	4800	0.459	4700	0.292	6100	0.160	9500	0.084	7100	0.004	10500	0.743
3300	2.659	3800	3.247	4900	1.295	4800	1.162	6200	0.401	9600	0.060	7200	0.055	10600	0.559
3400	5.606	3900	5.316	5000	4.022	4900	2.723	6300	3.563	9700	0.042	7300	0.124	10700	0.406
3500	7.215	4000	6.560	5100	6.214	5000	4.098	6400	5.296	9800	0.029	7400	0.253	10800	0.340
3600	7.609	4100	7.134	5200	6.815	5100	4.858	6500	6.220	9900	0.016	7500	0.375	10900	0.217
3700	7.152	4200	7.241	5300	6.555	5200	5.322	6600	6.895	10000	0.000	7600	0.606	11000	0.119
3800	4.184	4300	7.113	5400	5.986	5300	5.524	6700	7.133			7700	0.928	11100	0.038
3900	1.850	4400	6.685	5500	5.320	5400	5.594	6800	7.275			7800	1.642	11200	0.006
4000	0.610	4500	5.867	5600	4.721	5500	5.610	6900	7.592			7900	2.417	11300	0.000
4100	0.101	4600	4.601	5700	4.108	5600	5.486	7000	7.942			8000	3.105		
4200	0.000	4700	2.887	5800	3.428	5700	5.292	7100	8.167			8100	5.657		
		4800	1.497	5900	2.657	5800	4.989	7200	8.284			8200	7.009		
		4900	0.715	6000	1.875	5900	4.634	7300	8.293			8300	7.376		
		5000	0.227	6100	1.163	6000	4.206	7400	8.247			8400	7.418		
		5100	0.069	6200	0.685	6100	3.665	7500	8.140			8500	7.399		
		5200	0.000	6300	0.392	6200	3.178	7600	8.038			8600	7.294		
				6400	0.238	6300	2.659	7700	7.544			8700	7.140		
				6500	0.176	6400	2.241	7800	6.907			8800	6.786		
				6600	0.123	6500	1.869	7900	5.987			8900	6.465		
				6700	0.074	6600	1.461	8000	5.308			9000	6.138		
				6800	0.031	6700	1.125	8100	4.345			9100	5.677		
				6900	0.012	6800	0.862	8200	3.319			9200	5.295		
				7000	0.000	6900	0.649	8300	2.439			9300	4.827		
						7000	0.458	8400	1.723			9400	4.593		
						7100	0.337	8500	1.196			9500	4.092		
						7200	0.255	8600	0.848			9600	3.655		
						7300	0.176	8700	0.502			9700	3.157		
						7400	0.116	8800	0.354			9800	2.750		
						7500	0.080	8900	0.308			9900	2.427		
						7600	0.052	9000	0.225			10000	2.012		
						7700	0.018	9100	0.181			10100	1.651		
						7800	0.000	9200	0.150			10200	1.361		

Fig. 13. continued

UV BG R - Tifft - 1958

General purpose photographic and photoelectric system.

GENERAL INFORMATION

AUTHORS	W. G. Tifft
TELESCOPE	1.52m and 2.54m, Mount Wilson Obs.
DETECTOR	eleven-stage EMI 6094 (unrefrigerated), 103a-O and 103-E
MAIN ARTICLE	Tifft, W. G. 1958, AJ 63, 127

SYSTEM DESCRIPTION

BANDS DESCRIPTION [302]			
band	filter/ filter + plate	*WHM* (Å)	λ_c (Å)
photoelectric			
UV	Corning 5970	533	3700
BG	Corning 5030 + Corning 3387	537	4715
O	Corning 2434	283	5915
photographic			
UV	Corning 5970 + Kodak 103a-O	503	3672
BG	Schott GG9 + Kodak 103a-O	536	4723
R	Corning 2418 + Kodak 103a-E	430	6338

ZERO POINT: Unreddened A0V stars have zero color indices. [302]

PHOTOGRAPHIC VERSION: Tifft, W. G. 1958, AJ 63, 127

SYSTEM ANALYSIS

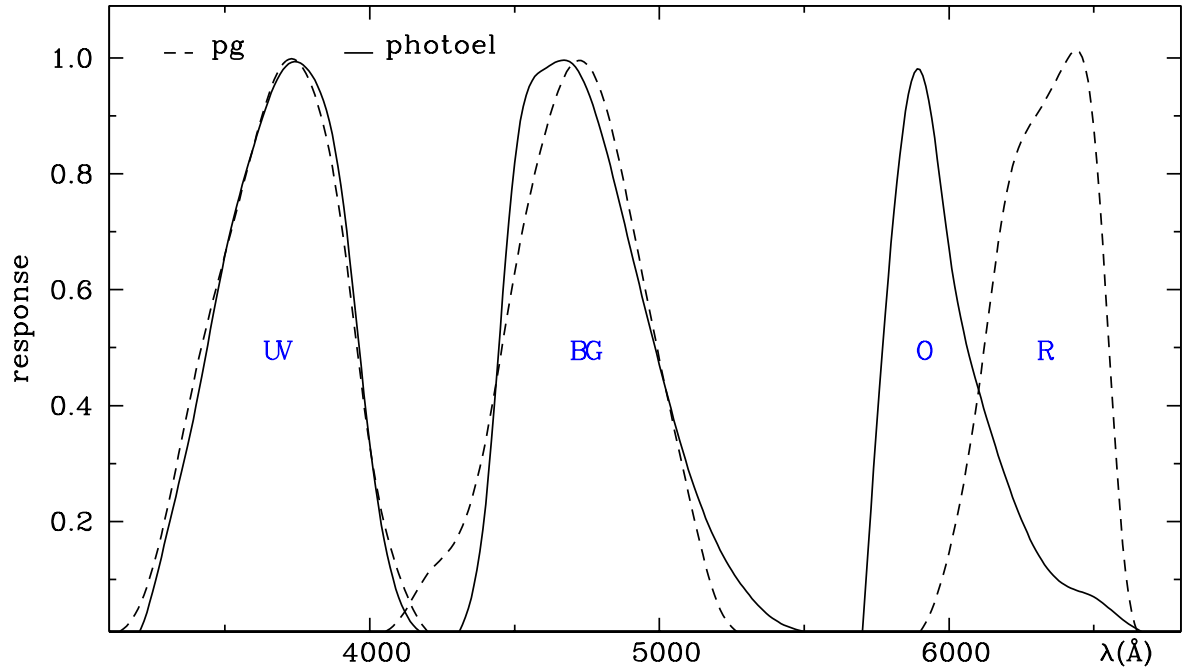
REDDENING PARAMETERS [302]

$A(BG) = 3.14\,E(BG-R)$

$(BG-R)_0 = 0.320\,Q - 0.014$, with $Q = (UV-BG) - [E(UV-BG) / E(BG-R)]\,(BG-R)$

Fig. 14. The photometric system *UV BG R* – Tifft – 1958

TRANSMISSION CURVES [302]



UV_{pg}		$UV_{photoel}$		BG_{pg}		$BG_{photoel}$		R		O	
λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ
3100	0.00	3100	0.00	4000	0.00	4300	0.00	5800	0.00	5600	0.00
3200	0.05	3200	0.05	4100	0.03	4400	0.23	5900	0.01	5700	0.01
3300	0.22	3300	0.18	4200	0.11	4500	0.82	6000	0.14	5800	0.68
3400	0.46	3400	0.42	4300	0.17	4600	0.98	6100	0.42	5900	0.98
3500	0.66	3500	0.66	4400	0.34	4700	0.99	6200	0.77	6000	0.67
3600	0.85	3600	0.85	4500	0.63	4800	0.87	6300	0.90	6100	0.43
3700	0.99	3700	0.98	4600	0.86	4900	0.67	6400	0.99	6200	0.27
3800	0.95	3800	0.97	4700	0.99	5000	0.47	6500	0.88	6300	0.15
3900	0.72	3900	0.78	4800	0.94	5100	0.29	6600	0.16	6400	0.09
4000	0.33	4000	0.39	4900	0.73	5200	0.16	6700	0.00	6500	0.07
4100	0.11	4100	0.07	5000	0.48	5300	0.08			6600	0.03
4200	0.01	4200	0.00	5100	0.25	5400	0.03			6700	0.01
4300	0.00			5200	0.06	5500	0.01			6800	0.00
				5300	0.00	5600	0.00				

Fig. 14. continued

5 colors - Borgman - 1959

Separates different stellar populations via ultraviolet excess.

GENERAL INFORMATION

AUTHORS	J. Borgman
TELESCOPE	0.91m, Mc Donald Observatory
DETECTOR	RCA 1P21 (unrefrigerated)
MAIN ARTICLE	Borgman, J. 1959, ApJ 129, 362

SYSTEM DESCRIPTION

BANDS DESCRIPTION [42]

band	lter	λ_{peak} (A)	FWHM (A)
U_1	glass + silver	3200	208
U_2	glass (#)	3660	325
404	interference	4035	94
453	interference	4527	92
503	interference	5029	87

(#) The U_1 is a sandwich of two Corning 9836 lters, each covered by a thin layer of silver.

ZERO POINT: The mean colors of the six A0V stars dening the zero point of the *UBV - Johnson and Morgan - 1953* system is taken to be 0.00 here too. [42]

SYSTEM ANALYSIS

COLOR INDICES AND PARAMETERS [42]

$m = (503{-}453) - (453{-}404) = 503 + 404 - 2(453)$: spectral type and metallicity indicator.

TRANSMISSION CURVES

As derived from Fig. 1 of [42]

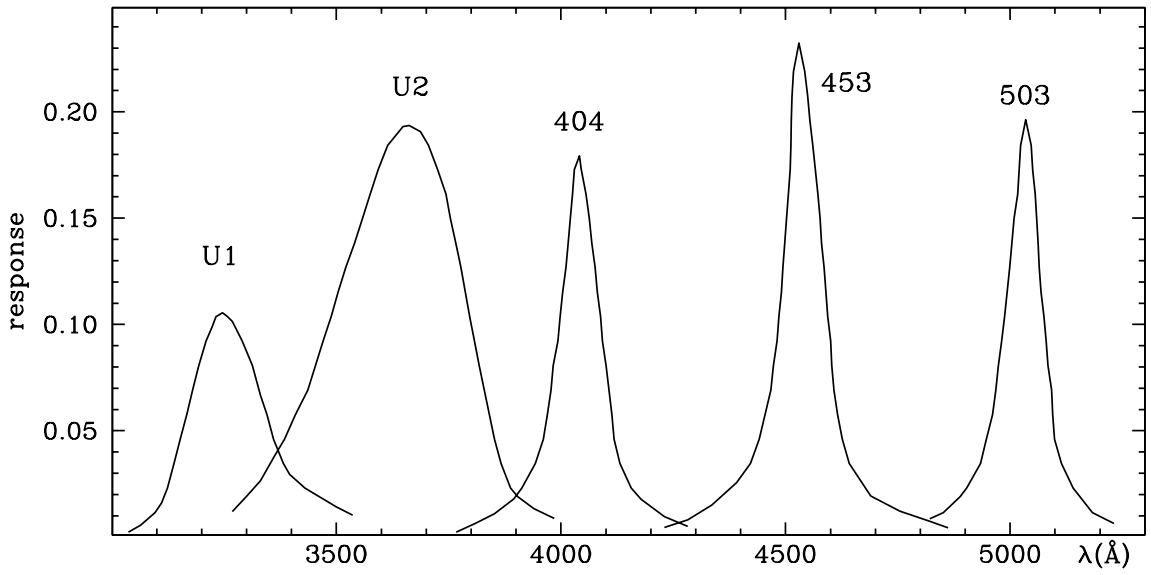


Fig. 15. The photometric system 5 colors – Borgman – 1959

U1		*U2*		*404*		*453*		*503*	
λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ
3025	0.0010	3225	0.0023	3780	0.0035	4200	0.0030	4760	0.0030
3050	0.0037	3250	0.0080	3810	0.0065	4230	0.0046	4790	0.0057
3075	0.0072	3275	0.0137	3840	0.0097	4260	0.0064	4820	0.0084
3100	0.0126	3300	0.0191	3870	0.0134	4290	0.0088	4850	0.0114
3125	0.0235	3325	0.0248	3900	0.0192	4320	0.0125	4880	0.0164
3150	0.0447	3350	0.0335	3930	0.0295	4350	0.0175	4910	0.0246
3175	0.0650	3375	0.0425	3960	0.0444	4380	0.0234	4940	0.0398
3200	0.0851	3400	0.0534	3990	0.0887	4410	0.0298	4970	0.0725
3225	0.0998	3425	0.0640	4000	0.1079	4440	0.0456	4980	0.0905
3250	0.1051	3450	0.0787	4010	0.1245	4470	0.0745	4990	0.1077
3275	0.0986	3475	0.0953	4020	0.1469	4500	0.1437	5000	0.1292
3300	0.0881	3500	0.1123	4030	0.1730	4510	0.1743	5010	0.1517
3325	0.0714	3525	0.1291	4040	0.1808	4520	0.2214	5020	0.1711
3350	0.0538	3550	0.1447	4050	0.1672	4530	0.2323	5030	0.1955
3375	0.0374	3575	0.1611	4060	0.1559	4540	0.2236	5040	0.1965
3400	0.0285	3600	0.1769	4070	0.1364	4550	0.2045	5050	0.1722
3425	0.0238	3625	0.1884	4080	0.1178	4560	0.1857	5060	0.1446
3450	0.0205	3650	0.1933	4090	0.0984	4570	0.1651	5070	0.1135
3475	0.0174	3675	0.1926	4100	0.0805	4580	0.1389	5080	0.0909
3500	0.0143	3700	0.1866	4110	0.0628	4590	0.1152	5090	0.0731
3525	0.0115	3725	0.1729	4140	0.0301	4600	0.0916	5120	0.0324
3550	0.0089	3750	0.1540	4170	0.0194	4610	0.0663	5150	0.0192
3575	0.0063	3775	0.1293	4200	0.0140	4640	0.0356	5180	0.0121
3600	0.0036	3800	0.0995	4230	0.0096	4670	0.0236	5210	0.0083
3625	0.0010	3825	0.0727	4260	0.0067	4700	0.0177	5240	0.0057
		3850	0.0478	4290	0.0045	4730	0.0142	5270	0.0031
		3875	0.0298	4320	0.0024	4760	0.0118		
		3900	0.0197			4790	0.0096		
		3925	0.0154			4820	0.0074		
		3950	0.0122			4850	0.0053		
		3975	0.0097			4880	0.0030		
		4000	0.0074						
		4025	0.0052						
		4050	0.0030						
		4075	0.0007						

Fig. 15. continued

KLMNPQR - Borgman - 1960

Classification of early-type stars.

GENERAL INFORMATION

AUTHORS	J. Borgman
TELESCOPE	0.53m (reflector), Lowell Obs.; 0.91m (reflector), McDonald Obs.
DETECTOR	1P21 (refrigerated)
MAIN ARTICLE	Borgman, J. 1960, BAN 15, 255

SYSTEM DESCRIPTION

BANDS DESCRIPTION

band	λ_{peak} (Å) [43]	FWHM (Å) [43]	λ_{eff} (Å) (#) [44]
R	3295	80	3328
Q	3560	90	3601
P	3750	110	3731
N	4055	200	4009
M	4550	200	4431
L	5240	220	5189
K	5880	215	5784

(#) For a 30000 K black body.

Interference filters.

ZERO POINT: The color indices of 15 Mon = S Mon (O7 Ve) are 0.00. [43]

SYSTEM ANALYSIS

COLOR INDICES AND PARAMETERS [44]

$(P-N)$: temperature index.

REDDENING-FREE PARAMETERS [45], [47], [117], pg 232

$\alpha = (M-L) - 1.69\,(N-M)$: chemical composition parameter.

$\beta = (P-N) - 0.701\,(N-M)$: measures the absorption by higher Balmer lines around 3750 Å.

$\gamma = (Q-N) - 1.086\,(N-M)$: measures the Balmer discontinuity.

$\delta = (R-Q) - 0.882\,(N-M)$: difference between the gradients on both sides of the hydrogen Balmer discontinuity.

$\varepsilon = (P-N) - 1.91(Q-P)$: luminosity parameter for late-type stars.

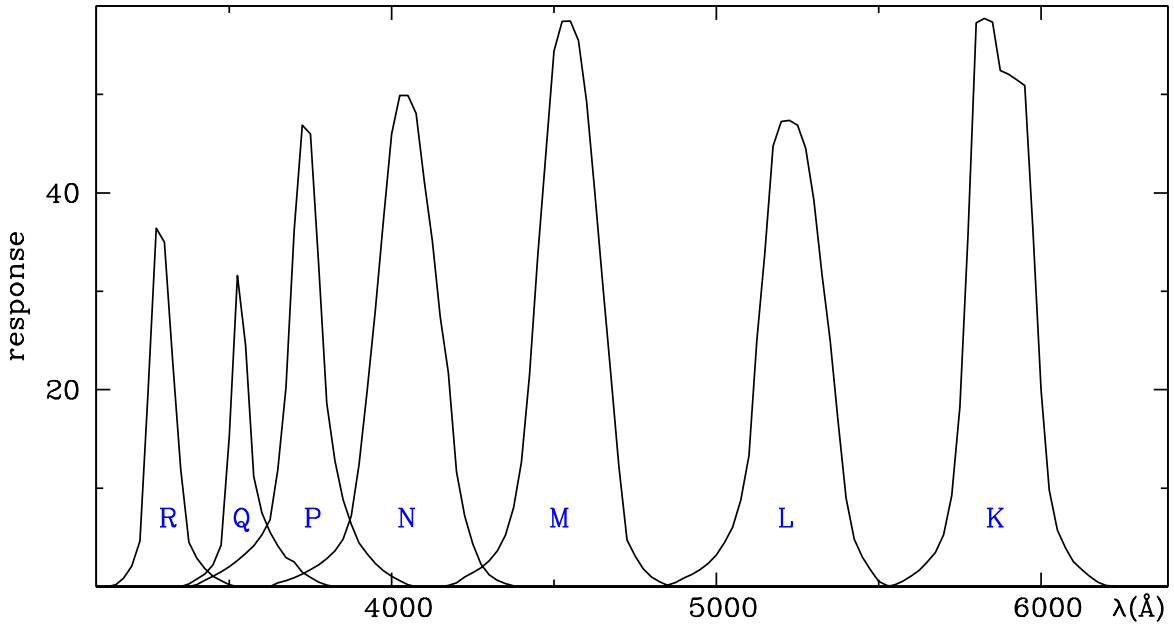
REDDENING RATIOS [44], [45]

$E(L-K)\,/\,E(N-M) = 1.117$ $\quad$ $E(M-L)\,/\,E(N-M) = 1.69$ $\quad$ $E(P-N)\,/\,E(N-M) = 0.701$

$E(Q-N)\,/\,E(N-M) = 1.068$ $\quad$ $E(R-Q)\,/\,E(N-M) = 0.882$

Fig. 16. The photometric system *KLMNPQR* – Borgman – 1960

TRANSMISSION CURVES [211]



R		*Q*		*P*		*N*		*M*		*L*		*K*	
λ (A)	ϒ (%)	λ (A)	ϒ (%)	λ (A)	ϒ (%)	λ (A)	ϒ (%)	λ (A)	ϒ (%)	λ (A)	ϒ (%)	λ (A)	ϒ (%)
3125	0.00	3350	0.00	3375	0.00	3625	0.00	4150	0.00	4825	0.00	5525	0.00
3150	0.18	3375	0.27	3400	0.20	3650	0.38	4175	0.11	4850	0.15	5550	0.18
3175	0.86	3400	0.76	3425	0.65	3675	0.60	4200	0.39	4875	0.42	5575	0.55
3200	2.10	3425	1.28	3450	1.05	3700	0.90	4225	0.96	4900	0.86	5600	1.07
3225	4.62	3450	2.21	3475	1.48	3725	1.28	4250	1.41	4925	1.22	5625	1.64
3250	19.86	3475	4.23	3500	2.02	3750	1.71	4275	1.92	4950	1.72	5650	2.49
3275	36.41	3500	15.25	3525	2.65	3775	2.20	4300	2.62	4975	2.35	5675	3.47
3300	35.00	3525	31.60	3550	3.35	3800	2.84	4325	3.62	5000	3.20	5700	5.24
3325	23.08	3550	24.52	3575	4.15	3825	3.63	4350	5.22	5025	4.46	5725	9.26
3350	11.93	3575	11.20	3600	5.25	3850	4.80	4375	8.00	5050	6.03	5750	18.25
3375	4.52	3600	7.50	3625	6.80	3875	7.17	4400	12.60	5075	8.80	5775	35.83
3400	2.90	3625	5.53	3650	11.90	3900	12.37	4425	21.50	5100	13.31	5800	57.27
3425	1.82	3650	4.14	3675	20.25	3925	19.90	4450	33.50	5125	24.88	5825	57.75
3450	1.034	3675	2.95	3700	36.15	3950	28.05	4475	43.98	5150	33.98	5850	57.37
3475	0.59	3700	2.51	3725	46.90	3975	37.27	4500	54.42	5175	44.75	5875	52.43
3500	0.19	3725	1.47	3750	46.00	4000	45.98	4525	57.42	5200	47.26	5900	52.06
3525	0.00	3750	0.94	3775	32.80	4025	49.92	4550	57.48	5225	47.38	5925	51.50
		3775	0.46	3800	18.65	4050	49.91	4575	55.48	5250	46.87	5950	50.90
		3800	0.15	3825	12.77	4075	48.09	4600	49.26	5275	44.55	5975	36.23
		3825	0.00	3850	8.85	4100	41.22	4625	40.10	5300	39.30	6000	19.97
		3850	0.00	3875	6.33	4125	35.06	4650	30.93	5325	31.70	6025	9.80
				3900	4.45	4150	27.44	4675	21.70	5350	25.00	6050	5.75
				3925	3.30	4175	21.72	4700	12.21	5375	16.92	6075	3.92
				3950	2.35	4200	11.68	4725	4.75	5400	8.98	6100	2.53
				3975	1.60	4225	7.18	4750	3.08	5425	4.80	6125	1.75
				4000	1.05	4250	4.32	4775	1.78	5450	3.00	6150	1.03
				4025	0.60	4275	2.27	4800	0.96	5475	1.68	6175	0.46
				4050	0.20	4300	1.21	4825	0.48	5500	0.54	6200	0.095
				4075	0.00	4325	0.65	4850	0.12	5525	0.12	6225	0.02
						4350	0.30	4875	0.01	5550	0.00	6250	0.00
						4375	0.08	4900	0.00	5575	0.00		
						4400	0.00						

Fig. 16. continued

Deeming - 1960

Three square-band measurement of Mg*b* on spectra of G and K stars.

GENERAL INFORMATION

AUTHORS	T. J. Deeming
TELESCOPE	0.90m (reflector), Cambridge Obs.
DETECTOR	EMI 9502 (refrigerated)
MAIN ARTICLE	Deeming, T. J. 1960, MNRAS 121, 52

SYSTEM DESCRIPTION

BANDS DESCRIPTION [84]	
band	bandpass (Å)
A	5110.4 – 5139.8
B	5160.8 – 5189.0
C	5214.4 – 5243.0

On the focal plane of a 18.4 Å/mm dispersion spectrograph three diaphragms transmit to photomultipliers the above three *A*, *B* and *C* portions of the spectrum.

SYSTEM ANALYSIS

COLOR INDICES AND PARAMETERS [84]

$r_{Mg} = \frac{A+C}{B}$: measures the strength of 5167−5184 Å MgI aborption lines.

r_{Mg} is a spectral type indicator between G8 and K5, and a luminosity indicator for stars with $0.70 < (B-V) < 1.30$.

Fig. 17. The photometric system Deeming – 1960

UBV - Eggen and Sandage - 1960

A general purpose realization of the *UBV - Johnson and Morgan - 1953* photometric system.
Used on LMC and SMC.

GENERAL INFORMATION

AUTHORS	O. Eggen and A. Sandage
TELESCOPE	aluminized 0.46m (reflector), Cape Town;
	silvered 1.93m Radcliffe (reflector), Pretoria
MAIN ARTICLE	Eggen, O., Sandage, A. 1960, MNRAS 120, 79

NOTES

A set of *UBV* primary sequence stars are established in both LMC and SMC with the aluminized 0.46m reflector.
They are used on the silvered 1.88m reflector to calibrate secondary standards in both LMC and SMC.
No details are provided for the photometer at the 0.46m reflector, while at the 1.93m reflector a refrigerated 1P21 is used together with a 2mm GG11 filter for the *V* band and 2mm GG13 + 1mm BG12 for the *B* band.

Fig. 18. The photometric system *UBV* – Eggen and Sandage – 1960

Griffin and Redman - 1960

Three square-band measurement of CN and *G* bands on spectra of G and K stars.

GENERAL INFORMATION

AUTHORS	R. F. Griffin and R. O. Redman
TELESCOPE	0.90m (reflector), Cambridge Obs.
DETECTOR	EMI 9502 (refrigerated)
MAIN ARTICLE	Griffin, R. F., Redman, R. O. 1960, MNRAS 120, 287

SYSTEM DESCRIPTION

BANDS DESCRIPTION [124]	
band	bandpass (Å)
CN	
A	4097 – 4149
B	4164 – 4214
C	4230 – 4283
G band	
A	4230 – 4270
B	4285 – 4315
C	4342 – 4380

On the focal plane of a 18.4 Å/mm dispersion spectrograph three diaphragms transmit to photomultipliers the above three *A*, *B* and *C* portions of the spectrum.

SYSTEM ANALYSIS

COLOR INDICES AND PARAMETERS [124]

$r_{CN} = \frac{A_{CN}+C_{CN}}{B_{CN}}$: measures the strength of the 4200 Å CN band.

r_{CN} offers a good separation of luminosity classes and correlates with space velocities and spectral types for stars between F0 and K5. [248]

$r_G = \frac{A_G+C_G}{B_G}$: measures the strength of the 4300 Å *G* band.

r_G poorly separates luminosity classes and does not to correlate with space velocities; it offers a fairly good spectral type classification for G and K stars. [248]

Fig. 19. The photometric system Griffin and Redman – 1960

USNO - Kron and Mayall - 1960

Optical and near-infrared photometry with a single detector.
Used for integral photometry of globular clusters.

GENERAL INFORMATION

AUTHORS	G. E. Kron, and N. U. Mayall
TELESCOPE	0.91 Crossley (reflector), Mount Hamilton
DETECTORS	1P21, Dumont 6291, CE25A/B, CE23A/B, Lallemand photomultipliers
MAIN ARTICLE	Kron, G. E., Mayall, N. U. 1960, AJ 65, 581

SYSTEM DESCRIPTION

BANDS DESCRIPTION [174]

obs. mode	cell	*P*	*V*	*I*
		small-field photometer		
PV, I separated	1P21	0.4mm C3060 + 1mm BG12	2mm GG14 + glass	
	CE25A/B			W88A + cover glasses
PVI simultanously	Lallemand II	2mm BG23 + 1mm BG12 + 2mm WG1 cryolite	2mm GG11 + 2mm BG18	2mm BG21 + 2mm RG8
I	Lallemand II			2mm RG2 coated
		large-field photometer		
PV, I separated	Dumont 6291	2mm GG13 + 1mm BG12	2mm GG14	
	CE23A/B			W88A + cover glasses
PVI simultanously	Lallemand I	2mm BG23 + 1mm BG12 + 2mm GG13	2mm GG14 + 2mm BG18 not cemented	C3966 + W89 + cover glass

SYSTEM ANALYSIS

REDDENING RATIOS [174]

$$A_V = 2.91\,(\pm 0.22)\,E(P-V) = 2.33\,(\pm 0.14)\,E(V-I)$$

RELATIONS WITH OTHER SYSTEMS [174]

UBV - Johnson and Morgan - 1953

$$V_{Johnson} = V - 0.075\,(P-V) - 0.027$$
$$(B-V) = 0.10 + 0.96\,(P-V) \qquad -0.4 < (P-V) < 1.0$$
$$(B-V) = 1.06\,(P-V) \qquad 1.0 < (P-V) < 1.5$$

PV - Eggen - 1955

$$V_{Eggen} = V - 0.115\,(P-V) - 0.026$$

RI - Kron and Smith - 1951

$$I_{USNO} = I_{KS}$$

Fig. 20. The photometric system USNO – Kron and Mayall – 1960

VBLUW - Walraven and Walraven - 1960

Classification of early-type stars.

GENERAL INFORMATION

AUTHORS	T. Walraven and J. H. Walraven
TELESCOPE	0.91m (reflector), Leiden Southern Station, Union Obs., South-Africa
DETECTOR	1P21 (for *V*, *B*, *L* and *U* bands) and Lallemand cell (for the *W* band), refrigerated
MAIN ARTICLE	Walraven, Th., Walraven J. H. 1960, BAN 15, 67

SYSTEM DESCRIPTION

BANDS DESCRIPTION				FLUX CALIBRATION [112]
band	λ_{peak} (Å) [178], pg. 78	λ_{eff} (Å) [178], pg. 78	FWHM (Å) [191]	F_λ (erg cm^{-2} s^{-1} Å^{-1})
W	3270	3255	150	2.12 10^{-11}
U	3670	3633	260	1.61 10^{-11}
L	3900	3838	140	1.52 10^{-11}
B	4295	4325	420	1.23 10^{-11}
V	5450	5467	850	6.73 10^{-12}

The *W, U, B* and *V* bands are obtained in a spectro-photometer by redirecting to separate photomultipliers portions of the spectrum geometrically selected by a filter of quartz and Iceland spar (which transmits a spectrum of bright bands at regular intervals separated by dark regions. Quartz prisms are used as a cross-disperser to separate the bright bands and redirect them via a quartz collector lens to four individual photomultipliers).
The L band is more conventionally obtained via standard filter photometry with UG2 (2mm) + WG2 (2mm) placed in front of a fifth photomultiplier (1P21) [313].
The 0.91m telescope and the Walraven photometrer were moved in 1979 from the Leiden Station in South Africa (Harteheespoortdam) to ESO - La Silla. As a result the passbands of the system slighly changed [306]

ZERO POINT: Magnitudes and colors of HD 144470 = ω^1 Sco (B1V) are:
$V = 1.1760$, $(V-B) = -0.0025$, $(B-U) = +0.0052$, $(U-W) = -0.0020$, $(B-L) = +0.0039$. [191]

SYSTEM ANALYSIS

COLOR INDICES AND PARAMETERS [50]

$(V-B)$: sensitive to reddening.

$(B-U)$: measures the Balmer jump. Temperature indicator for O and B stars.

$(B-L)$: depends mainly on gravity.

$(U-W)$: measures the slope of the Balmer continuum. Both gravity and temperature dependent.

REDDENING-FREE PARAMETERS [50]

$[B-U] = (B-U) - 0.61\,(V-B)$ $\quad$ $[U-W] = (U-W) - 0.45\,(V-B)$

$[B-L] = (B-L) - 0.39\,(V-B)$

REDDENING RATIOS [191], [306], [50]

$E(B-U)\,/\,E(V-B) = 0.62$ $\quad$ $E(U-W)\,/\,E(V-B) = 0.45$ $\quad$ $E(B-L)\,/\,E(V-B) = 0.41$

$E(L-U)\,/\,E(V-B) = 0.22$ $\quad$ $E(B-V)_{Johnson}\,/\,E(V-B) = 2.255$

$A(V)\,/\,E(V-B) = 3.16 - 0.12\,E(V-B)$

Fig. 21. The photometric system *VBLUW* – Walraven and Walraven – 1960

RELATIONS WITH OTHER SYSTEMS [50], [306]

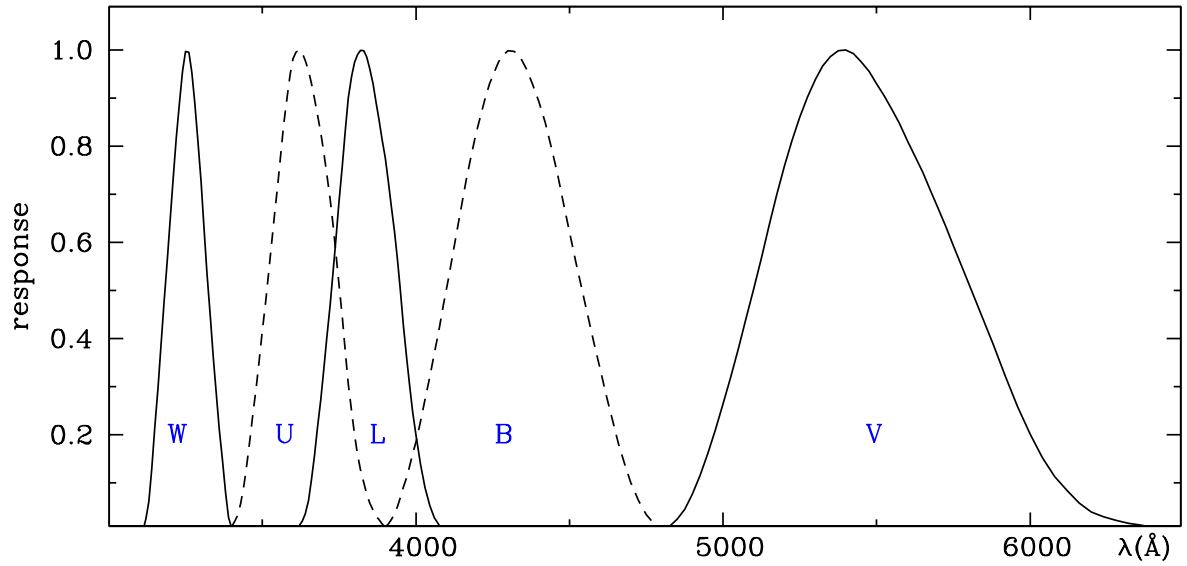
UBV - Johnson and Morgan - 1953

$(V-B)$	=	$0.0062 + 0.3873\,(B-V)_J$	for $(V-B) < 0.15$
$(V-B)$	=	$-0.0195 + 0.4744\,(B-V)_J$	for $(V-B) > 0.10$

RGU - Trefzger - 1983

V	=	$0.963\,G - 0.448\,(G-R) + 0.455$
$(B-V)$	=	$0.451\,(G-R) + 0.196\,(U-G) - 0.092$

TRANSMISSION CURVES [191]



W		*U*				*L*				*B*				*V*			
λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ
3100	0.000	3380	0.000	3700	0.787	3590	0.000	3910	0.727	3870	0.000	4285	0.990	4775	0.000	5575	0.847
3110	0.000	3390	0.004	3710	0.742	3600	0.003	3920	0.676	3880	0.001	4300	0.998	4800	0.001	5600	0.812
3120	0.025	3400	0.010	3720	0.691	3610	0.006	3930	0.621	3890	0.004	4320	0.997	4825	0.009	5625	0.779
3130	0.061	3410	0.020	3730	0.636	3620	0.011	3940	0.562	3900	0.008	4340	0.985	4850	0.024	5650	0.746
3140	0.130	3420	0.033	3740	0.575	3630	0.020	3950	0.496	3910	0.014	4360	0.960	4875	0.045	5675	0.709
3150	0.215	3430	0.058	3750	0.512	3640	0.035	3960	0.425	3920	0.023	4380	0.929	4900	0.076	5700	0.671
3160	0.300	3440	0.097	3760	0.444	3650	0.064	3970	0.356	3930	0.035	4400	0.893	4925	0.115	5725	0.633
3170	0.388	3450	0.142	3770	0.373	3660	0.108	3980	0.299	3940	0.051	4420	0.850	4950	0.161	5750	0.594
3180	0.475	3460	0.192	3780	0.306	3670	0.157	3990	0.246	3950	0.071	4440	0.800	4975	0.209	5775	0.554
3190	0.565	3470	0.245	3790	0.249	3680	0.215	4000	0.198	3960	0.092	4460	0.744	5000	0.264	5800	0.514
3200	0.652	3480	0.300	3800	0.200	3690	0.274	4015	0.138	3970	0.112	4480	0.683	5025	0.320	5840	0.451
3210	0.736	3490	0.356	3810	0.159	3700	0.336	4030	0.090	3980	0.136	4500	0.621	5050	0.380	5880	0.388
3220	0.817	3500	0.415	3820	0.127	3710	0.401	4045	0.053	3990	0.161	4520	0.562	5075	0.441	5920	0.321
3230	0.893	3510	0.475	3830	0.100	3720	0.468	4060	0.028	4000	0.186	4540	0.504	5100	0.504	5960	0.258
3240	0.956	3520	0.535	3840	0.076	3730	0.538	4075	0.012	4015	0.228	4560	0.445	5125	0.568	6000	0.201
3250	0.997	3530	0.596	3850	0.058	3740	0.609	4090	0.004	4030	0.273	4580	0.390	5150	0.634	6040	0.152
3260	0.995	3540	0.657	3860	0.043	3750	0.684	4105	0.000	4045	0.320	4600	0.335	5175	0.699	6080	0.113
3270	0.953	3550	0.721	3870	0.031	3760	0.759			4060	0.368	4620	0.282	5200	0.759	6120	0.084
3280	0.889	3560	0.784	3880	0.023	3770	0.832			4075	0.419	4640	0.230	5225	0.811	6160	0.058
3290	0.814	3570	0.846	3890	0.015	3780	0.900			4090	0.471	4660	0.181	5250	0.860	6200	0.039
3300	0.725	3580	0.901	3900	0.007	3790	0.945			4105	0.523	4680	0.138	5275	0.902	6240	0.029
3310	0.628	3590	0.948	3910	0.002	3800	0.974			4120	0.575	4700	0.101	5300	0.938	6280	0.022
3320	0.534	3600	0.982	3920	0.000	3810	0.990			4135	0.627	4725	0.063	5325	0.967	6320	0.016
3330	0.444	3610	0.995			3820	0.999			4150	0.682	4750	0.034	5350	0.986	6360	0.012
3340	0.359	3620	1.000			3830	0.998			4165	0.733	4775	0.015	5375	0.998	6400	0.008
3350	0.285	3630	0.993			3840	0.985			4180	0.781	4800	0.003	5400	1.000	6440	0.004
3360	0.211	3640	0.978			3850	0.961			4195	0.824	4825	0.000	5425	0.992	6480	0.000
3370	0.144	3650	0.956			3860	0.929			4210	0.863			5450	0.975		
3380	0.080	3660	0.929			3870	0.891			4225	0.898			5475	0.955		
3390	0.028	3670	0.898			3880	0.855			4240	0.929			5500	0.930		
3400	0.005	3680	0.865			3890	0.815			4255	0.954			5525	0.904		
3410	0.000	3690	0.827			3900	0.775			4270	0.976			5550	0.876		

Fig. 21. continued

Griffin - 1961

Three square-band measurement of 5247-5255 Å FeI triplet and 5890-5896 Å NaI doublet on spectra of G5-K5 stars.

GENERAL INFORMATION

AUTHORS	R. F. Griffin
TELESCOPE	0.90m (reflector), Cambridge Obs.
DETECTOR	EMI 9502 (refrigerated)
MAIN ARTICLE	Griffin, R. F. 1961, MNRAS 122, 181

SYSTEM DESCRIPTION

BANDS DESCRIPTION [123]	
band	bandpass (Å)
Fe I	
A	5190.0 – 5224.0
B	5245.5 – 5256.5
C	5278.0 – 5312.0
Na I	
A	5818.8 – 5850.0
B	5885.0 – 5900.6
C	5935.6 – 5966.8

On the focal plane of a 5.0 Å/mm dispersion spectrograph, three diaphragms transmit to photomultipliers the above three *A*, *B* and *C* portions of the spectrum.

[247] has performed similar observations with slightly modified passbands, namely 5830.0–5850.1 Å for *A*, 5885.0–5901.2 Å for *B* and 5936.1–5956.1 Å for *C*.

SYSTEM ANALYSIS

COLOR INDICES AND PARAMETERS [123]

$r_{FeI} = \frac{A_{FeI}+C_{FeI}}{B_{FeI}}$: measures the strength of the 5247-5255 Å FeI triplet.
r_{FeI} is found to offer an excellent separation of luminosity classes in G-K stars.

$r_{NaI} = \frac{A_{NaI}+C_{NaI}}{B_{NaI}}$: measures the strength of the 5890-5896 Å NaI doublet.
r_{NaI} does not correlate well with spectral type probably due to contamination by interstellar lines.

Fig. 22. The photometric system Griffin – 1961

8 colors - Tifft - 1961

Multicolor photometry of galaxies.

GENERAL INFORMATION

AUTHORS	W. G. Tifft
TELESCOPE	1.52m and 2.54m (reectors), Mount Wilson Obs.
DETECTOR	6094 EMI photocell (unrefrigerated) for bands *1-4*, 16 PM-1 Farnsworth photocell (refrigerated) for bands *5-8*
MAIN ARTICLE	Tifft, W. G. 1961, AJ 66, 390

SYSTEM DESCRIPTION

BANDS DESCRIPTION [303]			
band	lter (#)	*WHM* (A)	λ_c (A)
1	Corning 9863 + approximately Corning 7380	260	3760
2	Schott BG12 + Schott GG13	780	4165
3	Corning 5030 (1.6mm) + Corning 3387	750	4710
4	Corning 3480	350	5880
5	interference	860	6900
6	interference + Corning 2434	1390	8325
7	interference + Schott RG-10	1487	8700
8	Heimann 205	1430	9820

(#) Thickness quoted when different from stock values. The interference lters have been custom made by Federal Engineering.

TRANSMISSION CURVES [303]

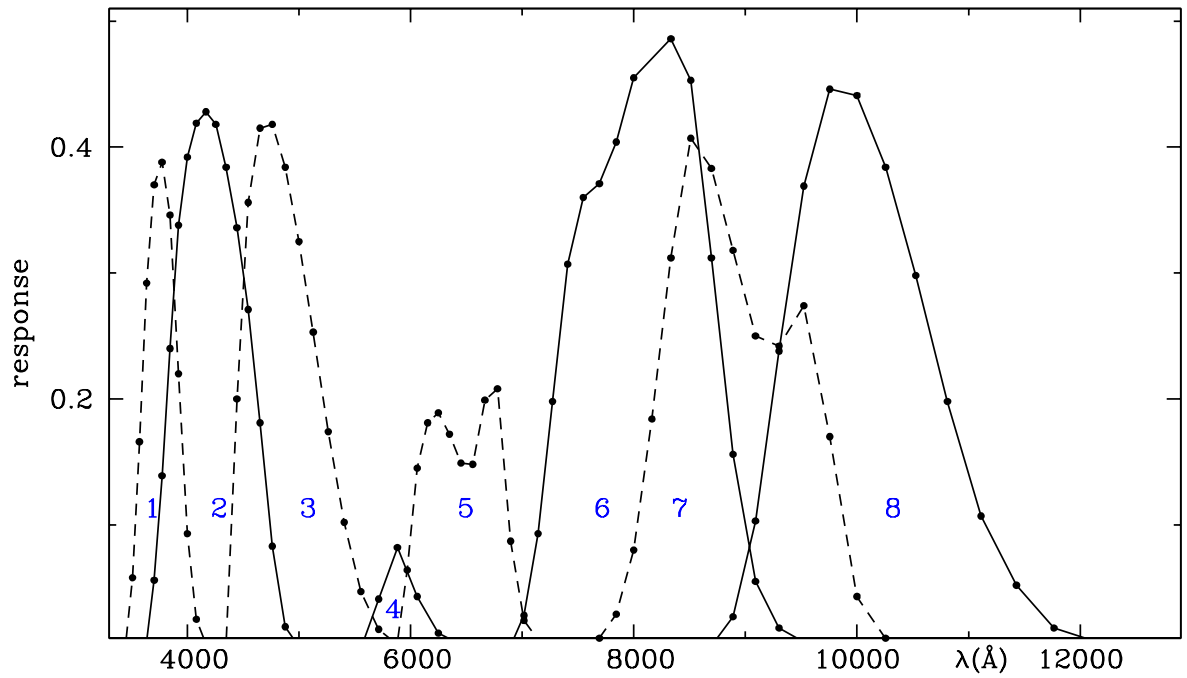


Fig. 23. The photometric system 8 colors – Tifft – 1961

As originally published

1		2		3		4		5		6		7		8	
1/λ (Å)	ϒ	1/λ (Å)	ϒ	1/λ (Å)	ϒ	1/λ (Å)	ϒ	1/λ (Å)	ϒ	1/λ (Å)	ϒ	1/λ (Å)	ϒ	1/λ (Å)	ϒ
2.90	0.007	2.75	0.009	2.30	0.007	1.80	0.002	1.700	0.007	1.450	0.004	1.350	0.001	1.150	0.004
2.85	0.058	2.70	0.056	2.25	0.200	1.75	0.041	1.675	0.064	1.425	0.028	1.325	0.003	1.125	0.027
2.80	0.166	2.65	0.139	2.20	0.356	1.70	0.082	1.650	0.145	1.400	0.093	1.300	0.010	1.100	0.103
2.75	0.292	2.60	0.240	2.15	0.415	1.65	0.043	1.625	0.181	1.375	0.198	1.275	0.029	1.075	0.238
2.70	0.370	2.55	0.338	2.10	0.418	1.60	0.014	1.600	0.189	1.350	0.307	1.250	0.080	1.050	0.369
2.65	0.388	2.50	0.392	2.05	0.384	1.55	0.005	1.575	0.172	1.325	0.360	1.225	0.184	1.025	0.446
2.60	0.346	2.45	0.419	2.00	0.325	1.50	0.001	1.550	0.149	1.300	0.371	1.200	0.312	1.000	0.441
2.55	0.220	2.40	0.428	1.95	0.253			1.525	0.148	1.275	0.404	1.175	0.407	0.975	0.384
2.50	0.093	2.35	0.418	1.90	0.174			1.500	0.199	1.250	0.455	1.150	0.383	0.950	0.298
2.45	0.025	2.30	0.384	1.85	0.102			1.475	0.208	1.200	0.486	1.125	0.318	0.925	0.198
2.40	0.006	2.25	0.336	1.80	0.047			1.450	0.087	1.175	0.453	1.100	0.250	0.900	0.107
2.35	0.002	2.20	0.271	1.75	0.017			1.425	0.024	1.150	0.312	1.075	0.242	0.875	0.052
		2.15	0.181	1.70	0.005			1.400	0.009	1.125	0.156	1.050	0.274	0.850	0.018
		2.10	0.083					1.375	0.004	1.100	0.055	1.025	0.170	0.825	0.008
		2.05	0.019					1.350	0.002	1.075	0.018	1.000	0.043	0.800	0.002
		2.00	0.003					1.325	0.002	1.050	0.007	0.975	0.010		
								1.300	0.001	1.025	0.003	0.950	0.002		
								1.275	0.001	1.000	0.002				
								1.250	0.001	0.975	0.001				
								1.200	0.001						
								1.150	0.002						
								1.100	0.006						
								1.050	0.007						
								1.000	0.004						
								0.950	0.002						
								0.900	0.001						

and retabulated in λ (Å)

1		2		3		4		5		6		7		8	
λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ
3448	0.007	3636	0.009	4348	0.007	5556	0.002	5882	0.007	6897	0.004	7407	0.001	8696	0.004
3509	0.058	3704	0.056	4444	0.200	5714	0.041	5970	0.064	7018	0.028	7547	0.003	8889	0.027
3571	0.166	3774	0.139	4545	0.356	5882	0.082	6061	0.145	7143	0.093	7692	0.010	9091	0.103
3636	0.292	3846	0.240	4651	0.415	6061	0.043	6154	0.181	7273	0.198	7843	0.029	9302	0.238
3704	0.370	3922	0.338	4762	0.418	6250	0.014	6250	0.189	7407	0.307	8000	0.080	9524	0.369
3774	0.388	4000	0.392	4878	0.384	6452	0.005	6349	0.172	7547	0.371	8163	0.184	9756	0.446
3846	0.346	4082	0.419	5000	0.325	6667	0.001	6452	0.149	7692	0.404	8333	0.312	10000	0.441
3922	0.220	4167	0.428	5128	0.253			6557	0.148	7843	0.455	8511	0.407	10260	0.384
4000	0.093	4255	0.418	5263	0.174			6667	0.199	8000	0.486	8696	0.383	10530	0.298
4082	0.025	4348	0.384	5405	0.102			6780	0.208	8333	0.453	8889	0.318	10810	0.198
4167	0.006	4444	0.336	5556	0.047			6897	0.087	8511	0.312	9091	0.250	11100	0.107
4255	0.002	4545	0.271	5714	0.017			7018	0.024	8696	0.156	9302	0.242	11430	0.052
		4651	0.181	5882	0.005			7143	0.009	8889	0.055	9524	0.274	11760	0.018
		4762	0.083					7273	0.004	9091	0.018	9756	0.170	12120	0.008
		4878	0.019					7407	0.002	9302	0.007	10000	0.043	12500	0.002
		5000	0.003					7547	0.002	9524	0.003	10260	0.010		
								7692	0.001	9756	0.002	10530	0.002		
								7843	0.001	10000	0.001				
								8000	0.001						
								8333	0.001						
								8696	0.002						
								9091	0.006						
								9524	0.007						
								10000	0.004						
								10530	0.002						
								11110	0.001						

Fig. 23. continued

Hγ - Bappu *et al.* - 1962

Luminosity classification of early-type stars.

GENERAL INFORMATION

AUTHORS	M. K. V. Bappu, S. Chandra, N. B. Sanwal, and S. D. Sinvhal
TELESCOPE	0.25m (refractor), Uttar Pradesh State Observatory
DETECTOR	1P21 (unrefrigerated)
MAIN ARTICLE	Bappu, M.K.V., Chandra, S., Sanwal, N.B., Sinvhal, S.D. 1962, MNRAS 123, 521

SYSTEM DESCRIPTION

BANDS DESCRIPTION [21]

band	filter (#)	λ_{peak} (Å)	FWHM (Å)
S	interference	4280	45
γ	interference	4340	45
L	interference	4410	45

(#) Filters by Baird Atomic.

ZERO POINT: The system zero point is defined by 15 stars of spectral types B0-A0, Ia-V. [21]

SYSTEM ANALYSIS

COLOR INDICES AND PARAMETERS [21]

$\Gamma = 1000 \cdot [-2.5 \log \frac{\sqrt{L \cdot S}}{\gamma}]$: measures the intensity of Hγ. Strongly dependent upon luminosity.

[21] provides a Γ, M_V calibration in tabular form.

RELATIONS WITH OTHER SYSTEMS [21]

Hγ equivalent width from spectra

EW_{Petrie} (Å)	=	22.653 − 0.0762 Γ	[244]
$EW_{Gunther}$ (Å)	=	24.734 − 0.0863 Γ	[126]
$EW_{Williams}$ (Å)	=	27.67 − 0.0983 Γ	[324]
EW_{Stock} (Å)	=	27.949 − 0.09616 Γ	[283]

uvby Hβ - Strömgren and Crawford - 1956

$H\beta$	=	3.1658 − 0.00227 Γ

Fig. 24. The photometric system *Hγ* – Bappu et al. – 1962

Geneva - Golay - 1962

General purpose system. Photometry of stars in clusters, associations and double systems.

GENERAL INFORMATION

AUTHORS	M. Golay
TELESCOPE	1m (reflector), Haute-Provence Obs. ;
	0.40m (reflector), Jungfraujoch Obs; ESO.
DETECTOR	northern emisphere: Victor VI [211]
	southern emisphere: EMI 9502−AM
MAIN ARTICLE	Golay, M. 1962 Pub. Obs. Genève No 15 (série A), 29

SYSTEM DESCRIPTION

BANDS DESCRIPTION [285], pg 369

band	filter	λ_0 (Å)	half-width (Å)
U	4mm Schott UG11	3456	465
B_1	2mm Schott GG 13 + 4mm Schott UG 3 + 1mm Schott BG 23	4024	395
B	2mm Schott BG 12 + 2mm Schott GG 13	4245	810
B_2	3mm Schott BG 25 + 4mm Schott GG 3	4480	415
V_1	2mm Schott OG 4 + 3mm Schott BG 18	5405	465
V	2mm Schott OG 4	5500	725
G	1.5mm Corning 3-67	5805	440

SYSTEM ANALYSIS

REDDENING RATIOS [118]

$E(U-B_2) = 1.186\,E(B_2-V_1)$ for reddened O-stars.

$E(B-V)_{Johnson} = 1.14\,E(B_2-V_1)$

REDDENING-FREE PARAMETERS

Golay reddening-free parameters: [285], pg 371

$d = (U-B_1) - 1.430\,(B_1-B_2)$: measures the Balmer jump. Almost blanketing-free.

$\Delta = (U-B_2) - 0.832\,(B_2-G)$: measures the Balmer jump. Also sensitive to metallic line-blocking.

$g = (B_1-B_2) - 1.357\,(V_1-G)$: measures the violet line-blocking. Sensitive to blanketing.

$m_2 = (B_1-B_2) - 0.457\,(B_2-V_1) = 0.550\,\Delta - 0.550\,d - 0.337\,g$: measures the violet line-blocking. [118]

Cramer and Maeder reddening-free parameters: [78]

$X = 0.3788 + 1.3764\,U - 1.2162\,B_1 - 0.8498\,B_2 - 0.1554\,V_1 + 0.8450\,G$: temperature indicator.

$Y = -0.8288 + 0.3235\,U - 2.3228\,B_1 + 2.3363\,B_2 + 0.7495\,V_1 - 1.0865\,G$: gravity indicator.

$Z = -0.4572 + 0.0255\,U - 0.1740\,B_1 + 0.4696\,B_2 - 1.1205\,V_1 + 0.7994\,G$:
related to intensity of the surface magnetic fields (Ap phenomenon).

Fig. 25. The photometric system Geneva – Golay – 1962

RELATIONS WITH OTHER SYSTEMS [116]

UBV - Johnson and Morgan - 1953

for A0-G8 stars:

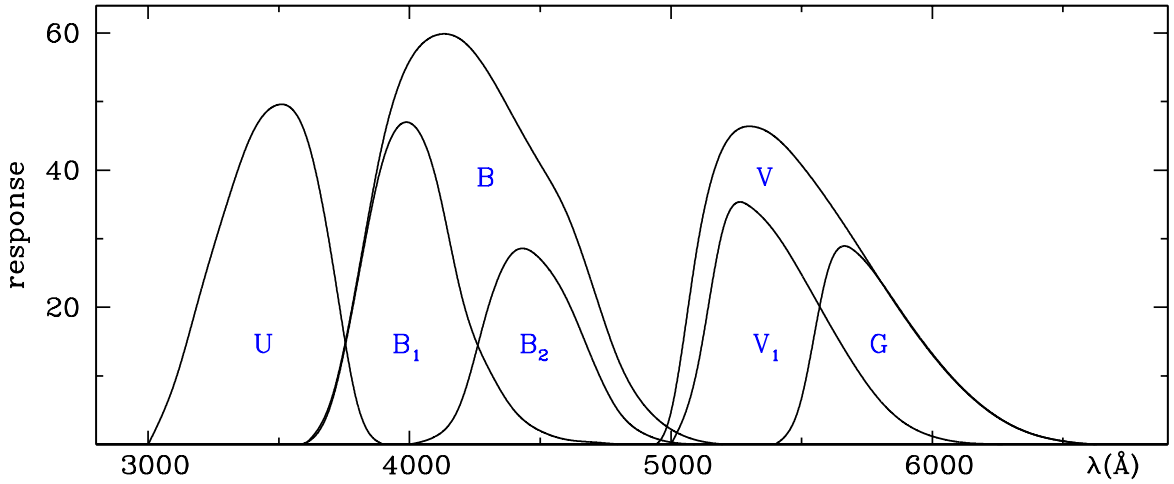
$$(B-V) = 1.164\ (\pm 0.005)\ (B_2-V_1) + 0.189\ (\pm 0.004)$$
$$(B_2-V_1) = 0.858\ (\pm 0.004)\ (B-V) - 0.162\ (\pm 0.004)$$

uvby Hβ - Strömgren and Crawford - 1956

for $-0.087 < (B_2-V_1) < +0.440$ (A3-G5 stars):

$$(B_2-V_1) = 1.273\ (\pm 0.008)\ (b-y) - 0.142\ (\pm 0.006)$$
$$(b-y) = 0.784\ (\pm 0.004)\ (B_2-V_1) + 0.112\ (\pm 0.006)$$

TRANSMISSION CURVES [117], pg. 142



U		*B*1		*B*		*B*2		*V*1		*V*		*G*	
λ (A)	ϒ (%)	λ (A)	ϒ (%)	λ (A)	ϒ (%)	λ (A)	ϒ (%)	λ (A)	ϒ (%)	λ (A)	ϒ (%)	λ (A)	ϒ (%)
3000	0.00	3500	0.00	3600	0.00	4000	0.00	5000	0.00	4900	0.00	5400	0.00
3100	8.89	3600	0.22	3700	6.49	4100	1.20	5100	10.84	5000	4.64	5500	6.73
3200	22.16	3700	5.93	3800	24.11	4200	6.45	5200	31.46	5100	28.58	5600	25.25
3300	34.95	3800	23.51	3900	44.44	4300	19.88	5300	34.77	5200	43.29	5700	28.30
3400	45.50	3900	41.59	4000	55.91	4400	28.10	5400	30.85	5300	46.38	5800	23.97
3500	49.56	4000	46.91	4100	59.66	4500	27.04	5500	24.75	5400	44.82	5900	18.38
3600	45.47	4100	38.96	4200	58.94	4600	21.30	5600	18.00	5500	40.73	6000	13.23
3700	27.82	4200	21.60	4300	54.34	4700	12.38	5700	11.65	5600	35.56	6100	8.79
3800	5.99	4300	11.24	4400	47.55	4800	4.85	5800	6.41	5700	29.85	6200	5.35
3900	0.00	4400	4.99	4500	40.87	4900	1.51	5900	2.97	5800	23.94	6300	2.87
		4500	1.97	4600	33.86	5000	0.32	6000	1.17	5900	18.25	6400	1.31
		4600	0.74	4700	23.21	5100	0.00	6100	0.36	6000	13.06	6500	0.47
		4700	0.35	4800	12.24			6200	0.10	6100	8.72	6600	0.07
		4800	0.00	4900	5.61			6300	0.03	6200	5.28	6700	0.00
				5000	2.24			6400	0.00	6300	2.83		
				5100	0.61					6400	1.29		
				5200	0.00					6500	0.47		
										6600	0.07		
										6700	0.00		

Fig. 25. continued

$ubvr_{20}$ - Sandage and Smith - 1963

Line blanketing in subdwarfs.

GENERAL INFORMATION

AUTHORS	A. Sandage, and L. L. Smith
TELESCOPE	0.50m (reflector), Palomar Obs.
DETECTOR	RCA C7237 (S-20 cathode, refrigerated)
MAIN ARTICLE	Sandage, A., Smith, L. L. 1963, ApJ 137, 1057

SYSTEM DESCRIPTION

BANDS DESCRIPTION [256]				
band	filter	λ_{eff} (Å)	*WHM* (Å)	λ_c (Å)
u	2.8mm Corning 9863 + $CuSO_4$ (#)	3620	657	3595
b	0.7mm Schott BG 12 + 2mm GG 13 + $CuSO_4$ (#)	4420	1000	4350
v	2.2mm Schott GG 11 + 1.6mm Schott BG 18	5400	842	5370
r_{20}	2mm Schott RG 1	6700	763	6505

(#) Red-leak suppressor. A 2.5mm thick liquid camber filled with an 80% saturated solution of $CuSO_4 \cdot 5\ H_2O$.

ZERO POINT: $(v - r_{20}) = 0.00$ for $(U-B)_{Johnson} = (B-V)_{Johnson} = 0.00$ stars. [256]

SYSTEM ANALYSIS

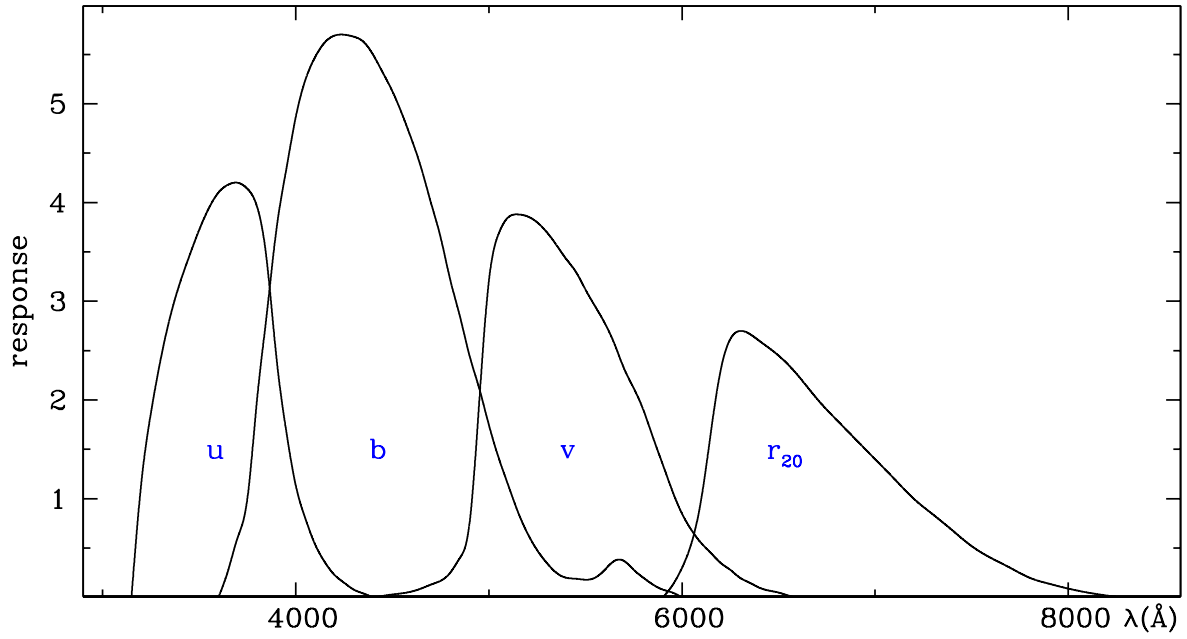
RELATIONS WITH OTHER SYSTEMS [256]

UBV - Johnson and Morgan - 1953

$(B-V)$	=	$1.100\ (\pm 0.004)\ (b-v) + 1.023\ (\pm 0.003)$
$(U-B)$	=	$1.015\ (\pm 0.003)\ (u-b) - 1.575\ (\pm 0.006)$

Fig. 26. The photometric system $ubvr_{20}$ – Sandage and Smith – 1963

TRANSMISSION CURVES [211]



u		*b*				*v*				*r*$_{20}$			
λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ
3150	0.000	3600	0.000	4900	2.450	4400	0.000	5700	2.320	5900	0.000	7200	1.000
3200	1.140	3650	0.270	4950	2.120	4450	0.016	5750	2.120	5950	0.122	7250	0.917
3250	1.860	3700	0.607	5000	1.750	4500	0.030	5800	1.900	6000	0.300	7300	0.840
3300	2.400	3750	1.000	5050	1.420	4550	0.042	5850	1.620	6050	0.557	7350	0.761
3350	2.840	3800	2.000	5100	1.140	4600	0.060	5900	1.350	6100	1.000	7400	0.680
3400	3.180	3850	2.860	5150	0.870	4650	0.091	5950	1.080	6150	1.680	7450	0.597
3450	3.460	3900	3.720	5200	0.650	4700	0.130	6000	0.850	6200	2.300	7500	0.520
3500	3.720	3950	4.320	5250	0.480	4750	0.169	6050	0.680	6250	2.617	7550	0.455
3550	3.940	4000	4.860	5300	0.350	4800	0.250	6100	0.550	6300	2.700	7600	0.400
3600	4.100	4050	5.240	5350	0.250	4850	0.400	6150	0.450	6350	2.670	7650	0.350
3650	4.180	4100	5.470	5400	0.200	4900	0.750	6200	0.350	6400	2.600	7700	0.300
3700	4.200	4150	5.620	5450	0.190	4950	1.970	6250	0.280	6450	2.528	7750	0.247
3750	4.140	4200	5.690	5500	0.180	5000	3.200	6300	0.200	6500	2.450	7800	0.200
3800	3.960	4250	5.700	5550	0.200	5050	3.680	6350	0.150	6550	2.358	7850	0.166
3850	3.420	4300	5.680	5600	0.280	5100	3.850	6400	0.100	6600	2.250	7900	0.140
3900	2.440	4350	5.630	5650	0.370	5150	3.880	6450	0.070	6650	2.130	7950	0.114
3950	1.700	4400	5.500	5700	0.370	5200	3.860	6500	0.050	6700	2.010	8000	0.090
4000	1.140	4450	5.320	5750	0.280	5250	3.800	6550	0.020	6750	1.901	8050	0.069
4050	0.800	4500	5.130	5800	0.200	5300	3.700	6600	0.000	6800	1.800	8100	0.050
4100	0.540	4550	4.900	5850	0.130	5350	3.570			6850	1.700	8150	0.034
4150	0.360	4600	4.640	5900	0.080	5400	3.430			6900	1.600	8200	0.020
4200	0.230	4650	4.350	5950	0.050	5450	3.300			6950	1.500	8250	0.009
4250	0.150	4700	4.000	6000	0.000	5500	3.120			7000	1.400	8300	0.000
4300	0.080	4750	3.650			5550	2.950			7050	1.301		
4350	0.040	4800	3.220			5600	2.780			7100	1.200		
4400	0.000	4850	2.850			5650	2.570			7150	1.097		

Fig. 26. continued

Barbier and Morguleff - 1964

Narrow band photometry of early-type stars.

GENERAL INFORMATION

AUTHORS	D. Barbier and N. Morguleff
TELESCOPE	0.80m (reflector), Haute Provence Obs.
DETECTOR	Lallemand cell
MAIN ARTICLE	Barbier, D., Morguleff, N. 1964, Compt. Rend. Acad. Sci. Paris 258, 4925

SYSTEM DESCRIPTION

BANDS DESCRIPTION [22]

band	bandpass (Å)	feature
361	3575 – 3650	Balmer Discontinuity
375	3720 – 3780	
395	3925 – 3965	Ca II (K)
405	4010 – 4070	
435	4310 – 4380	Hγ
486	4815 – 4905	Hβ
495	4900 – 5000	
595	5900 – 6000	

A mask-wheel is placed on the focal plane of a two fused silica prism spectrograph at the Coudé focus, and upon rotation trasmits in turn to the detector (a Lallemand cell) selected portions of the spectrum (in form of square bands).

Fig. 27. The photometric system Barbier and Morguleff – 1964

$H\gamma$ - Beer - 1964

Three square-band measurement of Hγ on spectra of early type stars.

GENERAL INFORMATION

AUTHORS	A. Beer
TELESCOPE	0.90m (reflector), Cambridge Obs.
DETECTOR	EMI 9502 photomultiplier (refrigerated)
MAIN ARTICLE	Beer, A. 1964, MNRAS 128, 261

SYSTEM DESCRIPTION

BANDS DESCRIPTION [27]

band	bandpass (Å)
A	4255 – 4289
B	4325 – 4357
C	4393 – 4427

On the focal plane of a 5.0 Å/mm dispersion spectrograph, three diaphragms transmit to photomultipliers the above three A, B and C portions of the spectrum.

SYSTEM ANALYSIS

COLOR INDICES AND PARAMETERS [27]

Light from the comparison bands $A+C$ is fed to one photomultiplier, that from B to a second one. To normalize the readings, the spectrum of a comparison lamp is recorded in a similar manner. Then the following ratio is obtained:

$$R_\gamma = \left[\frac{(A+C)_{star}}{(A+C)_{lamp}}\right] \Big/ \left[\frac{(B)_{star}}{(B)_{lamp}}\right]$$

It is found to be a good luminosity indicator.

Fig. 28. The photometric system $H\gamma$ – Beer – 1964

*H*α - Peat - 1964

Three square-band measurement of Hα on spectra of F, G and K stars.

GENERAL INFORMATION

AUTHORS	D. W. Peat
TELESCOPE	0.90m (reflector), Cambridge Obs.
DETECTOR	EMI 9558 (cooled at -20° C)
MAIN ARTICLE	Peat, D. W. 1964, MNRAS 128, 435

SYSTEM DESCRIPTION

BANDS DESCRIPTION [240]	
band	bandpass (Å)
A	6477.5 – 6495.0
B	6545.0 – 6580.0
C	6630.0 – 6647.5

On the focal plane of a 5.0 Å/mm dispersion spectrograph, three diaphragms transmit to photomultipliers the above three *A*, *B* and *C* portions of the spectrum.

SYSTEM ANALYSIS

COLOR INDICES AND PARAMETERS [240]

Light from the comparison bands $A+C$ is fed to one photomultiplier, that from B to a second one. To normalize the readings, the spectrum of a comparison lamp is recorded in an identical way. Then the following ratio is a measure of Hα intensity:

$$R_\alpha = \left[\frac{(A+C)_{star}}{(A+C)_{lamp}}\right] \Big/ \left[\frac{(B)_{star}}{(B)_{lamp}}\right]$$

It is found to be a good luminosity indicator.

Fig. 29. The photometric system *Hα* – Peat – 1964

Aerobee UV−64 -1964

Ultraviolet observations by an Aerobee rocket flown on September 2, 1964.

GENERAL INFORMATION

DETECTOR	photoelectric photometers
MAIN ARTICLE	Bless, R. C., Code, A. D., Houck, T. E., McNall, J. F., Taylor, D. J. 1965, AJ 70, 666

SYSTEM DESCRIPTION

BANDS DESCRIPTION [37]		
band	λ_c (Å)	half-width (Å)
230	2100	400
270	2500	400
300	2800	400

The ultraviolet bands were isolated by five-layer Al-MgF_2 interference filters.
Measurements were also taken in a fourth unspecified “blue” optical band. [37]

Fig. 30. The photometric system Aerobee UV-64 – 1964

Hα,β,γ,δ - Abt and Golson - 1965

Luminosity classification of early-type stars with emission lines.

GENERAL INFORMATION

AUTHORS	H. A. Abt and J. C. Golson
TELESCOPE	0.41m and 0.91m (reflectors), KPNO
DETECTOR	RCA 1P21, or 931-A, or EMI 9558
MAIN ARTICLE	Abt, H.A., Golson, J.C. 1965, ApJ 143, 106

SYSTEM DESCRIPTION

BANDS DESCRIPTION [2]

band	filter (#)	λ_{peak} (Å)	half-width (Å)	Υ_{peak} (%)
Hα narrow	KPNO 71	6567	54	56.7
Hα wide	KPNO 210	6595	159	87.3
Hβ narrow	KPNO 216	4868	26	60.8
Hβ wide	KPNO 225	4880	210	84.5
Hγ narrow	KPNO 48	4340	31	56.0
Hγ wide	KPNO 49	4385	161	70.6
Hδ narrow	KPNO 200	4115	64	44.1
Hδ wide	KPNO 199	4115	130	53.2

SYSTEM ANALYSIS

COLOR INDICES PARAMETERS [2]

$\alpha = -2.5 \log I(H\alpha\ wide) / I(H\alpha\ narrow)$

$\beta = -2.5 \log I(H\beta\ wide) / I(H\beta\ narrow)$

$\gamma = -2.5 \log I(H\gamma\ wide) / I(H\gamma\ narrow)$

$\delta = -2.5 \log I(H\delta\ wide) / I(H\delta\ narrow)$

A set of 12 standard stars without emission lines from G4 to B1 defines the reference value for α, β, γ and δ.

Fig. 31. The photometric system *Hα,β,γ,δ* – Abt and Golson – 1965

RI - Eggen - 1965

Red and near-infrared photometry. Visual binaries.

GENERAL INFORMATION

AUTHORS	O. J. Eggen
TELESCOPE	5m and 0.5m (reflectors), Palomar Obs.; 2.5m and 1.52m (reflectors), Mount Wilson Obs.; 0.41m (reflector) and 0.61m (refractor), Cape Observatory
DETECTOR	RCA 7102
MAIN ARTICLE	Eggen, O.J. 1965, AJ 70, 19

SYSTEM DESCRIPTION

BANDS DESCRIPTION [31]

band	λ_{eff} (Å)	bandpass (Å)
R	6350	5500 – 7200
I	7900	7200 – 8650

Fig. 32. The photometric system *RI* – Eggen – 1965

UBVRI(JHKLMN) - Johnson - 1965

Extention toward the infrared of the *UBV - Johnson and Morgan - 1953* system.
The system is also often called “The Arizona system”.

GENERAL INFORMATION

AUTHORS	H. L. Johnson
TELESCOPE	0.71cm (reflector), Lunar and Planetary Lab.
DETECTOR	1P21 (for *UBV*), ITT FW-118 (S-1 cathode, for *RI*), PbS or InSb cells (for *JHKL*), liquid He cooled Ge bolometer (for *M* and *N*)
MAIN ARTICLE	Johnson, H. L. 1965, ApJ 141, 923

SYSTEM DESCRIPTION

BANDS DESCRIPTION			FLUX CALIBRATION (#) [152], [153]	
band	λ_0 (μm) [152]	half-width (μm) [285], pg. 292	F(λ) (W cm^{-2} μm^{-1})	F(λ) (W m^{-2} Hz^{-1})
U	0.36	0.04	$4.35\ 10^{-12}$	$1.88\ 10^{-23}$
B	0.44	0.10	$7.20\ 10^{-12}$	$4.44\ 10^{-23}$
V	0.55	0.08	$3.92\ 10^{-12}$	$3.81\ 10^{-23}$
R	0.70	0.21	$1.76\ 10^{-12}$	$3.01\ 10^{-23}$
I	0.90	0.22	$8.3\ 10^{-13}$	$2.43\ 10^{-23}$
J	1.25	0.3	$3.4\ 10^{-13}$	$1.77\ 10^{-23}$
H (##)	1.62	0.2	$1.26\ 10^{-13}$	
K	2.2	0.6	$3.9\ 10^{-14}$	$6.3\ 10^{-24}$
L	3.4	0.9	$8.1\ 10^{-15}$	$3.1\ 10^{-24}$
M	5.0	1.1	$2.2\ 10^{-15}$	$1.8\ 10^{-24}$
N	10.2	6.0	$1.23\ 10^{-16}$	$4.3\ 10^{-25}$

(#) Fluxes for a 0.0 mag star.

(##) The H band appeared later in 1967 as part of the Arizona system, and its transmission profile has been a subject of debate. A profile for it is tabulated in *VJHKLL'M - Bessell and Brett - 1988* [34].

O (λ_0 = 11.5 μm), *P* (λ_0 = 13.1 μm) and *Q* (λ_0 = 20.0 μm) bands have been sometimes associated with this system.

The *UBV* bands are essentially those of *UBV - Johnson and Morgan - 1953*.

In the table with the band transmission profiles, the *L* band is indicated with *L'* ($\lambda_{eff} = 3.5$ μm) when realized with a InSb detector, *L"* ($\lambda_{eff} = 3.4$ μm) for a PbS detector.

ZERO POINT: Color indices are zero for unreddened A0 V stars. [151]

SYSTEM ANALYSIS

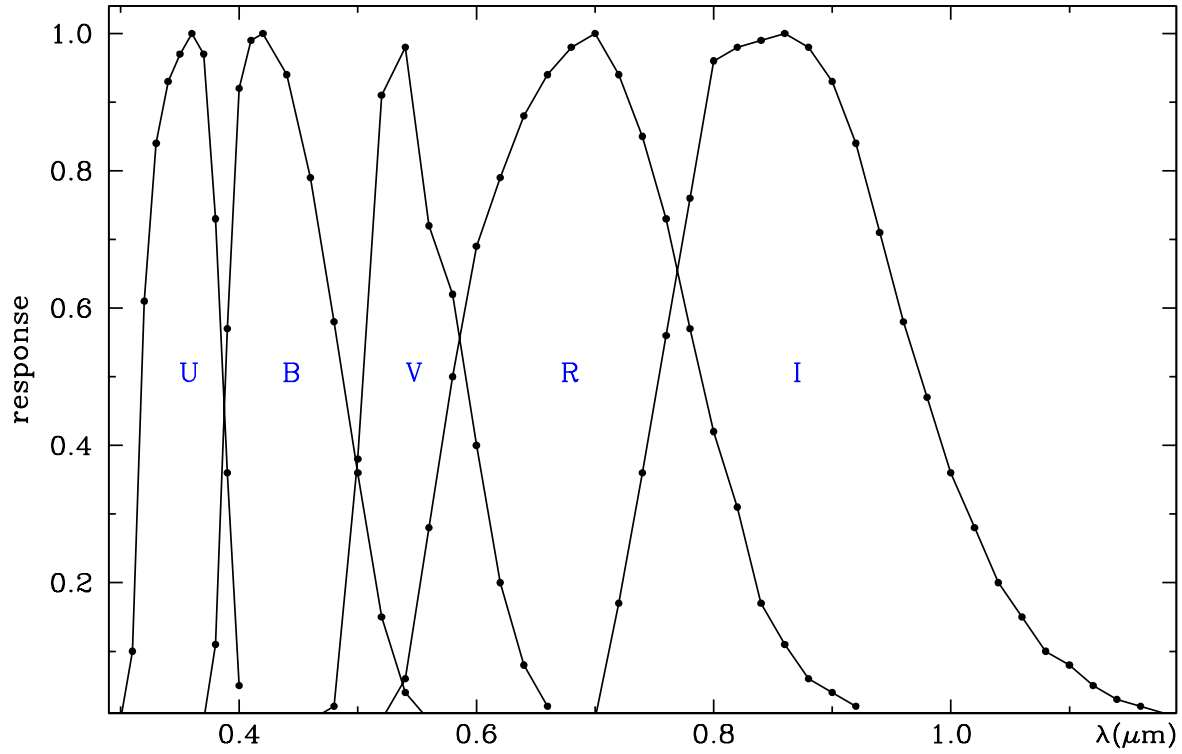
REDDENING RATIOS [258]

$A_R = 2.32\,E(B-V)$ $A_I = 1.50\,E(B-V)$ $A_J = 0.87\,E(B-V)$

$A_K = 0.38\,E(B-V)$ $A_L = 0.16\,E(B-V)$

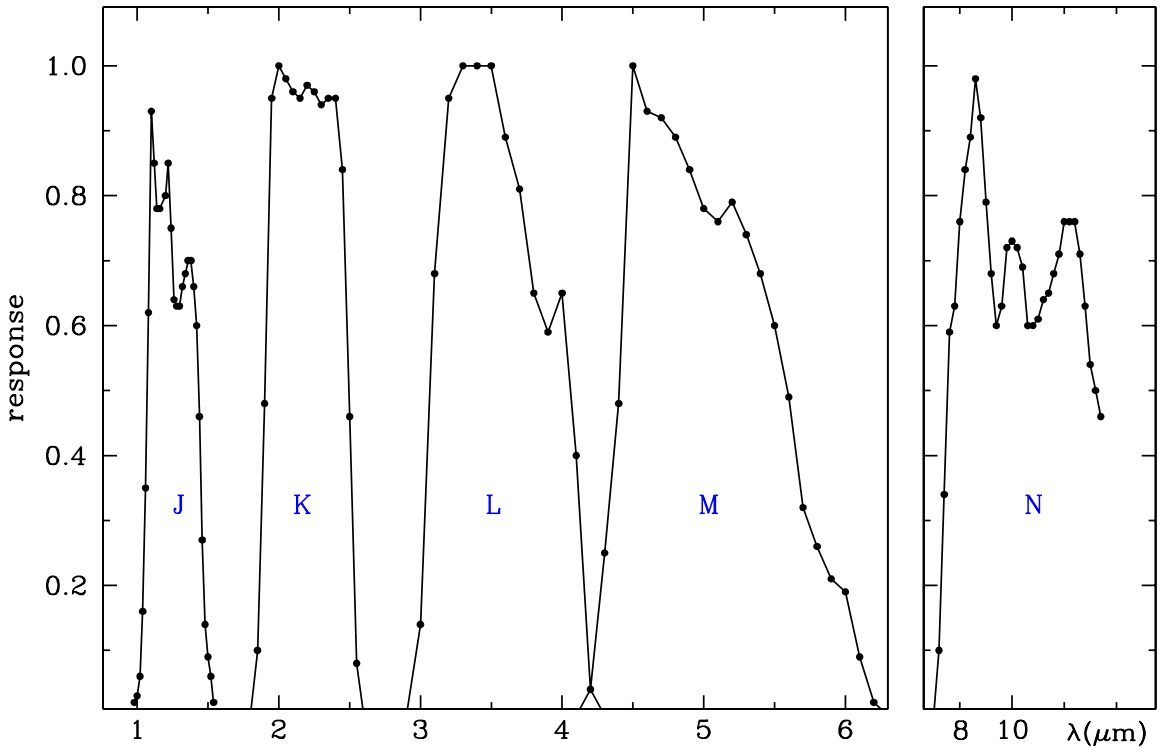
Fig. 33. The photometric system *UBVRI(JHKLMN)* – Johnson – 1965

TRANSMISSION CURVES [151]



U		*B*		*V*		*R*				*I*			
λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ
0.30	0.00	0.37	0.00	0.46	0.00	0.52	0.00	0.82	0.31	0.68	0.00	0.98	0.47
0.31	0.10	0.38	0.11	0.48	0.02	0.54	0.06	0.84	0.17	0.70	0.01	1.00	0.36
0.32	0.61	0.40	0.92	0.50	0.38	0.56	0.28	0.86	0.11	0.72	0.17	1.02	0.28
0.33	0.84	0.42	1.00	0.52	0.91	0.58	0.50	0.88	0.06	0.74	0.36	1.04	0.20
0.34	0.93	0.44	0.94	0.54	0.98	0.60	0.69	0.90	0.04	0.76	0.56	1.06	0.15
0.35	0.97	0.46	0.79	0.56	0.72	0.62	0.79	0.92	0.02	0.78	0.76	1.08	0.10
0.36	1.00	0.48	0.58	0.58	0.62	0.64	0.88	0.94	0.01	0.80	0.96	1.10	0.08
0.37	0.97	0.50	0.36	0.60	0.40	0.66	0.94	0.96	0.00	0.82	0.98	1.12	0.05
0.38	0.73	0.52	0.15	0.62	0.20	0.68	0.98			0.84	0.99	1.14	0.03
0.39	0.36	0.54	0.04	0.64	0.08	0.70	1.00			0.86	1.00	1.16	0.02
0.40	0.05	0.56	0.00	0.66	0.02	0.72	0.94			0.88	0.98	1.20	0.00
0.41	0.01			0.68	0.01	0.74	0.85			0.90	0.93		
0.42	0.00			0.70	0.01	0.76	0.73			0.92	0.84		
				0.72	0.01	0.78	0.57			0.94	0.71		
				0.74	0.00	0.80	0.42			0.96	0.58		

Fig. 33. continued



J				*K*		*L'*		*L"*		*M*		*N*			
λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ
0.96	0.00	1.44	0.46	1.80	0.00	2.90	0.00	2.90	0.00	4.10	0.00	7.00	0.00	11.8	0.71
0.98	0.02	1.46	0.27	1.85	0.10	3.00	0.14	3.00	0.14	4.20	0.04	7.20	0.10	12.0	0.76
1.00	0.03	1.48	0.14	1.90	0.48	3.10	0.68	3.10	0.68	4.30	0.25	7.40	0.34	12.2	0.76
1.02	0.06	1.50	0.09	1.95	0.95	3.20	0.95	3.20	0.95	4.40	0.48	7.60	0.59	12.4	0.76
1.04	0.16	1.52	0.06	2.00	1.00	3.30	1.00	3.30	1.00	4.50	1.00	7.80	0.70	12.6	0.71
1.06	0.35	1.54	0.02	2.05	0.98	3.40	1.00	3.40	1.00	4.60	0.93	8.00	0.76	12.8	0.63
1.08	0.62	1.56	0.00	2.10	0.96	3.50	1.00	3.50	0.98	4.70	0.92	8.20	0.84	13.0	0.54
1.10	0.93			2.15	0.95	3.60	0.89	3.60	0.85	4.80	0.89	8.40	0.89	13.2	0.50
1.12	0.85			2.20	0.97	3.70	0.81	3.70	0.69	4.90	0.84	8.60	0.98	13.4	0.46
1.14	0.78			2.25	0.96	3.80	0.65	3.80	0.39	5.00	0.78	8.80	0.92	13.6	0.43
1.16	0.78			2.30	0.94	3.90	0.59	3.90	0.21	5.10	0.76	9.00	0.79		
1.18	0.80			2.35	0.95	4.00	0.65	4.00	0.10	5.20	0.79	9.20	0.68		
1.20	0.85			2.40	0.95	4.10	0.40	4.10	0.02	5.30	0.74	9.40	0.60		
1.22	0.93			2.45	0.84	4.20	0.04	4.20	0.00	5.40	0.68	9.60	0.63		
1.24	0.75			2.50	0.46	4.30	0.00			5.50	0.60	9.80	0.69		
1.26	0.64			2.55	0.08					5.60	0.49	10.0	0.73		
1.28	0.63			2.60	0.00					5.70	0.32	10.2	0.72		
1.30	0.63									5.80	0.26	10.4	0.65		
1.32	0.66									5.90	0.21	10.6	0.60		
1.34	0.68									6.00	0.19	10.8	0.60		
1.36	0.70									6.10	0.09	11.0	0.61		
1.38	0.70									6.20	0.02	11.2	0.64		
1.40	0.66									6.30	0.00	11.4	0.65		
1.42	0.60											11.6	0.68		

Fig. 33. continued

Miner - 1965

Temperature and metallicity of F5-K5 stars via narrow-band photometry.

GENERAL INFORMATION

AUTHORS	E. D. Miner
TELESCOPE	0.61m (reflector), Brigham Young University
MAIN ARTICLE	Miner, E.D. 1965, ApJ 144, 1101

SYSTEM DESCRIPTION

BANDS DESCRIPTION [212]

band	filter manufacturer	λ_{peak} (Å)	half-width (Å)	Υ (%)
416	Baird B-1	4160	60	60
426	Baird B-3 + film	4260	160	80
431	Spectrolab	4305	60	35
439	Baird B-1	4390	70	80
452	Baird B-1	4520	70	60
486	Baird B-3 + film	4861	220	80
560	Baird B-9	5600	50	60

All filters are interference ones.

SYSTEM ANALYSIS

COLOR INDICES AND PARAMETERS [212]

$g' = cost + 2.5[\log I(439) - \log I(431)]$: measures the G-band.

$n' = cost + 2.5[\log I(426) - \log I(416)]$: measures the CN-band.

$m' = cost + 2.5[2 \log I(452) - \log I(431) - \log I(486)]$: metallicity indicator.

$bv' = cost + 2.5[\log I(560) - \log I(439)]$: temperature indicator.

RELATIONS WITH OTHER SYSTEMS [212]

UBV - Johnson and Morgan - 1953

$(B-V)$	=	$0.208 + 0.897bv'$	for $bv' < 1.000$
$(B-V)$	=	$0.272 + 0.815bv'$	for $bv' > 1.000$
$(B-V)$	=	$-0.72 + 1.93g' + 0.14n' + 0.06m' - 0.6\Delta m'$	for $g' < 0.680$
$(B-V)$	=	$-2.15 + 5.63g' + 0.01n' - 1.22m' - 1.9\Delta m'$	for $g' \geq 0.680$

The $\Delta m'$ correction (to eliminate chemical abundance effects) generally varies between +0.05 and -0.10. Numerical values for $\Delta m'$ are given in graphical form by [212].

Fig. 34. The photometric system Miner – 1965

Vilnius - Straižys *et al.* - 1965

General purpose system.

GENERAL INFORMATION

AUTHORS	V. Straižys, J. Sŭdžius, and K. Zdanavičius
TELESCOPE	0.63m (reflector), Moletai Obs.
DETECTOR	FEU-79 (S-20 cathode)
MAIN ARTICLE	Straižys, V., Zdanavičius, K. 1965 Bull. Vilnius Obs. 14, 1

SYSTEM DESCRIPTION

BANDS DESCRIPTION [178], pg 66				FLUX CALIBRATION			
band	filter	λ_0 (Å)	FWHM (Å)	A0 V (#)	O V (#)	A0 V (∗)	O V (∗)
U	1.5mm BS5 + 10mm UFS2	3450	400	3.23	18.97	3.34	19.22
P	2mm SZS22 + 2.7mm UFS6	3740	260	4.47	14.39	4.53	14.58
X	3.2mm ZhS4 + 6.2mm 3S7 + 1.8mm SZS21 + 1.0 FS7	4050	220	7.41	11.12	7.51	11.27
Y	5.2mm ZhS12 + 2.6mm SZS21 + 2mm SS15	4660	260	5.68	6.52	5.76	6.60
Z	2mm ZhS17 + 3.1mm ZS7 + 10mm SZS22	5160	210	4.39	4.59	4.45	4.65
V	1.5mm OS11 + 5mm SZS22 + 2mm PS7	5440	260	3.75	3.75	3.80	3.80
S	interference	6550	200	2.16	1.90	2.19	1.92
T	interference	6250	200				

(#) Fluxes for a $V = 0.0$ star (units of 10^{-9} erg cm^{-2} s^{-1} Å^{-1}). [178], pg. 66
(∗) Fluxes for a $V = 0.0$ star (units of 10^{-12} W cm^{-2} μm^{-1}). [285], pg. 427

ZERO POINT: Color indices are zero for unreddened O-type stars. [178], pg. 66

SYSTEM ANALYSIS

REDDENING-FREE PARAMETERS [285], pg. 431-454

A general expression for reddening-free parameters (involving four or three bands) is:

$Q_{ABCD} = (A-B) - \frac{E(A-B)}{E(C-D)} \cdot (C-D)$ $\qquad$ $Q_{ABC} = (A-B) - \frac{E(A-B)}{E(B-C)} \cdot (B-C)$

Q_{UPY} vs Q_{PYV} : classification of B stars.

Q_{UPY} vs Q_{XYV} : classification of B8 to early-G stars

Q_{UXY} vs Q_{UPYV} : classification of A5-G0 stars.

Q_{UPY} vs Q_{XZS} : classification of G-K type stars.

Q_{XZS} vs Q_{XYZ} : classification of K-M type stars.

RELATIONS WITH OTHER SYSTEMS [285], pg. 488-493

UBV - Johnson and Morgan - 1953

$(B-V) = -0.33 + 0.50\,[(X-V) + (Y-V)]$ for stars with $(B-V) \leq 0.8$

uvby Hβ - Strömgren and Crawford - 1956

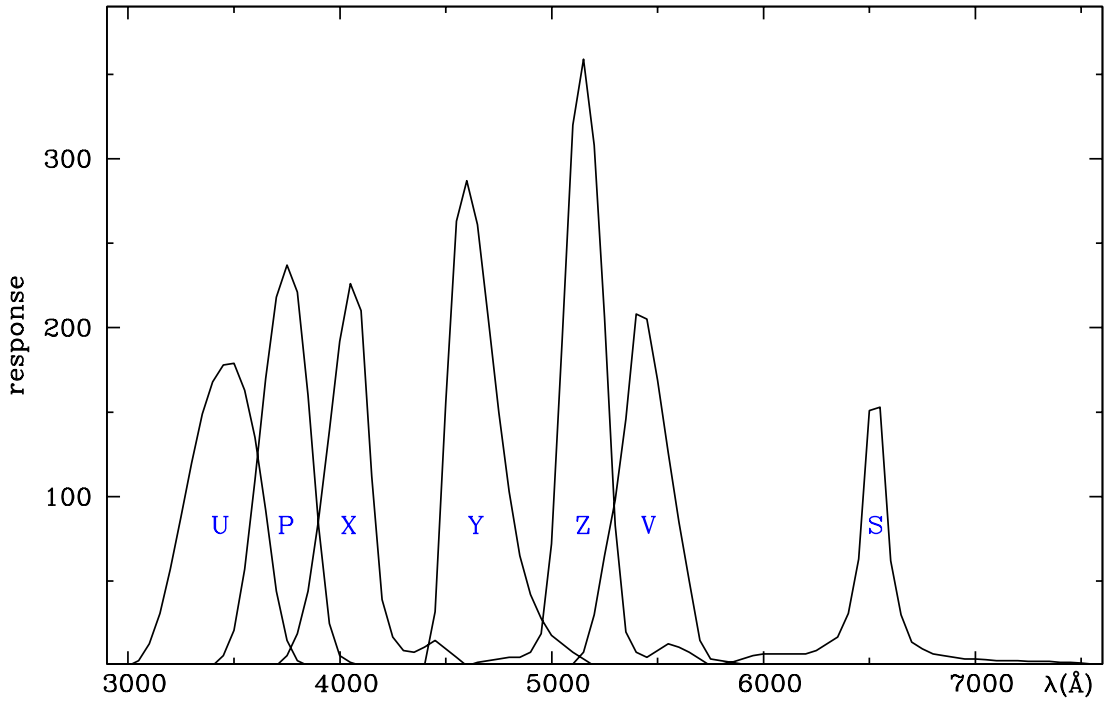
$(U-Y) = (u-b) + 0.30 - 0.024\,(b-y)_0 + c\,E(b-y)$ excluding M-giants and supergiants

$(Y-V) = 0.16 + 0.09\,(b-y)$ for O-K stars

where c increases from 0.005 for early-type stars to 0.016 for F- supergiants and goes to zero for late-type stars.

Fig. 35. The photometric system Vilnius – Straižys et al. – 1965

TRANSMISSION CURVES [287]



U		*P*		*X*		*Y*		*Z*		*V*		*S*			
λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ
3000	0	3400	0	3700	0	4400	0	4600	0	5050	0	5750	0	6950	4
3050	3	3450	6	3750	6	4450	32	4650	2	5100	1	5800	1	7000	4
3100	13	3500	21	3800	19	4500	156	4700	3	5150	8	5850	2	7050	3.5
3150	31	3550	57	3850	44	4550	263	4750	4	5200	30	5900	4	7100	3
3200	57	3600	110	3900	87	4600	287	4800	5	5250	65	5950	6	7150	3
3250	88	3650	170	3950	139	4650	261	4850	5	5300	98	6000	7	7200	3
3300	120	3700	218	4000	192	4700	206	4900	8	5350	146	6050	7	7300	2.5
3350	149	3750	237	4050	226	4750	150	4950	19	5400	208	6100	7	7350	2.5
3400	168	3800	221	4100	210	4800	103	5000	72	5450	205	6150	7	7400	2
3450	178	3850	160	4150	112	4850	65	5050	193	5500	169	6200	7	7450	2
3500	179	3900	82	4200	39	4900	42	5100	320	5550	126	6250	9	7500	1.5
3550	163	3950	25	4250	17	4950	28	5150	359	5600	85	6300	13	7550	1
3600	135	4000	6	4300	9	5000	18	5200	308	5650	50	6350	17	7600	1
3650	92	4050	2	4350	8	5050	13	5250	206	5700	15	6400	31	7650	0.5
3700	44	4100	0	4400	11	5100	8	5300	83	5750	4	6450	63	7700	0
3750	15			4450	15	5150	4	5350	20	5800	3	6500	151		
3800	3			4500	10	5200	0	5400	8	5850	2	6550	153		
3850	0			4550	5			5450	5	5900	1	6600	62		
				4600	0			5500	9	5950	0	6650	30		
								5550	13			6700	14		
								5600	11			6750	10		
								5650	8			6800	7		
								5700	4			6850	6		
								5750	0			6900	5		

Fig. 35. continued

UVBY - Kruszewski - 1966

General purpose system.

GENERAL INFORMATION

AUTHORS	A. Kruszewski
TELESCOPE	0.35m (reflector), Ostrowik station, Warsaw University Observatory
DETECTOR	1P21 (uncooled)
MAIN ARTICLE	Kruszewski, A. 1966, Acta Astronomica 16, 285

SYSTEM DESCRIPTION

BANDS DESCRIPTION [175]

band	filter	λ_{peak} (Å)	λ_{eff} (Å)	half-width (Å)
U	2mm UG 2 + 2mm UG 11	3600	3521	460
V	1mm UG 2 + 1mm BG 12 + 1mm GG 18	3820	3781	290
B	2mm BG 12 + 1mm GG 5 + 2mm GG 13	4700	4614	330
Y	1mm BG 18 + 1mm OG 4	5230	5480	620

ZERO POINT: Unreddened A0 V stars have 0.00 color indices [175]

SYSTEM ANALYSIS

REDDENING RATIOS [175]

$\frac{E(U-V)}{E(B-Y)} = 0.35$ $\frac{E(V-B)}{E(B-Y)} = 0.78$

REDDENING-FREE PARAMETERS [175]

$[V-B] = (V-B) - \frac{E(V-B)}{E(B-Y)}(B-Y)$: metallicity indicator.

$[U-V] = (U-V) - \frac{E(U-V)}{E(B-Y)}(B-Y)$: luminosity indicator.

$L = [V-B] - 0.5[U-V]$: correlates with absolute magnitude.

$H = [V-B] - 0.2[U-V] + 0.4[U-V]^2$: measures the intensity of Balmer lines.

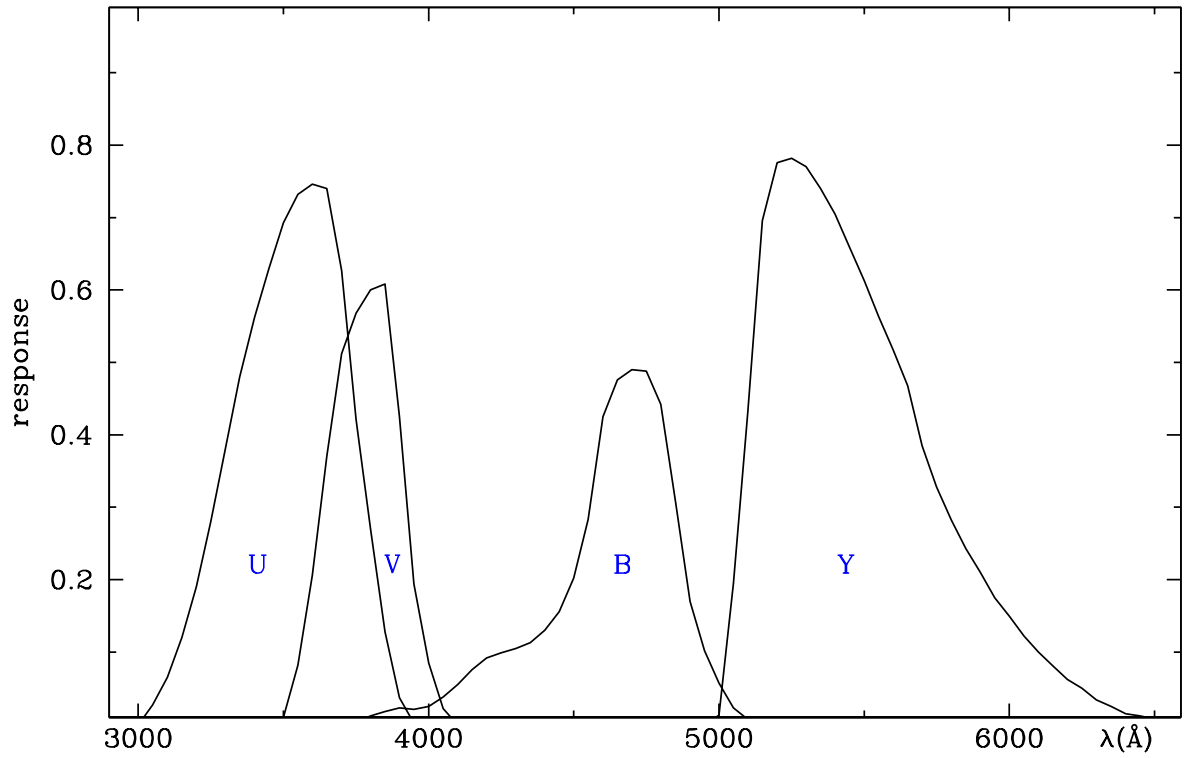
RELATIONS WITH OTHER SYSTEMS [175]

UBV - Johnson and Morgan - 1953

$$Y_{Kr} = V_J + 0.001\,(\pm 0.008) + 0.09\,(\pm 0.02)\,(B-Y)_{Kr}$$

Fig. 36. The photometric system *UVBY* – Kruszewski – 1966

TRANSMISSION CURVES [211]



U		*V*		*B*				*Y*			
λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ
3000	0.000	3450	0.000	3700	0.000	4750	0.488	4950	0.000	6000	0.150
3050	0.027	3500	0.009	3750	0.003	4800	0.442	5000	0.013	6050	0.122
3100	0.065	3550	0.082	3800	0.012	4850	0.307	5050	0.195	6100	0.100
3150	0.120	3600	0.206	3850	0.018	4900	0.170	5100	0.433	6150	0.081
3200	0.190	3650	0.370	3900	0.023	4950	0.102	5150	0.696	6200	0.062
3250	0.280	3700	0.512	3950	0.021	5000	0.057	5200	0.776	6250	0.050
3300	0.380	3750	0.568	4000	0.025	5050	0.023	5250	0.782	6300	0.034
3350	0.480	3800	0.600	4050	0.038	5100	0.007	5300	0.770	6350	0.025
3400	0.562	3850	0.608	4100	0.055	5150	0.000	5350	0.740	6400	0.015
3450	0.630	3900	0.425	4150	0.076			5400	0.705	6450	0.012
3500	0.693	3950	0.194	4200	0.092			5450	0.658	6500	0.008
3550	0.732	4000	0.085	4250	0.099			5500	0.613	6550	0.006
3600	0.746	4050	0.022	4300	0.105			5550	0.563	6600	0.004
3650	0.740	4100	0.000	4350	0.113			5600	0.517	6650	0.003
3700	0.627			4400	0.130			5650	0.468	6700	0.000
3750	0.421			4450	0.156			5700	0.385		
3800	0.270			4500	0.202			5750	0.328		
3850	0.128			4550	0.283			5800	0.282		
3900	0.037			4600	0.425			5850	0.243		
3950	0.002			4650	0.476			5900	0.210		
4000	0.000			4700	0.490			5950	0.175		

Fig. 36. continued

4 colors - Neff and Travis - 1966

General purpose system, aimed in particular to late type stars.

GENERAL INFORMATION

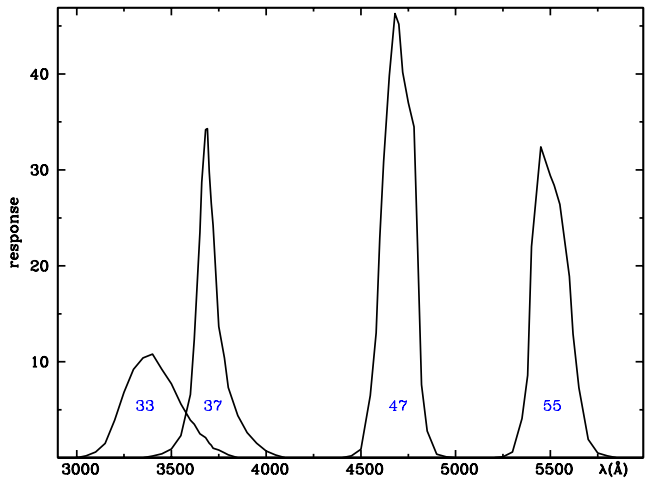
AUTHORS	J. S. Neff and L. D. Travis
TELESCOPE	0.91m and 2.08m (reectors), Mc Donald Obs.
DETECTOR	1P21 (refrigerated)
MAIN ARTICLE	Neff, J. S., Travis, L. D. 1967, AJ 72, 48

SYSTEM DESCRIPTION

BANDS DESCRIPTION [224], [225]			
band	interference lter manufacturer	*WHM* (A)	λ_c (A)
33	Space Astr. Lab., Univ. Wisconsin	330	3330
37	Fish-Schurman	140	3700
47	Baird Atomic	190	4680
55	Baird Atomic	220	5500

ZERO POINT: Unreddened A0 V stars have 0.00 color indices. [225]

TRANSMISSION CURVES [225]



33		*37*		*47*		*55*	
λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ
3000	0.0	3350	0.0	4400	0.0	5200	0.0
3050	0.2	3400	0.2	4450	0.2	5250	0.1
3100	0.6	3450	0.4	4500	0.9	5300	0.6
3150	1.5	3500	0.9	4550	6.5	5350	4.1
3200	3.9	3550	2.3	4580	13.0	5380	8.6
3250	6.8	3600	6.6	4600	22.9	5400	22.0
3300	9.2	3620	12.3	4620	30.9	5450	32.4
3350	10.4	3650	23.5	4650	39.8	5500	29.4
3400	10.8	3660	28.7	4680	46.3	5520	28.4
3450	9.2	3680	34.2	4700	45.2	5550	26.4
3500	7.7	3690	34.3	4720	40.2	5600	18.9
3550	5.6	3700	29.8	4750	37.0	5620	12.9
3600	3.9	3710	26.5	4780	34.5	5650	7.3
3620	3.5	3720	24.2	4800	21.7	5700	1.9
3650	2.5	3750	13.7	4820	7.6	5750	0.5
3660	2.4	3780	10.4	4850	2.8	5800	0.2
3680	2.1	3800	7.3	4900	0.4	5850	0.0
3690	1.8	3850	4.4	4950	0.1		
3700	1.5	3900	2.6	5000	0.0		
3710	1.3	3950	1.5				
3720	1.0	4000	0.7				
3750	0.8	4050	0.3				
3780	0.5	4100	0.0				
3800	0.3						
3850	0.0						

Fig. 37. The photometric system 4 colors – Neff and Travis – 1966

Scarfe - 1966

Square-band measurement of FeI lines in G-K stars.

GENERAL INFORMATION

AUTHORS	C. D. Scarfe
TELESCOPE	0.90m (reflector), Cambridge Obs.
DETECTOR	EMI 9502 (refrigerated)
MAIN ARTICLE	Scarfe, C. D. 1966, MNRAS 133, 99

SYSTEM DESCRIPTION

BANDS DESCRIPTION [259]

band	bandpass (Å)	feature
a_c	5289.5 - 5296.0	continuum
b_c	5303.5 - 5321.5	continuum
c_c	5317.0 - 5322.5	continuum
d_c	5333.5 - 5339.0	continuum
e_c	5350.5 - 5363.5	continuum
f_l	5363.5 - 5369.0	FeI multp. 1146 (5364.9, 5367.5 Å)
g_c	5373.0 - 5379.0	continuum
h_l	5382.0 - 5385.0	FeI multp. 1146 (5383.4 Å)
i_l	5388.0 - 5391.0	FeI multp. 1145 (5389.5 Å)
j_l	5395.8 - 5398.8	FeI multp. 15 (5397.1 Å)
k_l	5413.5 - 5416.5	FeI multp. 1165 (5415.2 Å)
l_l	5422.5 - 5425.5	FeI multp. 1146 (5424.1 Å)
m_l	5428.2 - 5431.2	FeI multp. 15 (5429.7 Å)
n_l	5433.0 - 5436.0	FeI multp. 15 (5434.5 Å)
o_l	5445.7 - 5448.7	FeI multp. 15 (5446.9 Å)
p_l	5462.0 - 5465.0	FeI multp. 1163 (5463.0, 5463.3 Å)
q_c	5490.0 - 5496.0	continuum
r_l	5496.0 - 5502.5	FeI multp. 15 (5497.5, 5501.6 Å)
s_l	5505.3 - 5508.3	FeI multp. 15 (5506.8 Å)
t_c	5508.0 - 5526.0	continuum
u_c	5532.5 - 5538.5	continuum
v_c	5538.0 - 5568.0	continuum

On the focal plane of a 6.2 Å/mm dispersion spectrograph diaphragms transmit to three separate photomultipliers three portions of the spectrum (a line band and two surrounding continuum bands).
The system includes also the bands from *Griffin - 1961*.

SYSTEM ANALYSIS

COLOR INDICES AND PARAMETERS [259]

If *A* and *C* are the continuum bands, and *B* is the line band, then:

$R = \frac{A+C}{B}$: measures the strength of a given FeI line.

Fig. 38. The photometric system Scarfe – 1966

ubVt - Smak - 1966

Broad and narrow band photometry of late-type stars.

GENERAL INFORMATION

AUTHORS	J. Smak
TELESCOPE	0.60m (reector), Lick Obs.
DETECTOR	1P21 (refrigerated)
MAIN ARTICLE	Smak, J. 1966, Acta Astron. 16, 109

SYSTEM DESCRIPTION

BANDS DESCRIPTION [271]						
band	lter	λ_c (A)	width (A)	Υ_c (%)	*WHM (A)*	λ_c (A)
u	2mm UG11				∼1000	∼3275
b	2mm GG5 + 2mm Corning 5030				700	4790
490	Bausch & Lomb 33-78-51 (interf.)	5100	80	35		
500	Bausch & Lomb 33-78-50 (interf.)	5000	80	35		
510	Bausch & Lomb 33-78-49 (interf.)	4900	80	35		
V	2mm GG11				870	5465

The *V* band is identical to the corresponding band of the *1953 - Johnson and Morgan - UBV* system [271].

SYSTEM ANALYSIS

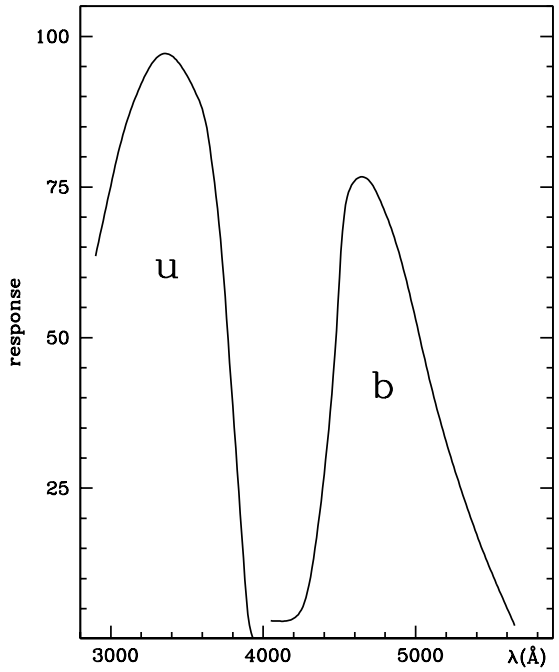
COLOR INDICES AND PARAMETERS [271]

$t = 0.5\,[510 + 490] - 500$: measures the strength of the TiO absorption band at 4955A.

$T = 9.25 - 21.67\,t$: gives the spectral type for M giants ($T = 0$ at M0, $T = 8$ at M8)

TRANSMISSION CURVES

As derived from Fig 2 of [271].



u		*b*	
λ (A)	ϒ	λ (A)	ϒ
2996	74.7	4098	2.9
3028	78.4	4205	3.5
3092	84.7	4291	7.9
3199	92.1	4344	15.8
3285	96.0	4398	26.8
3349	97.2	4441	37.9
3456	95.3	4484	52.6
3563	90.3	4516	66.3
3634	84.2	4537	71.6
3670	77.7	4569	74.7
3734	62.1	4633	76.6
3777	46.8	4719	75.3
3820	31.6	4783	71.8
3852	20.0	4847	67.6
3874	12.1	4954	57.9
3895	5.3	5100	42.1
3970	0.0	5265	27.4
		5447	14.2
		5597	5.3

Fig. 39. The photometric system *ubVt* – Smak – 1966

ubvr - Westerlund - 1966

Narrow band measurements of the continuum in Wolf-Rayet stars.

GENERAL INFORMATION

AUTHORS	B. E. Westerlund
TELESCOPE	0.91m (reflector), Kitt Peak National Observatory
DETECTOR	1P21 (refrigerated)
MAIN ARTICLE	Westerlund, B. E. 1966, ApJ 145, 724

SYSTEM DESCRIPTION

BANDS DESCRIPTION [320]

band	λ_{eff} (Å)	FWHM (Å)	Υ_{peak} (%)
u	3650	100	52
b	4280	65	70
v	5190	100	70
r	5990	80	67

Interference filters by Baird Atomic.

SYSTEM ANALYSIS

REDDENING-FREE PARAMETERS [320]

$\Delta = u - b - 0.68\,(b - v)$: intensity of the Balmer discontinuity.

$\delta = b - v - 1.43\,(v - r)$: deviation of the continuum at *b* relative to an extrapolation from the *v,r* bands.

Fig. 40. The photometric system *ubvr* – Westerlund – 1966

12 colors - Wood - 1966

Wide wavelength range photometric system for studies of galaxies.

GENERAL INFORMATION

AUTHORS	D. B. Wood
TELESCOPE	0.91m and 0.40m (reflectors), Kitt Peak National Observatory
DETECTOR	EMI 9558A tri-alkali
MAIN ARTICLE	Wood, D. B. 1966, ApJ 145, 36

SYSTEM DESCRIPTION

BANDS DESCRIPTION [332]

	only filter			filter plus photomultiplier		
band	λ_{peak}	half-width	Υ_{peak} (%)	λ_{peak}	Υ_{peak} (%)	spectral feature
u	3435	375	37	3459	22	Balmer jump
v	4100	195	46	4102	33	metals
b	4675	180	46	4667	42	continuum
g	5165	56	75	5169	56	Mg, MgH
y	5510	233	52	5470	33	continuum
a	5894	64	64	5901	33	Na D, TiO
o	6060	145	83	6029	38	continuum
t_1	6220	79	78	6220	31	TiO
h	6568	65	83	6571	22	Hα
r	6706	155	85	6696	19	continuum
t_2	7123	96	81	7118	8	TiO
i	7338	100	84	7331	5	continuum

SYSTEM ANALYSIS

COLOR INDICES AND PARAMETERS [332]

Denoting with $< M >= \frac{M_b + M_y + M_o + M_r}{4}$, color indices for the bands covering continuum portion of the spectrum are obtained as:

$C_{35} = M_u - < M >$ $C_{41} = M_v - < M >$ $C_{47} = M_b - < M >$ $C_{52} = M_g - < M >$

$C_{55} = M_y - < M >$ $C_{59} = M_a - < M >$ $C_{60} = M_o - < M >$ $C_{62} = M_{t1} - < M >$

$C_{66} = M_h - < M >$ $C_{67} = M_r - < M >$ $C_{71} = M_{t2} - < M >$ $C_{73} = M_i - < M >$

$I_{41} = (C_{41} - C_{47}) - (C_{47} - C_{55})$: analogous to Strömgren's m_1 index. Measures metallic line strength.

$I_{35} = (C_{35} - C_{41}) - (C_{41} - C_{47})$: analogous to Strömgren's c_1 index. Measures Balmer discontinuity.

Fig. 41. The photometric system 12 colors – Wood – 1966

Line indices are obtained by subtraction of mean continuum indices as:

$L_{52} = C_{52} - \frac{1}{2}(C_{47} + C_{55})$ $L_{59} = C_{59} - \frac{1}{2}(C_{55} + C_{60})$ $L_{62} = C_{62} - \frac{1}{2}(C_{60} + C_{67})$

$L_{66} = C_{66} - \frac{1}{2}(C_{60} + C_{67})$ $L_{71} = C_{71} - \frac{1}{2}(C_{67} + C_{73})$

REDDENING RATIOS [332]

$$E(C_{47} - C_{55}) = 0.74\, E(B-V)$$

RELATIONS WITH OTHER SYSTEMS [332]

UVBGRI - Stebbin and Whitford - 1943

U_{St-W}	=	$-1.87 + 1.00\, C_{35}$	
V_{St-W}	=	$-0.67 + 0.77\, C_{41}$	
R_{St-W}	=	$0.30 + 0.92\, C_{73}$	for $C_{73} \geq -0.78$
R_{St-W}	=	$-0.05 + 0.47\, C_{73}$	for $C_{73} < -0.78$

UBV - Johnson and Morgan - 1953

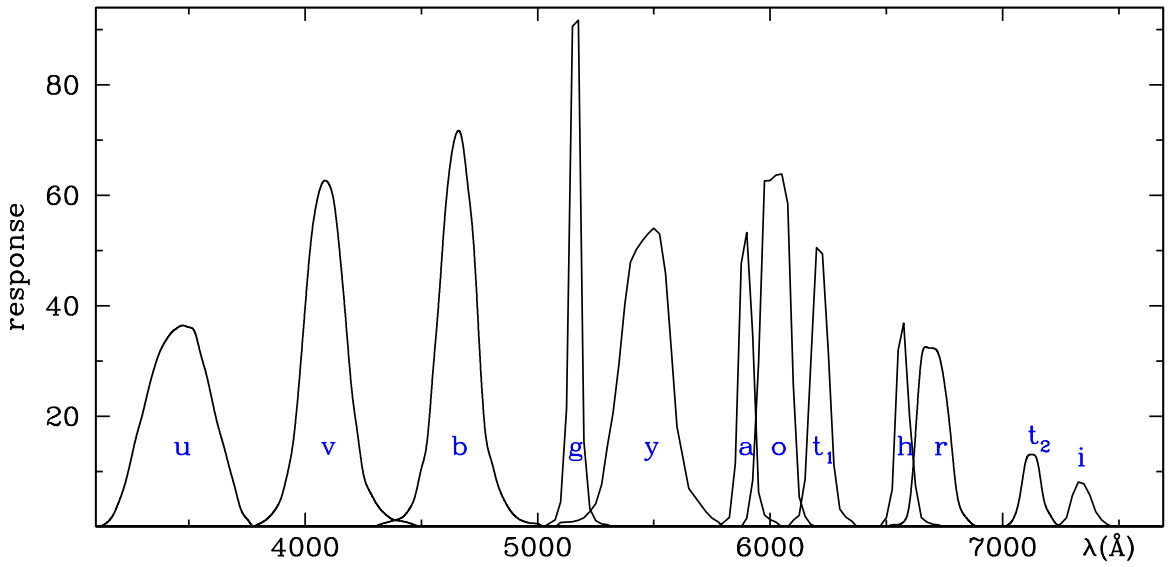
$(U-B)$	=	$-0.92 + 0.73\,(C_{35} - C_{47})$	for $C_{35} - C_{47} \leq 3.60$
$(U-B)$	=	$-0.30 + 0.56\,(C_{35} - C_{47})$	for $C_{35} - C_{47} > 3.60$
$(B-V)$	=	$0.16 + 1.66\,(C_{47} - C_{55})$	for $C_{47} - C_{55} \leq 0.75$
$(B-V)$	=	$0.61 + 1.06\,(C_{47} - C_{55})$	for $C_{47} - C_{55} > 0.75$

uvby Hβ - Strömgren and Crawford - 1956

$(b-y)$	=	$0.116\,(\pm 0.002) + 0.979\,(\pm 0.005)\,(C_{47} - C_{55})$
m_1	=	$0.076\,(\pm 0.003) + 1.052\,(\pm 0.016)\, I_{41}$
c_1	=	$-0.253\,(\pm 0.010) + 0.998\,(\pm 0.011)\, I_{35}$

Fig. 41. continued

TRANSMISSION CURVES [211]



u				*v*				*b*				*g*		*y*	
λ (A)	ϒ(%)	λ (A)	ϒ(%)	λ (A)	ϒ(%)	λ (A)	ϒ(%)	λ (A)	ϒ(%)	λ (A)	ϒ(%)	λ (A)	ϒ(%)	λ (A)	ϒ(%)
3100	0.000	3475	36.457	3775	0.000	4150	49.340	4300	0.000	4675	70.217	5025	0.000	5075	0.000
3125	0.207	3500	36.137	3800	0.498	4175	37.537	4325	0.483	4700	61.802	5050	0.595	5100	0.815
3150	0.849	3525	35.349	3825	1.064	4200	25.169	4350	0.793	4725	51.273	5075	1.279	5125	0.842
3175	2.177	3550	31.461	3850	1.975	4225	17.129	4375	1.088	4750	32.614	5100	4.500	5150	0.923
3200	4.612	3575	27.696	3875	3.323	4250	9.797	4400	1.369	4775	17.260	5125	21.373	5175	1.229
3225	7.664	3600	22.992	3900	5.588	4275	6.681	4425	1.970	4800	12.184	5150	90.577	5200	1.679
3250	11.891	3625	18.412	3925	9.782	4300	4.707	4450	3.336	4825	8.190	5175	91.705	5225	2.778
3275	16.463	3650	14.706	3950	15.666	4325	3.158	4475	5.832	4850	5.431	5200	15.454	5250	4.185
3300	20.246	3675	10.697	3975	26.387	4350	2.135	4500	10.514	4875	3.454	5225	3.278	5275	7.640
3325	24.631	3700	6.847	4000	39.493	4375	1.392	4525	15.528	4900	2.104	5250	1.145	5300	14.395
3350	28.530	3725	3.080	4025	51.534	4400	1.129	4550	28.003	4925	1.287	5275	0.525	5325	20.669
3375	31.623	3750	1.471	4050	58.712	4425	0.967	4575	40.749	4950	0.885	5300	0.423	5350	29.550
3400	33.646	3775	0.000	4075	62.296	4450	0.683	4600	55.460	4975	0.657	5325	0.000	5375	40.389
3425	35.120			4100	62.252	4475	0.297	4625	65.834	5000	0.564			5400	47.936
3450	36.013			4125	58.637	4500	0.000	4650	71.149	5025	0.000			5425	50.230

y		*a*		*o*		t_1		*h*		*r*		t_2		*i*	
λ (A)	ϒ(%)	λ (A)	ϒ(%)	λ (A)	ϒ(%)	λ (A)	ϒ(%)	λ (A)	ϒ(%)	λ (A)	ϒ(%)	λ (A)	ϒ(%)	λ (A)	ϒ(%)
5450	51.753	5775	0.000	5875	0.000	6075	0.000	6450	0.000	6500	0.000	6975	0.000	7225	0.000
5475	53.052	5800	0.775	5900	1.564	6100	1.179	6475	0.184	6525	0.360	7000	0.063	7250	0.542
5500	54.093	5825	1.714	5925	8.377	6125	2.134	6500	1.651	6550	0.393	7025	0.391	7275	1.625
5525	53.045	5850	11.486	5950	29.715	6150	8.654	6525	6.833	6575	0.943	7050	1.827	7300	5.675
5550	45.888	5875	47.646	5975	62.626	6175	29.071	6550	31.954	6600	4.402	7075	5.814	7325	8.090
5575	31.756	5900	53.257	6000	62.715	6200	50.514	6575	36.876	6625	16.671	7100	12.007	7350	7.823
5600	18.145	5925	34.845	6025	63.678	6225	49.420	6600	19.873	6650	30.292	7125	13.094	7375	5.791
5625	12.584	5950	6.274	6050	63.889	6250	31.530	6625	7.499	6675	32.488	7150	11.782	7400	2.754
5650	6.945	5975	2.156	6075	58.496	6275	11.236	6650	1.631	6700	32.337	7175	5.375	7425	1.272
5675	5.537	6000	1.306	6100	25.781	6300	3.194	6675	0.839	6725	31.199	7200	2.501	7450	0.457
5700	4.137	6025	0.874	6125	5.431	6325	1.764	6700	0.492	6750	25.900	7225	0.776	7475	0.000
5725	2.686	6050	0.000	6150	1.934	6350	1.084	6725	0.359	6775	17.212	7250	0.000		
5750	1.599			6175	0.497	6375	0.000	6750	0.000	6800	6.994				
5775	0.901			6200	0.000					6825	2.773				
5800	0.000									6850	1.353				
										6875	0.345				
										6900	0.000				

Fig. 41. continued

ri - Argue - 1967

General photometry of F-G-K stars.

GENERAL INFORMATION

AUTHORS	A. N. Argue
TELESCOPE	0.40m (reflector), Kitt Peak National Observatory
DETECTOR	RCA 7102 (refrigerated)
MAIN ARTICLE	Argue A.N. 1967, MNRAS 135, 23

SYSTEM DESCRIPTION

BANDS DESCRIPTION [11]			
band	filter	*WHM (Å)*	λ_c (Å)
r	multilayer dielectric	1400	6800
r8	2mm Schott RG8	2700	8100
r9	2mm Schott RG9	1900	8200
i	interference	300	10200

SYSTEM ANALYSIS

RELATIONS WITH OTHER SYSTEMS [11]

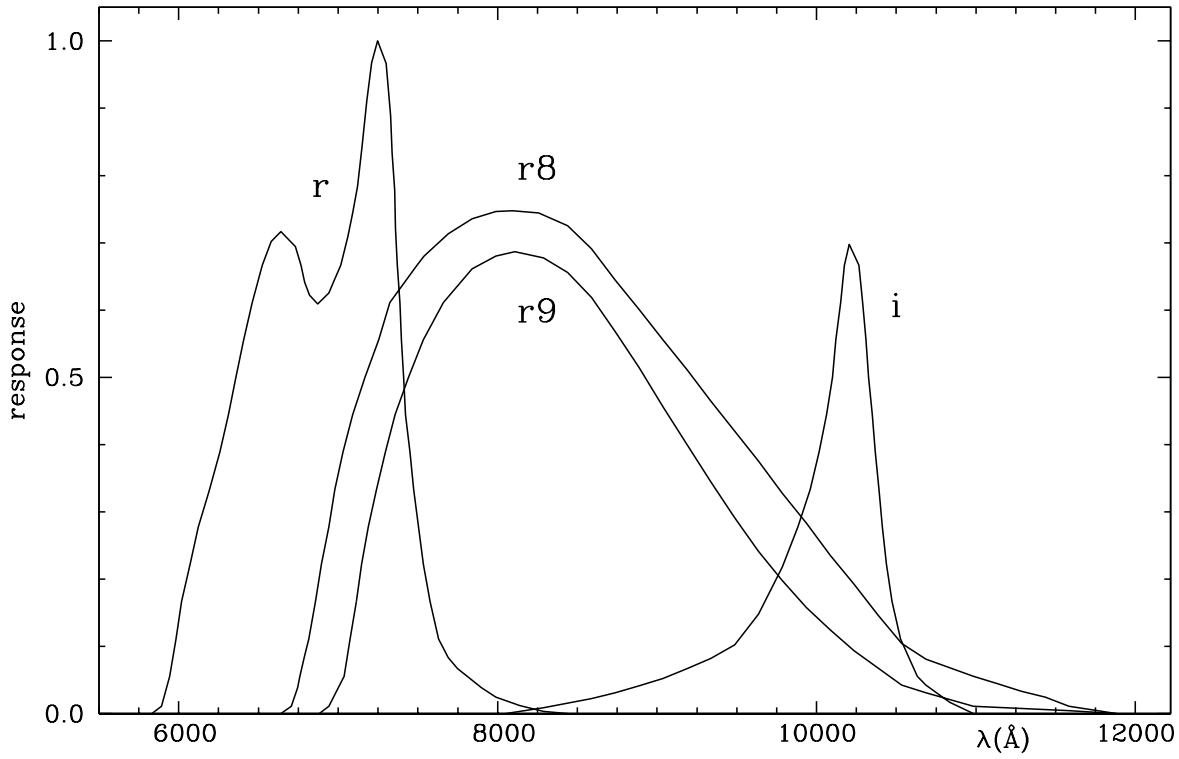
UBVRI(JHKLMN) - Johnson - 1965

$$(R-I) = 0.7411\,(r-i) - 2.373$$

Fig. 42. The photometric system *ri* – Argue – 1967

TRANSMISSION CURVES

As derived from Fig 1 of [11]



r				*r8*				*r9*				*i*			
λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ
5850	0.0008	7000	0.6567	6680	0.0032	9210	0.5041	6790	0.0000	9320	0.3507	8090	0.0015	9850	0.2568
5900	0.0155	7050	0.6975	6790	0.0859	9320	0.4697	6900	0.0039	9430	0.3111	8170	0.0044	9890	0.2829
5950	0.0643	7100	0.7558	6900	0.2278	9430	0.4366	7010	0.0316	9540	0.2727	8250	0.0074	9930	0.3104
6000	0.1401	7150	0.8416	7010	0.3686	9540	0.4045	7120	0.1759	9650	0.2370	8330	0.0105	9970	0.3416
6050	0.2013	7200	0.9508	7120	0.4678	9650	0.3713	7230	0.3228	9760	0.2051	8410	0.0138	10010	0.3808
6100	0.2532	7250	1.0000	7230	0.5377	9760	0.3360	7340	0.4298	9870	0.1748	8490	0.0173	10050	0.4306
6150	0.3010	7300	0.9667	7340	0.6212	9870	0.3030	7450	0.5056	9980	0.1475	8570	0.0213	10090	0.4784
6200	0.3375	7350	0.8008	7450	0.6567	9980	0.2694	7560	0.5693	10090	0.1236	8650	0.0257	10130	0.5725
6250	0.3816	7400	0.5371	7560	0.6858	10090	0.2343	7670	0.6149	10200	0.1002	8730	0.0306	10170	0.6544
6300	0.4319	7450	0.3886	7670	0.7099	10200	0.2025	7780	0.6481	10310	0.0805	8810	0.0358	10210	0.6996
6350	0.4888	7500	0.2843	7780	0.7279	10310	0.1700	7890	0.6694	10420	0.0614	8890	0.0413	10250	0.6897
6400	0.5473	7550	0.1977	7890	0.7407	10420	0.1360	8000	0.6809	10530	0.0429	8970	0.0469	10290	0.6101
6450	0.6000	7600	0.1391	8000	0.7470	10530	0.1056	8110	0.6867	10640	0.0336	9050	0.0533	10330	0.4873
6500	0.6468	7650	0.0982	8110	0.7477	10640	0.0865	8220	0.6837	10750	0.0268	9130	0.0608	10370	0.3819
6550	0.6851	7700	0.0801	8220	0.7460	10750	0.0743	8330	0.6729	10860	0.0187	9210	0.0690	10410	0.2839
6600	0.7094	7800	0.0571	8330	0.7395	10860	0.0648	8440	0.6552	10970	0.0118	9290	0.0774	10450	0.2030
6650	0.7169	7900	0.0387	8440	0.7253	10970	0.0566	8550	0.6298	11080	0.0084	9370	0.0855	10530	0.1083
6700	0.7085	8000	0.0231	8550	0.7015	11190	0.0401	8660	0.5953	11410	0.0069	9450	0.0956	10610	0.0631
6750	0.6818	8100	0.0147	8660	0.6691	11300	0.0324	8770	0.5565	11630	0.0037	9490	0.1029	10690	0.0412
6800	0.6337	8200	0.0083	8770	0.6349	11520	0.0168	8880	0.5173	11850	0.0004	9570	0.1243	10770	0.0264
6850	0.6121	8300	0.0029	8880	0.6034	11630	0.0079	8990	0.4751			9650	0.1530	10850	0.0147
6900	0.6113			8990	0.5700	11740	0.0030	9100	0.4328			9730	0.1881	10930	0.0056
6950	0.6303			9100	0.5370			9210	0.3915			9810	0.2317		

Fig. 42. continued

Boyce *et al.* - 1967

Classification of early-type M giants via TiO bands.

GENERAL INFORMATION

AUTHORS	P. B. Boyce, E. H. Olsen and B. E. Helt
TELESCOPE	1.82m Perkins (reflector), Lowell Observatory
DETECTOR	EMR 514R (refrigerated)
MAIN ARTICLE	Boyce, P. B., Olsen, E. H., Helt, B. E. 1967, PASP 79, 473

SYSTEM DESCRIPTION

Spectral scans (exit slit of 20 Å) over the 4430−5575 and 6900−7400 Å spectral intervals are used to synthesize square band filters of 150 Å width centered at 4510, 4970, 5500 and 6975, 7140, 7315 Å. [49]

SYSTEM ANALYSIS

COLOR INDICES AND PARAMETERS [49]

$m_5 = [m(6975) - m(7140)] - [m(7140) - m(7315)]$: spectral type index.

$m_4 = [m(4510) - m(4970)] - [m(4970) - m(5500)]$: luminosity class index.

$S = -2.97 - 26.74 m_5 - 6.03 m_5^2$: spectral type in units of 0.25 of a subtype starting with $S = 0$ at K5.

Fig. 43. The photometric system Boyce – 1967

62 65 102 - Eggen - 1967

Narrow-band photometry for K-M giants. TiO intensity.

GENERAL INFORMATION

AUTHORS	O. J. Eggen
TELESCOPE	0.50m and 1.52m (reflectors), Mount Wilson Obs.
DETECTOR	RCA 7102
MAIN ARTICLE	Eggen, O 1967, ApJS 14, 307

SYSTEM DESCRIPTION

BANDS DESCRIPTION [93]				
band	λ_c (Å)	feature	*WHM* (Å)	λ_c (Å)
62	6250	TiO	266	6235
65	6500	continuum	272	6505
102	10200	continuum	320	10185

All filter are interference Baird Atomic type “B”.

SYSTEM ANALYSIS

REDDENING RATIOS [93]

$E(102\text{–}65) \,/\, E(B-V) \;=\; 1.25$ $\qquad$ $A(102) \,/\, E(102\text{–}65) \;=\; 1.5$

where $E(B-V)$ is the color excess in the *UBV - Johnson and Morgan - 1953* system.

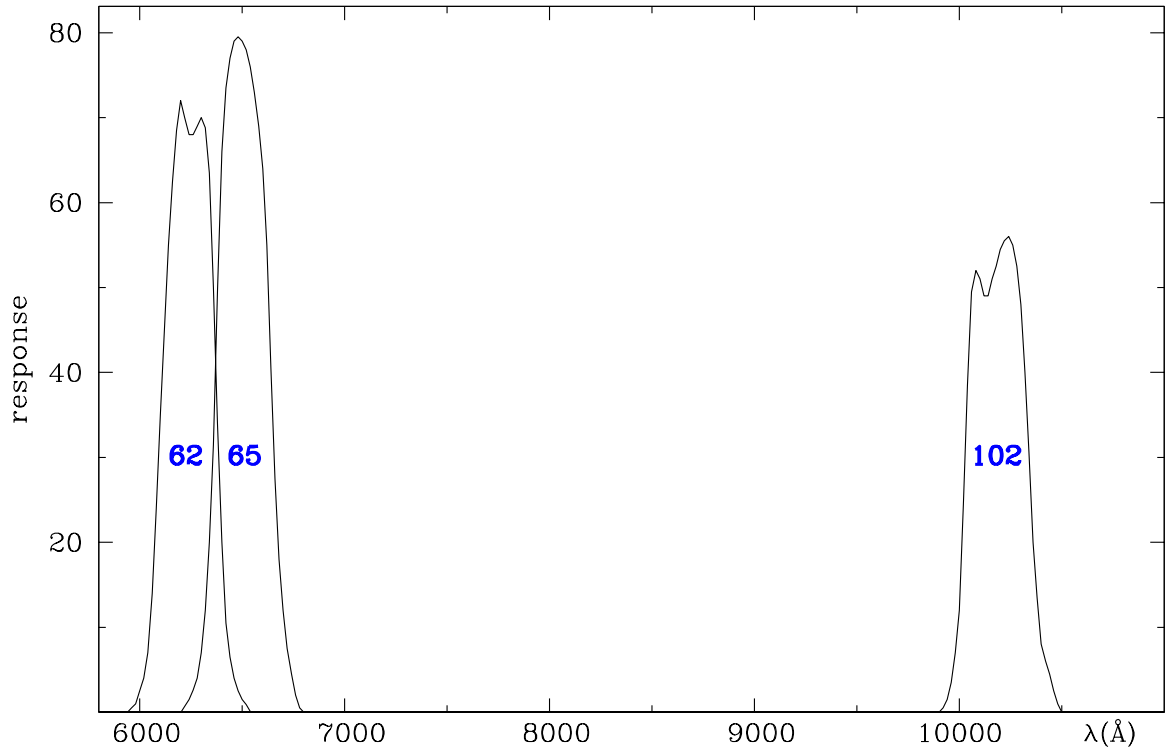
RELATIONS WITH OTHER SYSTEMS [93]

UBVRI(JHKLMN) - Johnson - 1965

$102 \;=\; I + 0.15$

Fig. 44. The photometric system *62 65 102* – Eggen – 1967

TRANSMISSION CURVES [211]



62				*65*				*102*			
λ (Å)	ϒ (%)	λ (Å)	ϒ (%)	λ (Å)	ϒ (%)	λ (Å)	ϒ (%)	λ (Å)	ϒ (%)	λ (Å)	ϒ (%)
5940	0.0	6260	68.0	6200	0.0	6520	78.0	9900	0.0	10220	55.5
5960	0.5	6280	69.0	6220	0.7	6540	76.0	9920	0.5	10240	56.0
5980	1.0	6300	70.0	6240	1.5	6560	73.0	9940	1.5	10260	55.0
6000	2.5	6320	68.8	6260	2.6	6580	69.0	9960	3.5	10280	52.5
6020	4.0	6340	63.5	6280	4.0	6600	64.0	9980	7.0	10300	48.0
6040	7.0	6360	50.0	6300	7.0	6620	55.0	10000	12.0	10320	40.0
6060	14.0	6380	34.0	6320	12.0	6640	40.5	10020	24.5	10340	30.5
6080	24.0	6400	20.0	6340	20.0	6660	27.5	10040	38.5	10360	20.0
6100	35.0	6420	10.5	6360	31.5	6680	18.0	10060	49.5	10380	13.5
6120	45.0	6440	6.5	6380	49.5	6700	12.0	10080	52.0	10400	8.0
6140	55.0	6460	4.0	6400	66.0	6720	7.5	10100	51.0	10420	6.0
6160	62.5	6480	2.5	6420	73.5	6740	4.5	10120	49.0	10440	4.5
6180	68.5	6500	1.5	6440	77.0	6760	2.0	10140	49.0	10460	2.5
6200	72.0	6520	0.9	6460	79.0	6780	0.5	10160	51.0	10480	1.0
6220	70.0	6540	0.1	6480	79.5	6800	0.0	10180	52.5	10500	0.0
6260	68.0	6560	0.0	6500	79.0			10200	54.5		

Fig. 44. continued

LPL - Johnson *et al.* - 1967

General purpose system.

GENERAL INFORMATION

AUTHORS	H. L. Johnson, R. I. Mitchell, and A. S. Latham
TELESCOPE	0.53m and 0.71m, Catalina observing station of the Lun.Plan.Lab.
DETECTOR	RCA 1P21 (S-4 cathode)
MAIN ARTICLE	Johnson, H. L., Mitchell, R. I., Lathan, A. S. 1967, Com. L.P.L. 6, No 92, 85

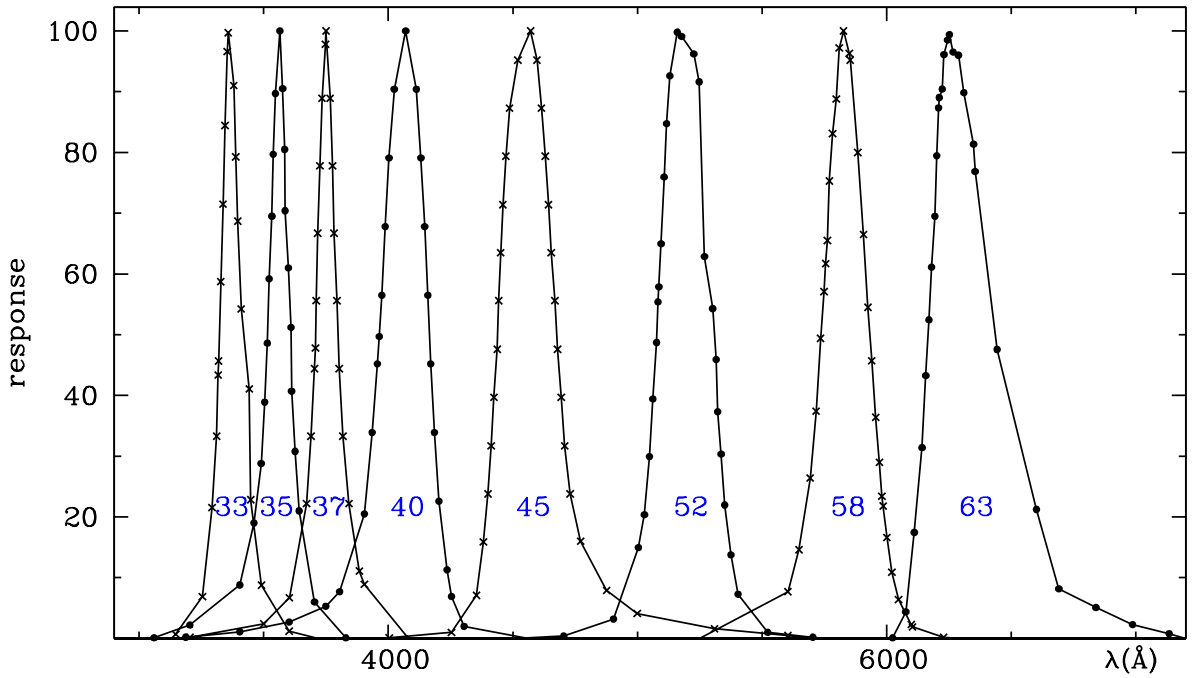
SYSTEM DESCRIPTION

BANDS DESCRIPTION [154]				FLUX CALIBRATION (#) [154]	
band	λ_0 (μm)	*WHM* (Å)	λ_c (Å)	(W cm^{-2} μm^{-1})	(W m^{-2} Hz^{-1})
33	0.337	92	3368	3.33 10^{-12}	1.13 10^{-23}
35	0.353	95	3563	3.51 10^{-12}	1.46 10^{-23}
37	0.375	90	3754	5.04 10^{-12}	2.36 10^{-23}
40	0.402	200	4064	7.73 10^{-12}	4.17 10^{-23}
45	0.459	234	4556	6.31 10^{-12}	4.43 10^{-23}
52	0.518	232	5193	4.61 10^{-12}	4.13 10^{-23}
58	0.583	197	5834	3.32 10^{-12}	3.76 10^{-23}
63	0.635	266	6300	2.49 10^{-12}	3.35 10^{-23}

(#) Fluxes for a mag. 0.0 star.

Fig. 45. The photometric system LPL – Johnson et al. – 1967

TRANSMISSION CURVES [154]



33		35		37		40		45		52		58		63	
λ (A)	ϒ (%)	λ (A)	ϒ (%)	λ (A)	ϒ (%)	λ (A)	ϒ (%)	λ (A)	ϒ (%)	λ (A)	ϒ (%)	λ (A)	ϒ (%)	λ (A)	ϒ (%)
3157	0.7	3060	0.1	3204	0.2	3187	0.2	4004	0.1	4704	0.4	5249	0.0	6024	0.1
3254	6.9	3204	2.2	3500	2.4	3404	1.1	4254	1.0	4904	3.2	5604	7.7	6077	4.4
3293	21.5	3404	8.8	3603	6.7	3602	2.7	4354	7.1	5004	15.0	5648	14.6	6111	17.5
3311	33.3	3461	19.0	3672	22.2	3749	5.3	4382	15.9	5028	20.4	5693	26.4	6142	31.5
3317	43.4	3490	28.8	3690	33.3	3805	7.7	4400	23.8	5048	30.0	5717	37.4	6157	43.3
3319	45.7	3504	38.9	3704	44.4	3904	20.5	4413	31.7	5062	39.5	5735	49.4	6170	52.5
3328	58.7	3515	48.6	3708	47.8	3935	33.9	4424	39.7	5077	48.8	5749	57.1	6180	61.2
3337	71.5	3522	59.2	3711	55.6	3956	45.2	4437	47.6	5082	55.5	5755	61.7	6194	69.6
3345	84.5	3533	69.5	3717	66.7	3964	49.7	4443	55.6	5086	58.0	5762	65.5	6201	79.6
3354	96.6	3538	79.7	3726	77.8	3974	56.5	4451	63.5	5095	65.1	5770	75.3	6208	87.5
3358	99.7	3547	89.7	3734	88.9	3988	67.8	4460	71.4	5107	76.1	5783	83.1	6211	89.2
3380	91.4	3565	100.0	3748	97.8	4003	79.1	4472	79.4	5117	84.9	5798	88.8	6223	90.6
3388	79.3	3576	90.5	3750	100.0	4024	90.4	4487	87.3	5130	92.8	5810	97.2	6230	96.3
3396	68.7	3584	80.5	3767	88.9	4070	100.0	4520	95.2	5160	99.8	5827	100.0	6245	98.7
3399	66.9	3586	70.4	3776	77.8	4113	90.4	4571	100.0	5177	99.2	5850	96.3	6252	99.7
3410	54.2	3599	61.0	3782	66.7	4131	79.1	4597	95.2	5226	96.3	5854	95.2	6267	96.7
3422	41.1	3610	51.2	3794	55.6	4146	67.8	4615	87.3	5248	91.7	5884	80.0	6288	96.2
3442	27.7	3612	40.7	3803	44.4	4159	56.5	4630	79.4	5269	81.1	5907	66.5	6310	90.0
3448	22.8	3626	30.8	3818	33.3	4170	45.2	4643	71.4	5284	70.9	5925	54.5	6349	81.5
3491	8.8	3642	21.0	3842	22.2	4185	33.9	4654	63.5	5292	62.5	5940	45.7	6355	77.0
3602	1.2	3704	6.0	3884	11.1	4203	22.6	4669	55.6	5302	54.3	5956	36.4	6443	47.6
3719	0.1	3830	0.1	3904	8.9	4236	11.3	4679	47.6	5316	46.0	5971	29.0	6601	21.2
				4082	0.0	4254	6.9	4694	39.7	5322	37.4	5981	23.4	6691	8.2
						4304	2.0	4708	31.7	5336	30.4	5986	21.8	6840	5.1
						4564	0.0	4730	23.8	5350	22.0	6001	16.6	6987	2.3
								4772	16.0	5375	13.8	6021	10.9	7134	0.8
								4876	7.9	5404	7.3	6048	6.4		
								4999	4.1	5523	1.0	6099	2.3		
								5309	1.6	5704	0.2	6104	1.9		
								5604	0.5			6229	0.2		

Fig. 45. continued

27 colors - Wing - 1967

Continuum energy distribution and molecular band photometry in late-type stars.

GENERAL INFORMATION

AUTHORS	R. F. Wing
TELESCOPE	0.91 Crossley (reflector), Lick Obs.
DETECTOR	RCA 7102 (refrigerated)
MAIN ARTICLE	Wing, R. F. 1967, proc. Colloquium on Late-Type Stars (ed. M. Hack), pg. 205 [189]

SYSTEM DESCRIPTION

The system is defined by 27 wavelength intervals (30 Å width) distributed over the 0.78 – 1.1 μm, and covering the major molecular bands in the region, namely TiO, VO, H_2O, ZrO and CN. The 27 bands are obtained from photoelectric scans at the Coudé spectrograph. [329]

ZERO POINT: The fluxes in all the bands are linked to the system of absolute fluxes given by [135] and the zero point of the whole system is set by requiring that the magnitude of α Lyr in the *10400* band is 0.00. [329]

SYSTEM ANALYSIS

COLOR INDICES AND PARAMETERS [329]

If $C(\lambda)$ are the counts/sec received through a 30 Å band centered at λ , then $m(\lambda) = -2.5 \log C(\lambda)$

$T = m(10400) - m(8834) - B + 1.200$: temperature index where

$B = m(9190) - 0.339\,[m(9190) - m(8140)] - m(8834)$ is the blanketing correction.

$TiO = m(8834) - m(8880) + B + f(T)$: index of TiO band strength where

$f(T) = 0.045T - 0.028$ is the correction to compensate for the spectral slope when combining a band and a reference continuum measured at different wavelengths.

$VO = m(10400) - 0.372\,[m(10400) - m(10834)] - m(10564) + 0.054$: index of VO band strength.

REDDENING RATIOS [329]

$E(T) = 0.33 E(B-V)_{Johnson}$

Fig. 46. The photometric system 27 colors – Wing – 1967

*H*α - Andrews - 1968

Three square-band measurement of the *H*α intensity in early type stars.

GENERAL INFORMATION

AUTHORS	P.J. Andrews
TELESCOPE	0.91m (reflector), Cambridge; 1.93m (reflector), Pretoria
DETECTOR	EMI 9558A
MAIN ARTICLE	Andrews, P. J. 1968, MemRAS 72, 35

SYSTEM DESCRIPTION

BANDS DESCRIPTION [9]		
band	bandpass (Å)	feature
Cambridge		
A	6477.5 – 6497.0	$H\alpha_{blue\ cont.}$
B	6546.4 – 6582.5	Hα
C	6634.3 – 6653.5	$H\alpha_{red\ cont.}$
Pretoria		
A	6469.0 – 6505.0	$H\alpha_{blue\ cont.}$
B	6546.5 – 6582.4	Hα
C	6623.8 – 6659.6	$H\alpha_{red\ cont.}$

On a focal plane of a 5.0 Å/mm dispersion spectrograph, three diaphrams transmit to separate photomultipliers the *A*, *B*, *C* portions of the spectrum.
In the Cambridge setup the light from both *A* and *C* bands are brought onto a single photometer, whereas at Pretoria two separate photomultipliers are used.

SYSTEM ANALYSIS

COLOR INDICES AND PARAMETERS [9]

Subscript "*L*" denotes readings on a comparison lamp.

$$R_\alpha = \frac{(A+C)\ /\ (C_L+A_L)}{B\ /\ B_L}$$: for Cambridge observations.

$$R_\alpha = \frac{1}{2}\,\frac{A\ /\ A_L + C\ /\ C_L}{B\ /\ B_L}$$: for Pretoria observations.

RELATIONS WITH OTHER SYSTEMS [9]

uvby Hβ - Strömgren and Crawford - 1956

$R_\alpha = 0.830\,\beta - 1.069$ for $\beta > 2.600$

Fig. 47. The photometric system Hα – Andrews – 1968

DDO - McClure and Van den Bergh - 1968

General purpose system.

GENERAL INFORMATION

AUTHORS	R. D. McClure and S. Van den Bergh
TELESCOPE	1.88m (reflector), DDO; 0.5m (reflector), Yale's Bethany obs. station 0.41m and 0.91m (reflectors), KPNO; 0.41m and 1.0m (reflectors), CTIO
DETECTOR	1P21, EMI 9502 (refrigerated), FW 130 (refrigerated)
MAIN ARTICLE	McClure R. and Van den Bergh, S. 1968, AJ 73, 313

SYSTEM DESCRIPTION

BANDS DESCRIPTION [201]					
band	filter	λ_{peak} (Å)	FWHM (Å)	λ_{eff} (Å) (#)	FWHM (Å)(#)
35	8mm Schott UG11 + 1mm Schott WG345	3460	383	3531	280
38	5mm Corning 7-51 + 2mm Schott GG375	3815	330	3816	287
41	interference	4166 ± 2.5	83 ± 5	4164	76
42	interference	4257 ± 2.5	73 ± 5	4258	79
45	interference	4517 ± 2.5	76 ± 5	4521	68
48	interference	4886 ± 2.5	186 ± 10	4880	183
BANDS DESCRIPTION [69]					
band		λ_c (Å)	FWHM (Å)		
51		5130	154		

(#) As realized at the South Africal Astron. Obs. [77]

SYSTEM ANALYSIS

COLOR INDICES AND PARAMETERS [203]

$C(35–38) = 2.5\log[I(38)/I(35)]$: measures the Balmer discontinuity.

$C(38–41) = 2.5\log[I(41)/I(38)]$: measures the line-blanketing discontinuity near 4000 Å .

$C(41–42) = 2.5\log[I(42)/I(41)]$: measures the CN intensity.

$C(42–45) = 2.5\log[I(45)/I(42)]$: measures the strength of the G-band break.

$C(48–51) = 2.5\log[I(51)/I(48)]$: measures the MgH + Mg*b* complex.

REDDENING-FREE PARAMETERS [203]

Obtained by adding $(B-V)$ from *UBV - Johnson and Morgan - 1953*:

$C^*(35–38) = C(35–38) - 0.306\,(B-V)$

$C^*(38–41) = C(38–41) - 0.318\,(B-V)$

$C^*(41–42) = C(41–42) - 0.066\,(B-V)$

$C^*(42–45) = C(42–45) - 0.234\,(B-V)$

REDDENING RATIOS [202]

$E[C(35–38)] = 0.32\,E(B-V)_{Johnson}$

$E[C(38–41)] = 0.33\,E(B-V)_{Johnson}$

$E[C(41–42)] = 0.07\,E(B-V)_{Johnson}$

$E[C(42–45)] = 0.23\,E(B-V)_{Johnson}$

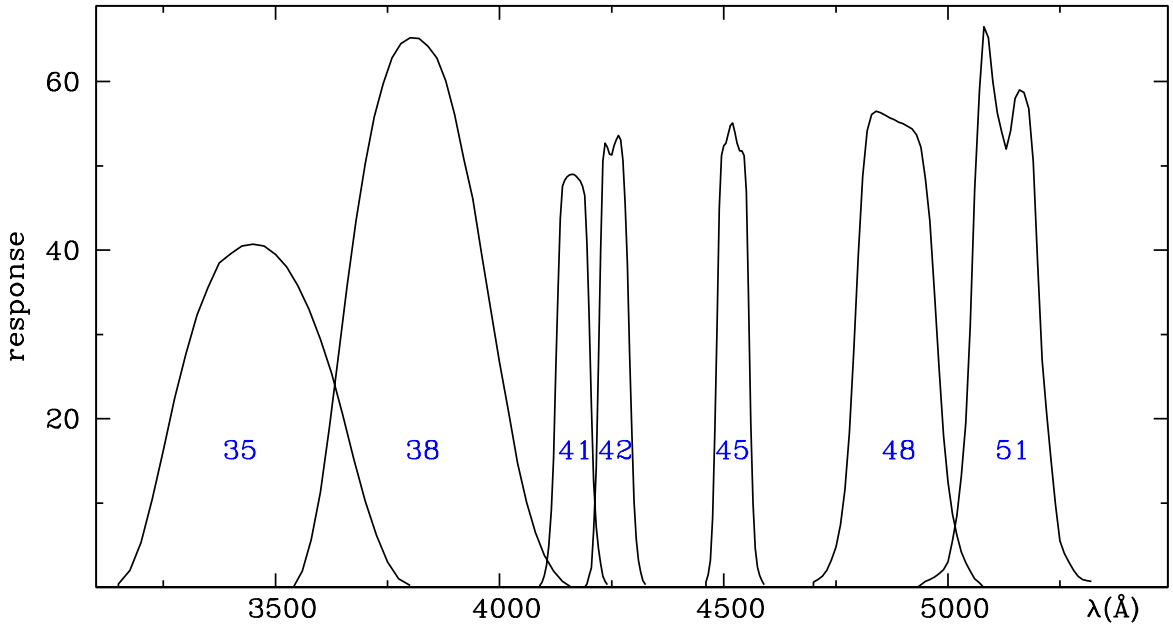
$E[C(45–48)] = 0.31\,E(B-V)_{Johnson}$

$E[C(48–51)] = 0.22\,E(B-V)_{Johnson}$

Fig. 48. The photometric system DDO – McClure and Van den Bergh – 1968

TRANSMISSION CURVES

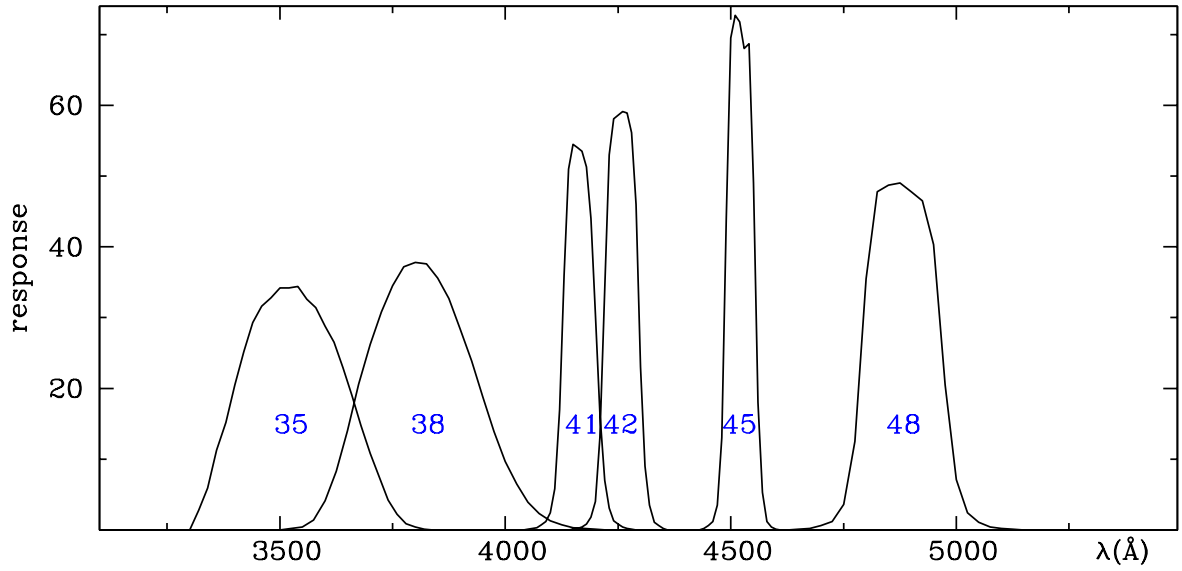
As from the original paper [201]. Transmission curve for the *51* band is from [69]



35		*38*		*41*		*42*		*45*		*48*				*51*			
λ (A)	ϒ (%)	λ (A)	ϒ (%)	λ (A)	ϒ (%)	λ (A)	ϒ (%)	λ (A)	ϒ (%)	λ (A)	ϒ (%)	λ (A)	ϒ (%)	λ (A)	ϒ (%)	λ (A)	ϒ (%)
3150	0.4	3540	0.0	4090	0.2	4190	0.0	4460	0.6	4700	0.6	5030	4.2	4950	0.7	5280	2.0
3175	2.0	3560	1.9	4095	0.6	4195	0.4	4465	1.5	4710	0.9	5040	2.9	4960	0.9	5290	1.3
3200	5.3	3580	5.6	4100	1.4	4200	1.4	4470	3.2	4720	1.3			4970	1.2	5300	0.9
3225	10.4	3600	11.3	4105	2.6	4205	2.3	4475	8.2	4730	2.0			4980	1.6	5310	0.8
3250	16.2	3620	18.9	4110	4.9	4210	6.7	4480	18.5	4740	3.2			4990	2.1	5320	0.7
3275	22.5	3640	27.3	4115	9.2	4215	14.1	4485	31.0	4750	4.8			5000	3.0		
3300	27.7	3660	35.8	4120	15.4	4220	26.5	4490	45.0	4760	7.4			5010	5.5		
3325	32.3	3680	43.5	4125	26.0	4225	40.0	4495	51.2	4770	11.6			5020	8.5		
3350	35.6	3700	50.3	4130	35.2	4230	50.6	4500	52.4	4780	18.3			5030	13.2		
3375	38.5	3720	55.8	4135	43.7	4235	52.7	4505	52.7	4790	28.2			5040	19.5		
3400	39.6	3740	59.7	4140	47.6	4240	52.2	4510	53.8	4800	39.4			5050	31.0		
3425	40.5	3760	62.8	4145	48.3	4245	51.4	4515	54.8	4810	48.8			5060	47.2		
3450	40.7	3780	64.5	4150	48.7	4250	51.3	4520	55.1	4820	54.2			5070	59.0		
3475	40.5	3800	65.2	4155	48.9	4255	52.4	4525	54.0	4830	56.1			5080	66.5		
3500	39.5	3820	65.1	4160	49.0	4260	53.1	4530	52.7	4840	56.5			5090	65.2		
3525	38.0	3840	64.2	4165	49.0	4265	53.6	4535	51.8	4850	56.3			5100	60.0		
3550	36.8	3860	62.8	4170	48.8	4270	53.1	4540	51.8	4860	56.0			5110	56.3		
3575	33.0	3880	60.1	4175	48.5	4275	50.7	4545	51.2	4870	55.7			5120	54.0		
3600	29.4	3900	56.1	4180	48.2	4280	45.5	4550	47.0	4880	55.5			5130	52.0		
3625	25.4	3920	50.8	4185	47.6	4285	38.5	4555	34.0	4890	55.2			5140	54.2		
3650	20.5	3940	46.1	4190	46.5	4290	27.8	4560	19.5	4900	55.0			5150	58.0		
3675	15.2	3960	39.5	4195	40.7	4295	18.6	4565	10.0	4910	54.7			5160	59.0		
3700	10.2	3980	33.1	4200	31.9	4300	10.2	4570	4.6	4920	54.4			5170	58.7		
3725	6.2	4000	26.7	4205	21.5	4305	5.7	4575	2.4	4930	53.7			5180	56.8		
3750	3.0	4020	20.7	4210	12.5	4310	3.2	4580	1.4	4940	52.2			5190	50.5		
3775	1.0	4040	14.7	4215	7.2	4315	1.8	4585	0.8	4950	48.5			5200	38.3		
3800	0.2	4060	10.1	4220	4.6	4320	0.8	4590	0.3	4960	43.5			5210	27.0		
		4080	6.5	4225	2.8	4325	0.3			4970	34.6			5220	20.7		
		4100	3.8	4230	1.3					4980	26.0			5230	15.1		
		4120	1.9	4235	0.7					4990	18.0			5240	9.8		
		4140	0.7	4240	0.3					5000	12.5			5250	5.5		
		4160	0.0							5010	8.7			5260	4.0		
										5020	6.2			5270	3.0		

Fig. 48. continued

As realized at the South Africal Astron. Obs. [77].



35		*38*		*41*		*42*		*45*		*48*	
λ (A)	ϒ (%)	λ (A)	ϒ (%)	λ (A)	ϒ (%)	λ (A)	ϒ (%)	λ (A)	ϒ (%)	λ (A)	ϒ (%)
3300	0.0	3500	0.0	4040	0.0	4140	0.0	4430	0.0	4625	0.0
3320	2.8	3525	0.2	4050	0.1	4150	0.1	4440	0.2	4650	0.1
3340	5.9	3550	0.4	4060	0.2	4160	0.2	4450	0.6	4675	0.2
3360	11.3	3575	1.4	4070	0.3	4170	0.4	4460	1.2	4700	0.6
3380	15.2	3600	4.1	4080	0.7	4180	0.8	4470	3.5	4725	1.2
3400	20.5	3625	8.3	4090	1.2	4190	1.8	4480	13.0	4750	3.6
3420	25.2	3650	14.0	4100	2.4	4200	4.0	4490	44.0	4775	12.5
3440	29.3	3675	20.6	4110	5.8	4210	13.0	4500	69.5	4800	35.5
3460	31.6	3700	26.2	4120	17.0	4220	34.0	4510	72.7	4825	47.8
3480	32.8	3725	30.8	4130	36.0	4230	53.0	4520	71.8	4850	48.7
3500	34.2	3750	34.5	4140	51.0	4240	58.1	4530	68.0	4875	49.0
3520	34.2	3775	37.2	4150	54.5	4250	58.6	4540	68.7	4900	47.8
3540	34.4	3800	37.8	4160	54.0	4260	59.1	4550	49.0	4925	46.5
3560	32.6	3825	37.6	4170	53.5	4270	58.9	4560	18.0	4950	40.3
3580	31.4	3850	35.6	4180	51.3	4280	56.1	4570	5.3	4975	20.5
3600	28.8	3875	32.7	4190	44.0	4290	46.0	4580	1.2	5000	7.1
3620	26.5	3900	28.4	4200	30.5	4300	23.0	4590	0.4	5025	2.4
3640	22.9	3925	23.9	4210	16.5	4310	9.0	4600	0.1	5050	1.1
3660	19.0	3950	18.8	4220	7.0	4320	3.5	4610	0.0	5075	0.4
3680	14.8	3975	13.9	4230	3.1	4330	1.1			5100	0.2
3700	10.8	4000	9.7	4240	1.3	4340	0.6			5125	0.1
3720	7.5	4025	6.5	4250	0.8	4350	0.2			5150	0.0
3740	4.2	4050	3.9	4260	0.4	4360	0.0				
3760	2.2	4075	2.3	4270	0.2						
3780	0.9	4100	1.3	4280	0.1						
3800	0.4	4125	0.7	4290	0.0						
3820	0.1	4150	0.3								
3840	0.0	4175	0.2								
		4200	0.1								
		4225	0.0								

Fig. 48. continued

Hβ,γ - Sinnerstad *et al.* - 1968

Hβ, Hγ and HeI 4471 Å narrow band photometry for early type stars.

GENERAL INFORMATION

AUTHORS	U. Sinnerstad, J. Arkling, S. H. Alm, P. Brattlund
TELESCOPE	1.0m (reflector), Stockholm Observatory
DETECTOR	EMI 6256 S (uncooled)
MAIN ARTICLE	Sinnerstad U., Arkling J., Alm S.H., Brattlund P. 1968, Ark. Astr. 5, 105

SYSTEM DESCRIPTION

The light coming into the photometer is split in two parts by a beam-splitting mirror and each of the two beams proceeds through a filter and falls on a separate photomultiplier.

BANDS DESCRIPTION [270]

band	filter manufacturer	λ_{peak} (Å)	half-width (Å)
Hγ narrow	Baird Atomic	4340	20
Hγ wide	Baird Atomic	4340	165
HeI narrow	Baird Atomic	4471	23
HeI interm	Baird Atomic	4471	88
HeI wide	Baird Atomic	4471	140
Hβ narrow	Spectrolab	4861	20
Hβ narrow	Spectrolab	4861	26
Hβ wide	Spectrolab	4861	164
Hβ narrow (#)	Baird Atomic	4861	6
Hβ interm (#)	Baird Atomic	4861	28
Hβ wide (#)	Baird Atomic	4861	195

Interference filters.

(#) Filter set used in April and May 1967.

SYSTEM ANALISYS

COLOR INDICES AND PARAMETERS [270]

Line indices are obtained as the magnitude difference corresponding to the ratio of the intensities measured simultaneously through the narrow and wide filters. The simultaneity directly accounts for variability of the atmosphere transmission which is cancelled out. The difference in sensitivity between the direct and reflected beams is accounted for by interchanging their light paths.

RELATIONS WITH OTHER SYSTEMS [270]

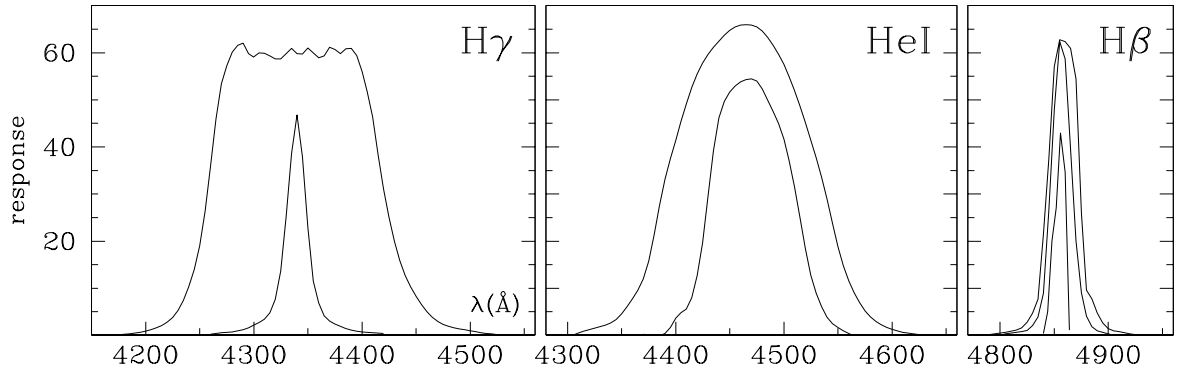
uvby Hβ - Strömgren and Crawford - 1956

$$H\beta = 2.088\ \beta_{Stromgren} - 5.260$$

Fig. 49. The photometric system *Hβ,γ* – Sinnerstad et al. – 1968

TRANSMISSION CURVES

As derived from Fig 1a,b,c of [270].



Hγ 20 Å		*Hγ 165 Å*		*HeI 88 Å*		*HeI 140 Å*		*Hβ 6 Å*		*Hβ 20 Å*		*Hβ 26 Å*	
λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ
4252.7	0.0	4167.7	0.0	4377.0	0.0	4304.1	0.0	4825.5	0.0	4799.0	0.0	4785.8	0.0
4269.7	0.5	4203.4	1.1	4394.9	1.7	4327.1	1.7	4833.3	0.8	4820.4	0.8	4811.8	0.9
4288.3	1.1	4219.7	2.7	4401.5	4.1	4345.1	3.4	4842.1	1.7	4829.6	1.9	4824.0	2.5
4305.3	2.7	4230.6	5.4	4412.8	6.6	4361.5	8.3	4843.7	4.2	4835.7	4.2	4831.7	5.4
4316.4	5.4	4240.7	10.9	4420.5	13.2	4375.9	16.6	4846.3	15.0	4839.8	8.3	4836.8	10.8
4323.9	12.0	4252.6	22.6	4425.6	20.7	4386.1	29.0	4854.1	34.1	4842.3	17.5	4841.9	28.3
4329.0	22.3	4259.4	34.8	4431.7	33.1	4401.5	42.6	4856.7	44.9	4847.4	35.7	4847.0	44.5
4330.7	27.2	4269.6	53.0	4439.4	45.5	4416.9	53.8	4859.3	38.2	4852.5	58.2	4850.5	58.6
4334.1	35.9	4274.7	57.1	4445.0	49.7	4438.4	62.1	4861.9	19.1	4856.1	62.7	4853.1	61.1
4337.5	45.1	4279.1	59.8	4456.3	53.2	4452.8	65.2	4863.0	7.5	4860.2	58.2	4857.2	64.0
4340.2	46.7	4283.9	61.3	4469.1	54.5	4467.1	66.0	4867.1	3.7	4865.3	38.2	4860.2	62.3
4342.5	44.3	4293.4	60.9	4475.8	53.8	4478.4	65.0	4872.4	1.7	4870.4	18.9	4863.8	62.3
4345.9	35.1	4303.6	59.8	4485.5	49.7	4488.7	62.1	4877.6	0.8	4875.5	8.3	4865.3	60.7
4349.3	25.0	4328.1	59.2	4494.7	45.1	4504.1	55.4	4882.8	0.0	4880.6	3.7	4868.9	59.8
4352.7	15.2	4335.9	60.9	4500.3	41.4	4524.6	41.8			4885.7	1.7	4869.9	54.8
4356.1	10.3	4344.4	59.5	4510.1	31.4	4540.0	29.0			4891.8	0.8	4872.5	39.9
4362.2	5.4	4351.2	60.9	4515.2	24.8	4550.2	18.6			4906.1	0.0	4875.0	25.8
4372.4	2.7	4364.8	59.2	4525.4	12.4	4566.6	8.3					4877.6	14.1
4390.0	1.1	4371.6	61.4	4531.1	8.3	4575.9	5.0					4882.7	8.7
4412.0	0.5	4378.3	59.8	4539.2	4.1	4595.3	1.7					4887.8	6.0
4432.4	0.0	4385.1	60.9	4550.0	1.7	4637.4	0.0					4898.0	1.8
		4395.3	59.2	4563.8	0.0							4908.2	0.8
		4398.7	57.1									4928.6	0.0
		4402.1	54.1										
		4408.9	47.8										
		4415.7	37.2										
		4422.5	28.0										
		4434.4	16.3										
		4450.4	8.2										
		4458.5	5.4										
		4497.3	1.1										
		4510.8	0.0										

Fig. 49. continued

u'ubvv' - Smith - 1968

Narrow-band photometry of Wolf-Rayet stars.

GENERAL INFORMATION

AUTHORS	L. F. Smith
TELESCOPE	1.0m (reflector), Siding Spring Observatory;
	1.27m (reflector), Mount Stromlo Observatory
DETECTOR	1P21 (refrigerated)
MAIN ARTICLE	Smith, L. F. 1968, MNRAS 140, 409

SYSTEM DESCRIPTION

BANDS DESCRIPTION [272]

band	filter manufacturer	λ_c (Å)	FWHM (Å)	Υ_{peak} (%)
u'	Schott	3500	80	43
u	Schott	3650	100	39
b	Spectrolab	4270	70	60
v	Spectrolab	5160	130	50
v'	Schott	5500	230	64

Interference filters.

A slightly different set of filters (and a refrigerated EMI 6256 photomultiplier) have been used at ESO by [193].

The passbands have been reproduced with a spectral scanner by [197].

SYSTEM ANALYSIS

REDDENING-FREE PARAMETERS [272]

$\xi = -(u'-u) + 0.24\,(b-v)$: intensity of N IV 3480 Å (in WN stars).

$\Delta = (u-b) - 0.69\,(b-v)$: measures the non-linearity on the continuum in the region covered by the *u,b,v* bands.

$\phi = (b-v') - 1.29\,(b-v)$: measures HeII 5412 Å in WN stars; in WC stars it measures the intensity of the HeII 5412, CIV 5469 and OV 5592 Å blend.

REDDENING RATIOS [272]

$E(B-V) \,/\, E(b-v) = 1.20$ $\quad$ $E(v-v') \,/\, E(b-v) = 0.29$

Fig. 50. The photometric system *u'ubvv'* – Smith – 1968

jhk - Bahng - 1969

General purpose system. Cool stars.

GENERAL INFORMATION

AUTHORS	J. Bahng
TELESCOPE	0.91m (reflector), KPNO
DETECTOR	PbS, operating at dry-ice temperatures
MAIN ARTICLE	Bahng, J. 1969, MNRAS 143, 73

SYSTEM DESCRIPTION

BANDS DESCRIPTION [17]

band	λ_c (μm)	half-width (μm)	Υ_c (%)
j	1.21	0.077	58
h	1.59	0.086	49
k	2.15	0.098	61

Filters by Infrared Industries

SYSTEM ANALYSIS

RELATIONS WITH OTHER SYSTEMS [17]

UBVRI(JHKLMN) - Johnson - 1965

$$(J-K)_{Johnson} = 0.923\,(j-k) + 1.446$$

Fig. 51. The photometric system *jhk* – Bahng – 1969

Ca II K - Henry - 1969

Square band spectrophotometric measurement of Ca II K in A-type stars.

GENERAL INFORMATION

AUTHORS	R. C. Henry
TELESCOPE	0.40m (reflector), KPNO
DETECTOR	EMR 641-A
MAIN ARTICLE	Henry, R. C. 1969, ApJS 18, 47

SYSTEM DESCRIPTION

BANDS DESCRIPTION [137]

band	λ_c (Å)	width (Å)	feature
K	3933.68	8.50	Ca II K line
C	3915.30	8.23	continuum

Two exit slits direct to two separate photomultipliers the *K* and *C* portions of the spectrum.

SYSTEM ANALYSIS

COLOR INDICES AND PARAMETERS [137]

$$k = -2.5 \log \frac{K}{C} + const$$

Fig. 52. The photometric system *Ca II K* – Henry – 1969

Newell *et al.* - 1969

Narrow-band system. Horizontal-branch stars.

GENERAL INFORMATION

AUTHORS	E. B. Newell, A. W. Rodgers, and L. Searle
TELESCOPE	0.41m and 1.02m, Siding Spring Observatory
DETECTOR	1P21 (refrigerated)
MAIN ARTICLE	Newell, E. B., Rodgers, A. W., Searle, L. 1969, ApJ 156, 597

SYSTEM DESCRIPTION

BANDS DESCRIPTION[229]

band	interference filter manufacturer	λ_{eff} (Å)	FWHM (Å)	Υ_{peak} (%)
354 [229]	Thin Film Products	3535	78	43
427 [229]	Thin Film Products	4272	84	68
531 [229]	Thin Film Products	5305	155	40
Hγ [228]		4348	50	53

Additional observations in the *UBV* bands of *UBV - Johnson and Morgan - 1953* system have been obtained with the following filters: 2mm Corning 9863 (*U*), 3mm Corning 5030 + 2mm Schott 6613 (*B*), 2mm Corning 3384 (*V*).

SYSTEM ANALYSIS

COLOR INDICES AND PARAMETERS [228]

$353 - 427$: measures the Balmer discontinuity.

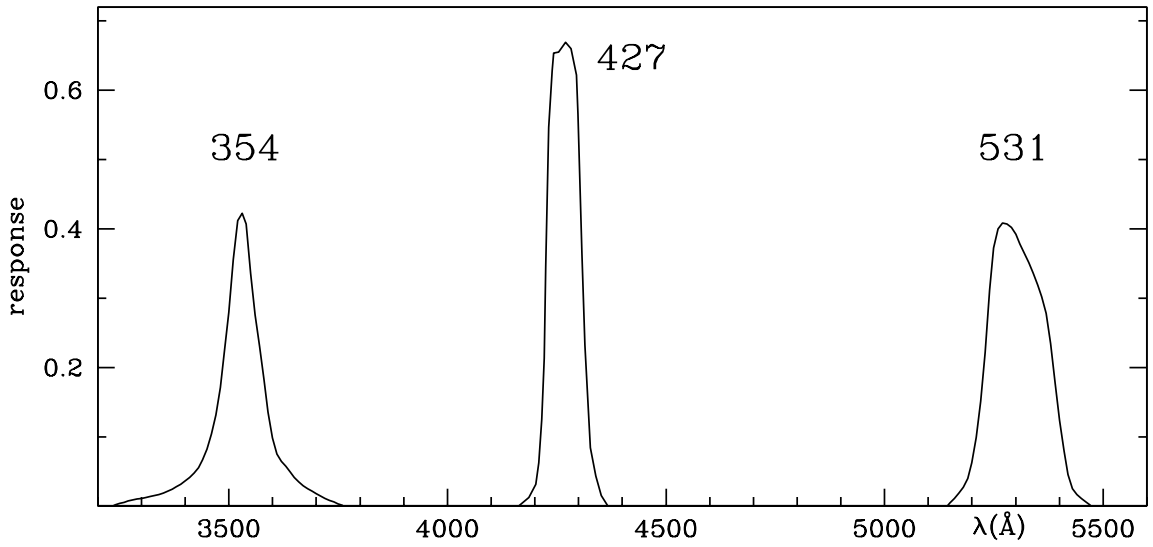
$427 - 531$: measures the continuum.

$\gamma = 427 - 0.074(427 - 531) - H\gamma$: measures Hγ.

Fig. 53. The photometric system Newell et al. – 1969

TRANSMISSION CURVES

As derived from Fig 4 of [228].



354				*427*				*531*			
λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ
3230	0.000	3530	0.423	4161	0.000	4282	0.660	5143	0.000	5334	0.346
3269	0.008	3543	0.393	4187	0.013	4295	0.622	5168	0.018	5353	0.314
3309	0.013	3549	0.342	4202	0.031	4299	0.565	5184	0.031	5372	0.270
3348	0.019	3568	0.239	4210	0.063	4301	0.515	5200	0.063	5385	0.207
3388	0.031	3587	0.148	4216	0.126	4308	0.364	5215	0.126	5398	0.135
3422	0.049	3606	0.082	4221	0.214	4314	0.232	5226	0.188	5410	0.079
3437	0.063	3623	0.063	4225	0.346	4327	0.085	5232	0.239	5423	0.038
3460	0.104	3651	0.041	4231	0.547	4340	0.044	5238	0.298	5442	0.016
3479	0.166	3689	0.022	4240	0.628	4352	0.016	5251	0.377	5474	0.000
3492	0.232	3728	0.009	4243	0.653	4368	0.000	5273	0.408		
3505	0.311	3766	0.000	4254	0.655			5302	0.390		
3515	0.390			4271	0.669			5311	0.377		

Fig. 53. continued

Spinrad and Taylor - 1969

Square-band measurement of line and molecular absorptions in late-type stars.

GENERAL INFORMATION

AUTHORS	H. Spinrad and B. J. Taylor
TELESCOPE	0.91m and 3.0m (reflectors), Lick Obs.
DETECTOR	FW-130 (S-20 cathode, for 3800-7400 Å)
	RCA 7102 (S-1 cathode, for 7400-10700 Å)
MAIN ARTICLE	Spinrad, H., Taylor, B. J. 1969, ApJ 157, 1279

SYSTEM DESCRIPTION

BANDS DESCRIPTION [275]

λ_c (Å)	feature	λ_c (Å)	feature
3880	CN (3883 Å)	6180	TiO (6152 Å)
4040	continuum	6386	CaH (6382 Å)
4100	Hδ	6564	Hα
4200	CN (4215 Å)	6620	continuum
4227	CaI	7000	continuum
4300	CH (4313 Å)	7100	TiO (7054 Å)
4340	Hγ	7400	continuum
4500	continuum	7980	continuum
4715	continuum	8190	NaI
4900	continuum	8400	continuum
5000	continuum	8662	Ca II
5175	MgI + MgH	8800	continuum
5300	continuum	8900	TiO (8859 Å)
5360	continuum	9200	CN
5864	continuum	10300	continuum
5892	NaI D	10700	continuum
6110	continuum		

A spectrum scanner feeds the photomultipliers.
A set of 12 stars given in [275] set the zero points of the system.
[275] prescribes that to accurately reproduce the system the observations must be obtained at 15 Å resolution shortward of 5360 Å and 30 Å resolution longward.

SYSTEM ANALYSIS

COLOR INDICES AND PARAMETERS [275]

$T = I(7000) + I(7400)$: red temperature index.

$T_{IR} = I(8800) + I(10300) + I(10700)$: infrared temperature index.

Fig. 54. The photometric system Spinrad and Taylor – 1969

Hα,β - Tebbe - 1969

Separation between B supergiants and Be stars by means of Hα, Hβ narrow band photometry.

GENERAL INFORMATION

AUTHORS	P. L. Tebbe
TELESCOPE	0.30m (refractor), Georgetown College Observatory
DETECTOR	RCA C-31000 B (S-20 cathode, refrigerated)
MAIN ARTICLE	Tebbe, P.L. 1969, AJ 74, 920

SYSTEM DESCRIPTION

BANDS DESCRIPTION [298]

band	comments	λ_{peak} (Å)	half-width (Å)	Υ_{peak} (%)
Nα	Hα narrow	6570	45	41
Wα	Hα wide	6550	157	57
Nβ	Hβ narrow	4863	39	59
Wβ	Hβ wide	4837	184	63

Interference filters by Baird Atomic.

SYSTEM ANALYSIS

COLOR INDICES AND PARAMETERS [298]

$\alpha = 2.5\log(W_\alpha) - 2.5\log(N_\alpha) + const.$ $\beta = 2.5\log(W_\beta) - 2.5\log(N_\beta) + const.$

RELATIONS WITH OTHER SYSTEMS [298]

uvbyHβ - Strömgren and Crawford - 1956

least-square fit relations

β_{Strom}	=	$+0.246 + 1.415\,\beta$	for B stars
β_{Strom}	=	$-0.225 + 1.667\,\beta$	for A-F stars

Fig. 55. The photometric system *Hα,β* – Tebbe – 1969

gnkmfu - Dickow *et al.* - 1970

Narrow band photometry of late-type stars.

GENERAL INFORMATION

AUTHORS	P. Dickow, K. Gyldenkerne, L. Hansen, P.-U. Jacobsen, K. T. Johansen, P. Kjaeregaard, E. H. Olsen
TELESCOPE	0.61m Morgan (reflector), Lowell Observatory, Arizona
DETECTOR	EMI 6265 S/A (CsSb cathode, unrefrigerated)
MAIN ARTICLE	Dickow, P., Gyldenkerne, K., Hansen, L., Jacobsen, P.-U., Johansen, K. T., Kjaergaard, P., Olsen, E. H. 1970, A&AS 2, 1

SYSTEM DESCRIPTION

BANDS DESCRIPTION [86]

band	filter	λ_{peak} (Å)	FWHM (Å)
344	Schott UG 11 + WG 3	3440	389
391	Schott UV − PIL (tilted by 5°)	3910	55
406	Schott PIL	4057	73
417	Baird B9	4174	40
427	Baird B9	4271	27
439	Baird B9	4389	47
452	Schott PIL	4517	80
497	Schott PIL	4973	95

Except for the *344* band, all filters are of interference type.

SYSTEM ANALYSIS

COLOR INDICES AND PARAMETERS [86]

$g = 2.5\,(\log I_{439} - \log I_{427})$: measures the break around the G-band.

$n = 2.5\,(\log I_{427} - \log I_{417})$: measures the CN absorption.

$k = 2.5\,(\log I_{391} - \log I_{406})$: aimed to the iron discontinuity shortward of 4000 Å , including the Ca II K line.

$m = 2.5\,(2\log I_{452} - \log I_{406} - \log I_{497})$: metallicity index, similar to m_1 Strömgren index.

$f = 2.5\,(\log I_{497} - \log I_{406})$: given the wide $\Delta\lambda$ baseline, it is an useful tool to evaluate the reddening.

$u = 2.5\,(\log I_{406} - \log I_{344})$: ultraviolet color index.

$1.00[Fe/H] = -16.39(\pm1.05)g + 9.80(\pm0.78)m + 8.14(\pm1.25)$: for giant with $-0.8 \leq [Fe/H] \leq 0.3$. [166]

REDDENING RATIOS [86]

for A_V = 1.0 mag

$E(g) = 0.035$ $E(n) = 0.029$ $E(k) = -0.037$

$E(m) = -0.029$ $E(f) = 0.305$ $E(u) = 0.194$

Fig. 56. The photometric system *gnkmfu* – Dickow et al. – 1970

Uppsala - Haggkvist and Oja - 1970

Narrow band photometry of late-type stars.

GENERAL INFORMATION

AUTHORS	L. Häggkvist, and T. Oja
TELESCOPE	0.33m (photographic refractor), Uppsala Obs.; 0.15m Zeiss-Heyde astrograph
DETECTOR	EMI 9502B
MAIN ARTICLE	Häggkvist, L., Oja, T. 1970, A&AS 1, 199

SYSTEM DESCRIPTION

BANDS DESCRIPTION [132]

band	λ_{peak} (Å)	half-width (Å)
418	4176	40
427	4269	43
451	4508	50

Interference filters by Baird Atomic.

SYSTEM ANALYSIS

COLOR INDICES AND PARAMETERS [132]

$g_e = (427) - (451)$: measures the break at the G-band.

$c_e = (418) - (427)$: measures the CN absorption.

RELATIONS WITH OTHER SYSTEMS [132]

gnkmfu - Dickow *et. al* - 1970

g	=	$0.416\ (\pm0.005)\ g_e + 0.105\ (\pm0.007)\ c_e - 0.257\ (\pm0.006)$
n	=	$-0.489\ (\pm0.063)\ g_e + 0.241\ (\pm0.023)\ g_e^2 + 0.454\ (\pm0.008)\ c_e + 0.332\ (\pm0.042)$
g_e	=	$2.504\ (\pm0.048)\ g - 0.504\ (\pm0.051)\ n + 0.638\ (\pm0.008)$
c_e	=	$0.995\ (\pm0.196)\ g - 2.605\ (\pm0.267)\ g^2 + 2.180\ (\pm0.052)\ n - 0.286\ (\pm0.029)$

DDO - McClure and Van den Bergh - 1968

$C(42–45)$	=	$0.846\ (\pm0.040)\ g_e + 0.085\ (\pm0.016)\ g_e^2 + 0.070\ (\pm0.013)\ c_e - 0.329\ (\pm0.024)$
$C(41–42)$	=	$0.831\ (\pm0.010)\ c_e + 0.041\ (\pm0.002)$
g_e	=	$1.069\ (\pm0.024)\ C(42–45) - 0.072\ (\pm0.013)\ C(42–45)^2 + -0.070(\pm0.015)\ C(41–42) + 0.386\ (\pm0.009)$
c_e	=	$1.187\ (\pm0.014)\ C(41–42) - 0.047(\pm0.003)$

Fig. 57. The photometric system Uppsala – Häggkvist and Oja – 1970

RI - Jacobsen - 1970

Photometry in the red and near-infrared.

GENERAL INFORMATION

AUTHORS	P. U. Jacobsen
TELESCOPE	0.61m Morgan reflector, Lowell Obs.
DETECTOR	FW118 (S-1 cathode, refrigerated)
MAIN ARTICLE	Jacobsen, P. U. 1969, A&A 4, 302

SYSTEM DESCRIPTION

BANDS DESCRIPTION [146]			
band	filter (#)	*WHM* (Å)	λ_c (Å)
R	2mm RG 610/1 + Corning 3965 (150%) + 2mm KG 3	980	6290
I	Corning 2540 (75%)	1960	9430

(#) The filter thickness is given in percentage of the standard optical thickness in the Corning Catalogue [146].

SYSTEM ANALYSIS

RELATIONS WITH OTHER SYSTEMS [146]

UVBGRI - Stebbin and Withford - 1943

$(R-I)_{S-W} = 0.924\ (\pm 0.015)\ (R-I)_{Jacobsen} - 0.703\ (\pm 0.014)$ for 44 stars in common

UBVRI(JHKLMN) - Johnson - 1965

$(R-I)_{Johnson} = 0.761\ (\pm 0.004)\ (R-I)_{Jacobsen} - 0.196\ (\pm 0.005)$ for 90 stars in common

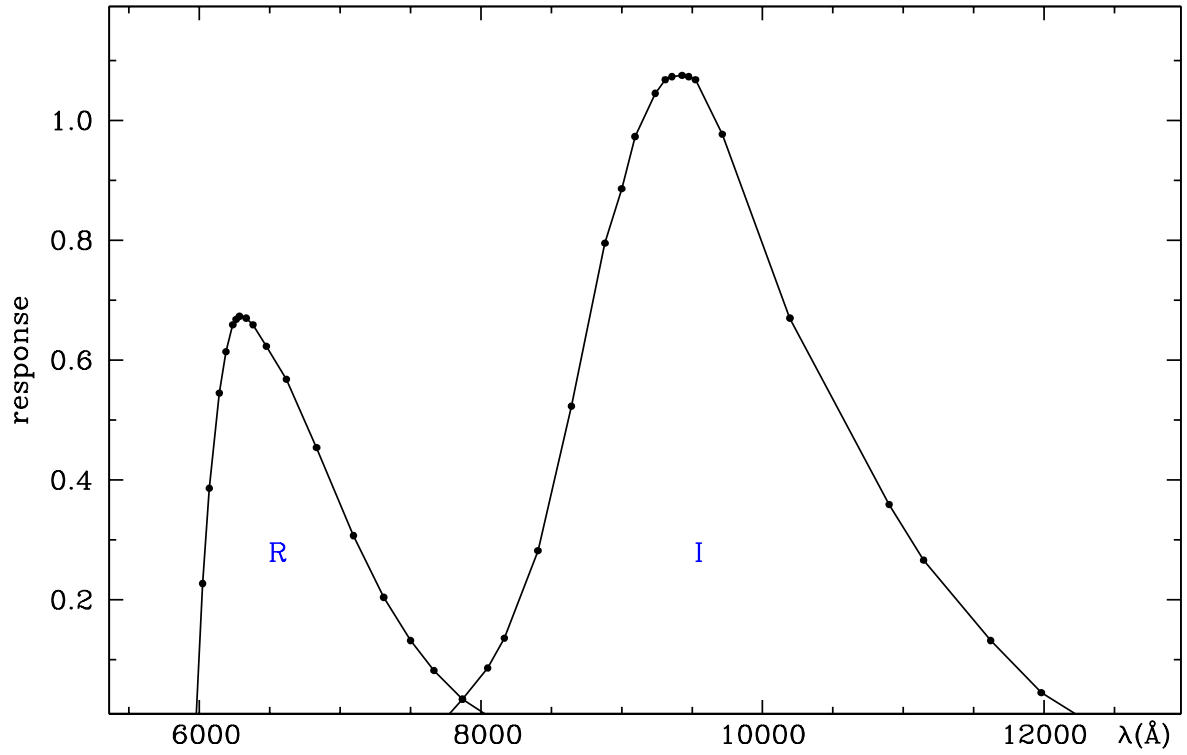
ri - Argue - 1967

$(r-i)_{Argue} = 0.758\ (\pm 0.009)\ (R-I)_{Jacobsen} - 0.181\ (\pm 0.009)$ for 46 stars in common

Fig. 58. The photometric system *RI* – Jacobsen – 1970

TRANSMISSION CURVE

As derived from Fig 1 of [146].



R				*I*			
λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ
5976	0.000	6619	0.568	7738	0.000	9357	1.073
6024	0.227	6833	0.454	7869	0.034	9429	1.075
6071	0.386	7095	0.307	8048	0.086	9476	1.073
6143	0.545	7310	0.204	8167	0.136	9524	1.068
6190	0.614	7500	0.132	8405	0.282	9714	0.977
6238	0.659	7667	0.082	8643	0.523	10195	0.670
6262	0.668	7869	0.034	8881	0.795	10900	0.359
6286	0.673	8095	0.000	9000	0.886	11145	0.266
6333	0.670			9095	0.973	11620	0.132
6381	0.659			9238	1.045	11980	0.045
6476	0.623			9310	1.068	12000	0.000

Fig. 58. continued

nh - Landolt - 1970

Luminosity class of O stars.

GENERAL INFORMATION

AUTHORS	A. U. Landolt
TELESCOPE	0.40m and 0.91m (reflectors), KPNO
DETECTOR	RCA 1P21
MAIN ARTICLE	Landolt, A. U. 1970, AJ 75, 337

SYSTEM DESCRIPTION

BANDS DESCRIPTION [180]

band	λ_{eff} (Å)	half-width (Å)	ϒ (%)
N III wide	4633.9[a]	182.0[a]	65.0[a]
	4637.5[b]	178.5[b]	64.2[b]
	4635.5[c]	180.6[c]	62.6[c]
N III narrow	4624.2[a]	48.8[a]	60.5[a]
	4627.9[b]	47.0[b]	59.0[b]
	4628.3[c]	47.7[c]	59.0[c]
He II wide	4678.8[b]	191.1[b]	48.0[b]
	4679.7[c]	193.0[c]	47.0[c]
He II narrow	4687.1[b]	41.6[b]	47.0[b]
	4686.9[c]	41.6[c]	47.2[c]

a = June 9, 1965 b = October 10, 1965 c = October 14, 1966

The zero point of the system is defined by the *n* and *h* values of seven standard stars, all supergiants of spectral types between B9 and A5.

SYSTEM ANALYSIS

COLOR INDICES AND PARAMETERS [180]

$n = 2.5\log(N\ III\ \ narrow) - 2.5\log(N\ III\ \ wide)$

$h = 2.5\log(He\ II\ \ narrow) - 2.5\log(He\ II\ \ wide)$

Absolute magnitude from a least-square fit on 20 stars of spectral type O:

$M_V = -67.927 + 43.756\, n$

$M_V = -21.645 + 10.661\, h$

Fig. 59. The photometric system *nh* – Landolt – 1970

Morguleff *et al* - 1970

Classification and metallicity of cool stars.

GENERAL INFORMATION

AUTHORS	N. Morguleff, M. P. Véron and D. Barbier
TELESCOPE	0.80m (reflector), Haute-Provence Obs.
DETECTOR	Lallemand photomultiplier
MAIN ARTICLE	Morguleff, N., Véron, M. P. 1970, A&A 4, 391

SYSTEM DESCRIPTION

BANDS DESCRIPTION [214]

band	bandpass (Å)	feature
Bj	3575−3650	Balmer jump
K	3925−3965	K Ca II
CN_c	4010−4070	continuum
CN_l	4170−4215	CN
$Ca\ I$	4220−4260	Ca I
$H\beta_l$	4815−4905	Hβ
$H\beta_c$	4920−5000	continuum
$Mg\ I_l$	5150−5200	Mg I
$Mg\ I_c$	5300−5350	continuum
Na_l	5840−5900	Na I
Na_c	5900−6000	continuum

A mask-wheel is placed on the focal plane of a two fused silica prism spectrograph at the Coudé focus, and upon rotation trasmits in turn to the detector (a Lallemand cell) selected portions of the spectrum (in form of square bands).

Fig. 60. The photometric system Morguleff et al. – 1970

OAO2 WEP - 1970

Winsconsin Experiment Package for ultraviolet photometry on board the OAO-2 satellite.

GENERAL INFORMATION

TELESCOPE	0.40m and 0.20m (reflectors)
DETECTOR	photometer 1 and 2: EMI 6256B
	photometer 3: Ascop 541F cesium telluride
	photometer 4: Ascop 541G cesium iodide
MAIN ARTICLE	Code, A. D., Houck, T. E., McNall, J. F., Bless, R. C., Lillie, C. F. 1970, ApJ 161, 377

SYSTEM DESCRIPTION

BANDS DESCRIPTION [70]

band	λ_{eff} (Å)(#)	λ at 50% trans. (Å)
133	1330	1185 – 1370
143	1430	1260 – 1500
155	1550	1410 – 1680
168	1680	1460 – 1730
191	1910	1760 – 2020
203	2030	1690 – 2180
213	2130	1930 – 2230
239	2390	2220 – 2550
246	2460	2290 – 2650
256	2560	2350 – 2770
294	2940	2740 – 3170
297	2970	2740 – 3170
298	2980	2760 – 3170
332	3320	3040 – 3560
333	3330	3050 – 3570
425	4250	3810 – 4670

Interference filters. (#) For an *Equal Energy Source.*

SYSTEM ANALISYS

The magnitudes are defined by $m(\lambda) = -2.5 \log F_\lambda - 21.10$

RELATIONS WITH OTHER SYSTEMS [71]

13 colors - Johnson and Mitchell - 1976

$$m(332) = 1.028\,(\pm 0.046)\; 33_{J-M} - 0.0385(\pm 0.188)$$

UBV - Johnson and Morgan - 1953

$$m(425) = 0.986\,(\pm 0.033)\; B + 0.178\,(\pm 0.107)\,(B-V) - 0.606\,(\pm 0.186)$$

Fig. 61. The photometric system OAO2 WEP – 1970

Hγ - Häggkvist - 1971

Hγ in early-type stars.

GENERAL INFORMATION

AUTHORS	L. Häggkvist
TELESCOPE	0.33m refractor, Uppsala Obs.
MAIN ARTICLE	Häggkvist L. 1971, A&A 12, 5

SYSTEM DESCRIPTION

BANDS DESCRIPTION [131]

band	λ_{peak} (Å)	half-width (Å)	feature
41	4059	56	continuum
44	4346	30	Hγ
45	4508	50	continuum

Interference filters.

SYSTEM ANALYSIS

COLOR INDICES AND PARAMETERS [131]

$\gamma = 44 - 0.666 \cdot 45 - 0.334 \cdot 41$: measures the Hγ absorption.

RELATIONS WITH OTHER SYSTEMS [131]

uvby Hβ - Strömgren and Crawford - 1956

$$\gamma = 3.300 - 2.878\,\beta + 0.744\,\beta^2$$
$$\beta = 1.348 + 1.947\,\gamma - 0.553\,\gamma^2$$

Hγ - Bappu *et al.* - 1962

$$\gamma = 1.455 - 0.00244\,\Gamma$$

Hγ - Beer - 1964

$$\gamma = -0.025 + 0.803\,R_\gamma$$

Hγ equivalent width from spectra

$\gamma = 0.717 + 0.0385\,EW_{Petrie} + 0.00060\,EW^2_{Petrie}$	[244]
$\gamma = 0.749 + 0.0289\,EW_{Gunther}$	[126]
$\gamma = 0.757 + 0.0239\,EW_{Williams}$	[324]
$\gamma = 0.757 + 0.0246\,EW_{Stock}$	[283]

Fig. 62. The photometric system Hγ – Häggkvist – 1971

DAO - Hill *et al.* - 1971

General purpose system.

GENERAL INFORMATION

AUTHORS	G. Hill, S. C. Morris and G. A. H. Walker
TELESCOPE	0.40m (reflector), Mt. Kobau, British Columbia; 0.40m (reflector), KPNO
DETECTOR	EMI 6256 SA (filter 35), EMI 6094 SA (filters 38,42,44), EMI 9558 QA (filters 54, 56) [211]
MAIN ARTICLE	Hill, G., Morris, S. C., Walker, G. A. H. 1971, AJ 76, 246

SYSTEM DESCRIPTION

BANDS DESCRIPTION [140]

band	bandpass (Å)
35	3400 – 3600
38	3700 – 3850
42	3900 – 4400
44	3900 – 4900
54	5050 – 5770
56	5410 – 5770

The photometer consists of a small spectrograph that isolates four spectral bands (*35, 38, 44, 54*). The radiation from each region is diverted to a separate photomultiplier. A mask cutting-off the blue side of the the *54* band and the red side of the *44* band allows the realization of further two bands, *42* and *56*.

ZERO POINT: (*44–54*) = (*42–56*) = 0.0 for unreddened A0 V stars. [140]

SYSTEM ANALYSIS

RELATIONS WITH OTHER SYSTEMS [140]

UBV - Johnson and Morgan - 1953

$$(B-V)_{Johnson} = 1.270\ (\pm 0.007)\ (44\text{–}54) + 0.000\ (\pm 0.003)$$

Fig. 63. The photometric system DAO – Hill et al. – 1971

5 colors - Lockwood and Wing - 1971

Measurements of TiO and VO bands in M stars. It is a partial realization with interference filters at KPNO of the *27 colors - Wing - 1967* system used at Lick on digitized spectra.

GENERAL INFORMATION

AUTHORS	G. W. Lockwood and R. F. Wing
TELESCOPE	0.91m and 1.27m (reflectors), KPNO
DETECTOR	ITT FW-118
MAIN ARTICLE	Lockwood, G. W., Wing, R. F. 1971, ApJ 169, 63

SYSTEM DESCRIPTION

BANDS DESCRIPTION [189]

band	λ_c (Å)	FWHM (Å)	Υ_c (%)	feature [188]
78	7817	90	66	TiO
87	8778	82	69	Continuum
88	8884	114	50	TiO
104	10351	125	51	Continuum
105	10506	100	45	VO

ZERO POINT: The fluxes in all the bands are linked to the system of absolute fluxes given by [135] and the zero point of the whole system is set by requiring that the magnitude of α Lyr in the *10400* band is 0.00. [329]

SYSTEM ANALYSIS

COLOR INDICES AND PARAMETERS [188]

(*78–87*) : increases with TiO absorption and decreasing photospheric temperature.

(*87–104*) : temperature indicator.

$T_1 = (78–87) - 0.6\,(87–104)$: temperature independent index measuring TiO absorption in the *78* band.

$T_2 = (88–87) + 0.07\,(87–104)$: temperature independent index measuring TiO absorption in the *88* band.

$V_1 = (105–104) + 0.1\,(87–104)$: temperature independent index measuring VO absorption in the *105* band.

$D = 0.18\,T_1 + T_2 + V_1$: increases monotonically from M0 to M10 (cfr. Fig 1 of [188]).

Fig. 64. The photometric system 5 colors – Lockwood and Wing – 1971

Mendoza - 1971

Intensity of the OI 7774 A line.

GENERAL INFORMATION

AUTHORS	E. V. Mendoza
TELESCOPE	1.52m (reector), University of Arizona
DETECTOR	ITT FW-118 (S-1 cathode) [208]
MAIN ARTICLE	Mendoza, E.V. 1971, Boletin de los observatorios de Tonantzintla y Tacubaya No 37, 6

SYSTEM DESCRIPTION

BANDS DESCRIPTION [209]		
band	λ_{peak} (A)	half-width (A)
F1	7755	20
F2	7772	25
F3	7792	25

Interference lters by Oriel Optics Corporation.

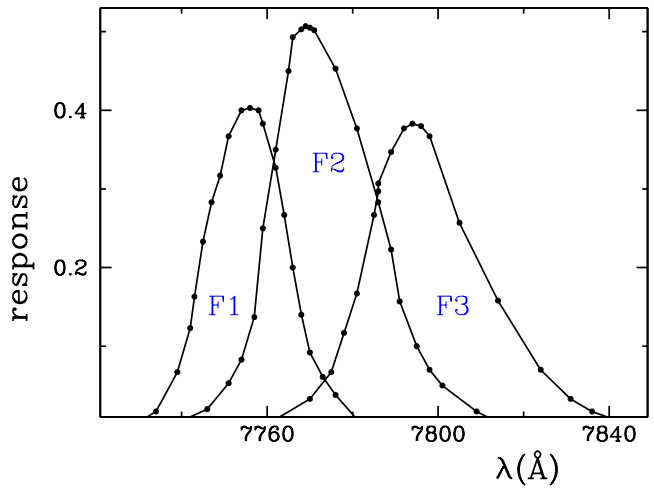
SYSTEM ANALYSIS

COLOR INDICES AND PARAMETERS [209]

$\Lambda = 1/2\,[F1 + F3] - F2$: OI intensity. Luminosity indicator.

TRANSMISSION CURVES

As derived from Fig 2 of [209].



F1		*F2*		*F3*	
λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ
7729	0.000	7738	0.000	7754	0.000
7734	0.017	7746	0.020	7762	0.007
7739	0.067	7751	0.053	7770	0.033
7742	0.123	7754	0.083	7775	0.067
7743	0.163	7757	0.137	7778	0.117
7745	0.233	7759	0.250	7781	0.167
7747	0.283	7762	0.350	7785	0.267
7749	0.317	7765	0.450	7786	0.297
7751	0.367	7766	0.493	7786	0.307
7754	0.400	7768	0.503	7789	0.347
7756	0.403	7769	0.507	7792	0.377
7758	0.400	7770	0.505	7794	0.383
7759	0.383	7771	0.502	7796	0.380
7762	0.327	7776	0.453	7798	0.367
7764	0.267	7781	0.377	7805	0.257
7766	0.200	7786	0.283	7814	0.158
7768	0.140	7789	0.223	7824	0.070
7770	0.092	7791	0.157	7831	0.033
7773	0.061	7795	0.100	7836	0.017
7776	0.038	7798	0.070	7841	0.007
7781	0.007	7801	0.050	7892	0.000
7783	0.000	7809	0.017		
		7814	0.003		
		7816	0.000		

Fig. 65. The photometric system Mendoza – 1971

Williams *et al.* - 1971

Square-band photometry of FeII, CaI and BaII lines in late-type stars.

GENERAL INFORMATION

AUTHORS	P. M. Williams, D. W. Peat and M. E. Rego
TELESCOPE	0.91m (reflector), Cambridge Obs.
DETECTOR	EMI 9502 (refrigerated)
MAIN ARTICLE	Williams, P. M. 1971, MNRAS 153, 171
	Rego, M. E., Williams, P. M., Peat, D. W. 1972, MNRAS 160, 129
	Williams, P. M. 1975, MNRAS 170, 343

SYSTEM DESCRIPTION

BANDS DESCRIPTION

band	bandpass (Å)		
	FeII [325]	CaI [249]	BaII [326]
A	5354.3 – 5368.3	6106.4 – 6115.6	6067.0 – 6077.0
B	5427.8 – 5435.7	6160.1 – 6168.0	6140.4 – 6143.6
C	5485.2 – 5496.3	6201.6 – 6209.9	6202.0 – 6212.0

On the focal plane of a 5.0 Å/mm dispersion spectrograph three diaphragms transmit
to three photomultipliers the *A*, *B* and *C* portions of the spectrum.
Readings on a tungsten lamp are obtained to monitor the relative response of the three channels.

SYSTEM ANALYSIS

COLOR INDICES AND PARAMETERS [249], [325], [326]

If subscripts *s* and *l* denotes observations of the stars and the lamp respectively,
and *a*, *b*, *c* are three constants, the line strength ratio is then:

$$R = \frac{a\,A_s/A_l + c\,C_s/C_l}{b\,B_s/B_l} = \frac{a\,\Omega + c\,\Lambda}{b\,\Psi}$$

$R(Fe) = \frac{0.45\Omega_{Fe} + 0.55\Lambda_{Fe}}{\Psi_{Fe}}$: measures the strength of FeII 5435 Å .

$R(Ca) = \frac{0.44\Omega_{Ca} + 0.56\Lambda_{Ca}}{\Psi_{Ca}}$: measures the strength of CaI 6162 Å .

$R(Ba) = 0.5\,\frac{\Omega_{Ba} + \Lambda_{Ba}}{\Psi_{Ba}}$: measures the strength of BaII 6141.7 Å .

Fig. 66. The photometric system Williams et al. – 1971

8 colors - Wing - 1971

Measurements of TiO, CN and VO bands in late-type stars. It is a partial realization with interference filters at KPNO of the *27 colors - Wing - 1967* system devised at Lick on photoelectric spectral scans.

GENERAL INFORMATION

AUTHORS	R. F. Wing
TELESCOPE	KPNO telescopes
DETECTOR	S-1 cathods
MAIN ARTICLE	Wing, R. F. 1971, in Proc. of the *Conf. on Late-Type Stars*, (G. W. Lockwood and H. M. Dyck ed.s), KPNO Contr. 554, 145

SYSTEM DESCRIPTION

BANDS DESCRIPTION [328]

band	λ_c (Å)	FWHM (Å)	feature	contaminants
71	7117	53	TiO	CN
75	7545	50	continuum (M0-M7)	CN, VO
78	7806	42	continuum (G,K,C)	TiO
81	8122	43	CN	TiO
104	10392	55	continuum	
105	10544	58	VO	
108	10800	74	continuum (C)	HeI (10830 Å)
109	10968	73	CN	

65 (#)	6510	40	ZrO	TiO, CN
79 (#)	7945	50	LaO	TiO, VO, CN

Interference filters by Infrared Industries.

(#) These two bands have been introduced by [245] in a later variant of the system. [245] replaced the original *71* and *81* with the *65* and *79* bands to measure the strength of the ZrO and LaO absorptions in S stars.

Fig. 67. The photometric system 8 colors – Wing – 1971

Aerobee IR−71 - 1971

Far-Infrared observations of the Galactic Center by an Aerobee rocket flown on July 16, 1971.

GENERAL INFORMATION

TELESCOPE	0.18m, far-infrared telescope (helium cooled)
MAIN ARTICLE	Houck, J. R., Soifer, B. T., Pipher, J. L., Harwit, M. 1971, ApJ 169, L31

SYSTEM DESCRIPTION

BANDS DESCRIPTION [143]

band	λ_c (μm)	half-width (μm)
A	5.5	1
B	13	2
C	19	7
D	100	30

The radiation has been fully chopped by a turning-fork chopper placed in the telescope focal plane, and has been directed to the individual detectors (one for each band) through separate light pipes.

Fig. 68. The photometric system Aerobee IR-71 – 1971

Jones and Dixon - 1972

Luminosity and metallicity of late-type stars.

GENERAL INFORMATION

AUTHORS	D.H. P. Jones and M. E. Dixon
TELESCOPE	0.41m and 1.02m (reflectors), Siding Spring Obs.
DETECTOR	1P21 (refrigerated) and FW130 (S-20 cathode)
MAIN ARTICLE	Jones, D. H. P., Dixon, M. E. 1972, ApJ 177, 665

SYSTEM DESCRIPTION

BANDS DESCRIPTION [158]

band	λ_{peak} (Å)	half width (Å)
CN_{narrow}	4189	50
CN_{wide}	4189	200
Mg_{narrow}	5174	30
Mg_{wide}	5174	140

Interference filters.

SYSTEM ANALYSIS

COLOR INDICES AND PARAMETERS [158]

$[Mg] = Mg_{wide}/Mg_{narrow}$ $[CN] = CN_{wide}/CN_{narrow}$

RELATIONS WITH OTHER SYSTEMS [158]

Griffin and Redman - 1960

$r_{CN} = 1.16\,[CN] - 1.94$ for 36 stars in common

Deeming - 1960

$r_{Mg} = 1.13\,[Mg] - 3.09$ for 36 stars in common

Fig. 69. The photometric system Jones and Dixon – 1972

Hα, β - Peton *et al.* - 1972

Narrow-band photometry of Be stars.

GENERAL INFORMATION

AUTHORS	A. Peton, J. H. Bigay, R. Garnier, and G. Paturel
TELESCOPE	0.60m (reflector), Haute Provence Obs.
DETECTOR	EMI three-alkaline
MAIN ARTICLE	Peton, A., Bigay, J. H., Garnier, R., Paturel, G. 1972, A&A 17, 47

SYSTEM DESCRIPTION

BANDS DESCRIPTION [243]

band	λ_c (Å)	bandpass (Å)	feature
1	4861	29	Hβ narrow
2	4861	112	Hβ wide
5	6350	164	Hα continuum
3	6563	158	Hα line
4	6645	89	Hα continuum

Interference filters by Baird Atomic.

SYSTEM ANALYSIS

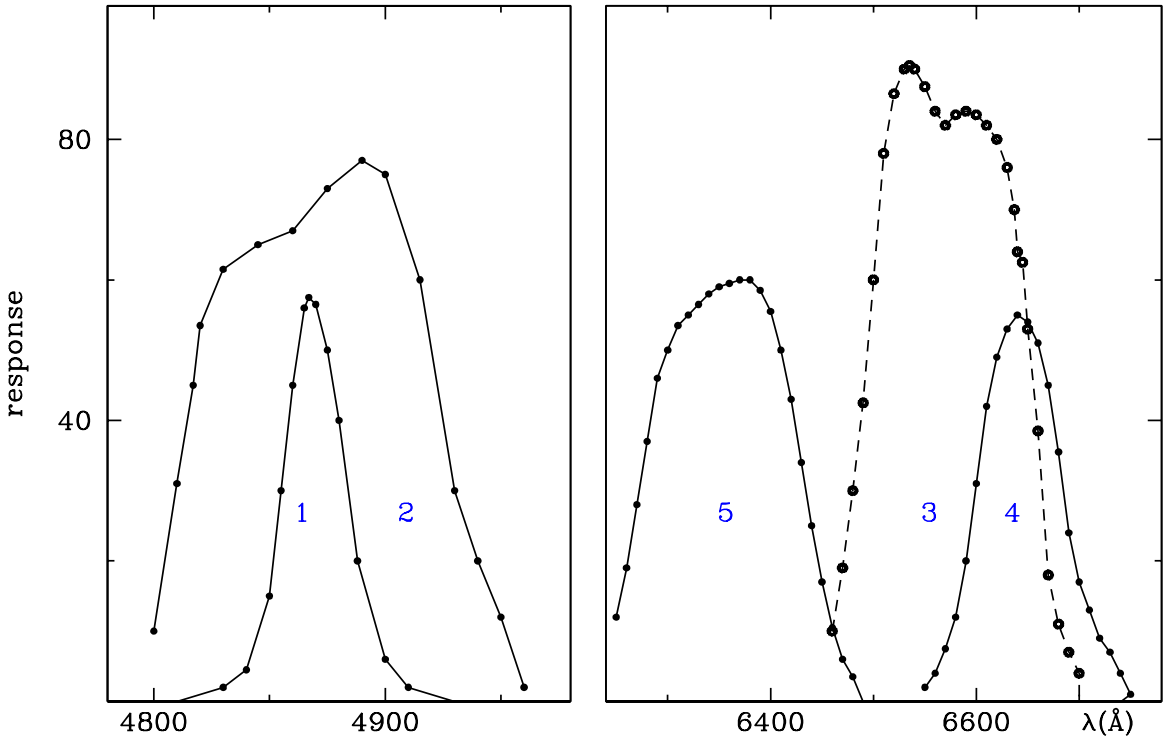
COLOR INDICES AND PARAMETERS [243]

$\beta = m_1 - m_2$ $\alpha = m_3 - 1/2\,(m_4 + m_5)$

Fig. 70. The photometric system $H\alpha,\beta$ – Peton – 1972

TRANSMISSION CURVES

As derived from Fig 1 of [243].



1		*2*		*5*				*4*				*3*			
λ (A)	ϒ (%)	λ (A)	ϒ (%)	λ (A)	ϒ (%)	λ (A)	ϒ (%)	λ (A)	ϒ (%)	λ (A)	ϒ (%)	λ (A)	ϒ (%)	λ (A)	ϒ (%)
4810	0.0	4800	10.0	6250	12.0	6400	55.5	6550	2.0	6700	17.0	6460	10.0	6600	83.5
4830	2.0	4810	31.0	6260	19.0	6410	50.0	6560	4.0	6710	13.0	6470	19.0	6610	82.0
4840	4.5	4817	45.0	6270	28.0	6420	43.0	6570	7.5	6720	9.0	6480	30.0	6620	80.0
4850	15.0	4820	53.5	6280	37.0	6430	34.0	6580	12.0	6730	7.0	6490	42.5	6630	76.0
4855	30.0	4830	61.5	6290	46.0	6440	25.0	6590	20.0	6740	4.0	6500	60.0	6637	70.0
4860	45.0	4845	65.0	6300	50.0	6450	17.0	6600	31.0	6750	1.0	6510	78.0	6640	64.0
4865	56.0	4860	67.0	6310	53.5	6460	10.5	6610	42.0			6520	86.5	6645	62.5
4867	57.5	4875	73.0	6320	55.0	6470	6.0	6620	49.0			6530	90.0	6650	53.0
4870	56.5	4890	77.0	6330	56.5	6480	3.5	6630	53.0			6535	90.5	6660	38.5
4875	50.0	4900	75.0	6340	58.0	6490	0.0	6640	55.0			6540	90.0	6670	18.0
4880	40.0	4915	60.0	6350	59.0			6650	54.0			6550	87.5	6680	11.0
4888	20.0	4930	30.0	6360	59.5			6660	51.0			6560	84.0	6690	7.0
4900	6.0	4940	20.0	6370	60.0			6670	45.0			6570	82.0	6700	4.0
4910	2.0	4950	12.0	6380	60.0			6680	35.5			6580	83.5	6708	4.0
4930	0.0	4960	2.0	6390	58.5			6690	24.0			6590	84.0		

Fig. 70. continued

$u_A\ b_A\ \beta_A\ y_A$ - Wickramasinghe and Strittmatter - 1972

Temperature and surface gravity of DA white dwarfs.

GENERAL INFORMATION

AUTHORS D. T. Wickramasinghe, and P. A. Strittmatter

MAIN ARTICLE Wickramasinghe D. T., Strittmatter, P. A. 1972, MNRAS 160, 421

SYSTEM DESCRIPTION

BANDS DESCRIPTION [323]

band	λ_c (Å)	FWHM (Å)
u_A	3500	300
b_A	4500	200
β_A	4860	400
y_A	5400	300

Conceptual design for an optimized photometric system.

SYSTEM ANALYSIS

REDDENING FREE PARAMETERS [323]

$w_A = (b_A - \beta_A) - 0.63(\beta_A - y_A)$ $d_A = (u_A - b_A) - 1.89(b_A - y_A)$

Fig. 71. The photometric system $u_A b_A \beta_A y_A$ – Wickramasinghe and Strittmatter – 1972

TD1 - 1972

Ultraviolet photometry with the TD-1 satellite.

GENERAL INFORMATION

TELESCOPE	0.275m
DETECTOR	EMR 542 F-08-16 and EMR 542 G-08 ASCOP photomultipliers
MAIN ARTICLE	Boksenberg, A., Evans, R.G., Fowler, R. G., Gardner, I. S. K., Honziaux, L., Humphries, C. M., Jamar, C., Macau, D., Malaise, D., Monfils, A., Nandy, K., Wroe, H. 1973, MNRAS 163, 291

SYSTEM DESCRIPTION

BANDS DESCRIPTION [60]

band	λ_c (Å)	width (Å)	band	λ_c (Å)	width (Å)
140	1400	100	*200*	2000	100
146	1455	110	*208*	2075	110
150	1500	100	*210*	2100	100
157	1565	110	*220*	2200	100
157	1565	330	*226*	2255	110
160	1600	100	*230*	2300	100
168	1675	110	*237*	2365	110
170	1700	100	*237*	2365	330
180	1800	100	*240*	2400	100
186	1855	110	*247*	2465	110
190	1900	100	*250*	2500	100
197	1965	110	*274*	2740	310
197	1965	330			

An ultraviolet telescope feeds in turn a spectrophotometer which gives low dispersion spectra over the range 1350-2550 Å and a broad band photometer for measurements centered at 1505, 1965, 2365 and 2740 Å .
As the satellite spins a set of slits on the telescope focal plane realizes the spectral scanning and band delimitation.
The 21 narrow bands are synthesized from the 10 Å resolution spectra.

SYSTEM ANALYSIS

REDDENING-FREE PARAMETERS [60]

The reddening-free parameter Φ makes use of the V magnitude of *UBV - Johnson and Morgan - 1953*.

$$\Phi = (274 - V) - 1.57\,(237\text{–}274)$$

RELATIONS and REDDENING RATIOS [60]

for $(157-237)_0 < -0.70$, i.e. O to B8V stars:

$$E(B-V) = 0.49\,(157-274) - 1.07(157-237) - 0.34$$

$$(157-274)_0 = 0.09\,(157-274) + 1.97\,(157-237) + 0.63$$

$$(157-237)_0 = 0.04\,(157-274) + 0.92\,(157-237) - 0.03$$

for $(157-237)_0 > -0.70$, i.e. B8.5V to F2V stars:

$$E(B-V) = 0.51\,(157-274) - 0.61\,(157-237)$$

$$(157-274)_0 = 0.05\,(157-274) + 1.13\,(157-237)$$

$$(157-237)_0 = 0.04\,(157-274) + 0.95\,(157-237)$$

Fig. 72. The photometric system TD1 – 1972

24 colors - Chapman *et al.* - 1973

Taxonomy of asteroids.

GENERAL INFORMATIONS

AUTHORS	C. R. Chapman, B. McCord, and T. V. Johnson
TELESCOPE	5m (reflector), Palomar Obs.; 0.61m and 1.52m (reflectors), Mt Wilson; 0.91m (reflector), KPNO
DETECTOR	S-1 and S-20 dry-ice-cooled ITT photomultipliers
MAIN ARTICLE	Chapman, C. R., McCord, B., Johnson, T. V. 1973, AJ 78, 126

SYSTEM DESCRIPTION

BANDS DESCRIPTION [66]

band	λ (μm)	bandpass (μm)	Υ_{peak}	λ_{eff} (μm)	
				S–20	S–1
(#) 1	0.3010	0.019	0.13		0.3100
2	0.3196	0.016	0.19	0.3216	0.3229
3	0.3383	0.022	0.14	0.3406	0.3412
4	0.3590	0.014	0.18	0.3598	0.3593
5	0.3831	0.013	0.23	0.3833	0.3825
6	0.4019	0.028	0.48	0.4021	0.4015
7	0.4344	0.028	0.42	0.4344	0.4340
8	0.4687	0.033	0.49	0.4684	0.4685
9	0.5001	0.029	0.57	0.4998	0.5001
10	0.5336	0.033	0.46	0.5331	0.5336
11	0.5662	0.029	0.55	0.5658	0.5663
12	0.5993	0.032	0.54	0.5987	0.5994
13	0.6328	0.032	0.56	0.6322	0.6326
14	0.6649	0.027	0.50	0.6645	0.6649
15	0.6991	0.026	0.54	0.6986	0.6992
16	0.7299	0.033	0.51	0.7287	0.7300
17	0.7640	0.031	0.57	0.7628	0.7640
18	0.8078	0.049	0.46	0.8016	0.8072
19	0.8551	0.047	0.48	0.8499	0.8551
20	0.9063	0.048	0.58		0.9058
21	0.9475	0.051	0.59		0.9469
22	1.0036	0.050	0.53		1.0025
23	1.0548	0.050	0.55		1.0525
24	1.1033	0.049	0.44		1.1009

(#) Not used after November 1970.

Interference filters used in a double-beam photometer.

Fig. 73. The photometric system 24 colors – Chapman et al. – 1973

10 colors - Faber - 1973

Old stellar populations in globular clusters and galaxies.
Combines bands from *DDO - McClure and Van den Bergh - 1968* and *12 colors - Wood - 1966* systems.

GENERAL INFORMATION

AUTHORS	S. M. Faber
TELESCOPE	0.40m and 0.91m (reflectors), KPNO
DETECTOR	ITT FW-130 (S-20 cathode, refrigerated)
MAIN ARTICLE	Faber, S. M. 1973, A&AS 10, 201

SYSTEM DESCRIPTION

BANDS DESCRIPTION [101]

band	source	λ_{eff} (Å)	half-width (Å)	feature
35	DDO, Wood	3490	372	Balmer jump
38	DDO	3800	172	Balmer head
41	DDO	4166	83	(#)
42	DDO	4257	73	(#)
45	DDO	4517	76	(#)
52	Wood	5169	56	MgH + Mg_b
55	Wood	5470	233	continuum
62	Wood	6220	79	TiO
67	Wood	6696	155	continuum
74	Wood	7331	100	continuum

(#) These three bands are aimed to measure the line blanketing discontinuity, CN absorption and the G-band.

SYSTEM ANALYSIS

RELATIONS WITH OTHER SYSTEMS [101]

For stars with $(B-V)_{Johnson} < 1.30$:

DDO - McClure and Van den Bergh - 1968

$$(35-41)_{DDO} = 0.977\,(\pm0.007)(35-41)_{Faber} - 0.815\,(\pm0.003)$$
$$(38-41)_{DDO} = -0.067(\pm0.017)\,(38-41)^2_{Faber} + 1.048\,(\pm0.035)\,(38-41)_{Faber} - 0.116\,(\pm0.004)$$
$$(41-42)_{DDO} = +0.139(\pm0.222)\,(41-42)^2_{Faber} + 0.879\,(\pm0.017)\,(41-42)_{Faber} + 0.040\,(\pm0.000)$$
$$(42-45)_{DDO} = -0.009(\pm0.005)\,(42-45)^2_{Faber} + 0.971\,(\pm0.007)\,(42-45)_{Faber} + 0.321\,(\pm0.000)$$
$$(45-48)_{DDO} = +0.007(\pm0.010)\,(45-55)^2_{Faber} + 0.486\,(\pm0.007)\,(45-55)_{Faber} + 0.859\,(\pm0.001)$$

12 colors - Wood - 1966

$$(35-55)_{Wood} = -0.001(\pm0.000)\,(35-55)^2_{Faber} + 1.001\,(\pm0.014)\,(35-55)_{Faber} + 0.092\,(\pm0.018)$$
$$(48-55)_{Wood} = +0.050(\pm0.023)\,(45-55)^2_{Faber} + 0.715\,(\pm0.029)\,(45-55)_{Faber} + 0.032\,(\pm0.002)$$
$$(52-55)_{Wood} = -0.028(\pm0.117)\,(52-55)^2_{Faber} + 0.877\,(\pm0.052)\,(52-55)_{Faber} + 0.005\,(\pm0.001)$$
$$(62-55)_{Wood} = -0.214(\pm0.002)\,(62-55)^2_{Faber} + 1.100\,(\pm0.046)\,(62-55)_{Faber} - 0.001\,(\pm0.001)$$
$$(67-55)_{Wood} = +0.052(\pm0.084)\,(67-55)^2_{Faber} + 1.118\,(\pm0.028)\,(67-55)_{Faber} - 0.009\,(\pm0.001)$$
$$(74-55)_{Wood} = -0.040(\pm0.018)\,(74-55)^2_{Faber} + 1.006\,(\pm0.021)\,(74-55)_{Faber} - 0.078\,(\pm0.002)$$

Fig. 74. The photometric system 10 colors – Faber – 1973

JHKL SAAO - Glass - 1973

Realization at South African Astronomical Observatory of the infrared bands
of the *UBVRI(JHKLMN)* - Johnson - 1965 system.

GENERAL INFORMATION

AUTHORS	I. S. Glass
TELESCOPE	1.0m (reector), Sutherland; 1.93m Radcliffe reector , Pretoria
DETECTOR	PbS cell
MAIN ARTICLE	Glass, I. S. 1973, MNRAS 164, 155

SYSTEM DESCRIPTION

BANDS DESCRIPTION

band	*WHM* (μm)	λ_c (μm)
J	0.286	1.229
H	0.323	1.657
K	0.380	2.227
L	0.613	3.442
M	0.531	5.076
N	7.11	11.88
Q	10.31	20.84

SYSTEM ANALYSIS

RELATIONS WITH OTHER SYSTEMS [114]

MSSO - Thomas *et al.* - 1973

J_{SAAO}	=	J_{MSSO} + 0.05 (±0.01)	2 stars in common
H_{SAAO}	=	H_{MSSO} + 0.13 (±0.01)	2 stars in common , α Cet excluded
K_{SAAO}	=	K_{MSSO} + 0.06 (±0.01)	4 stars in common
L_{SAAO}	=	L_{MSSO} + 0.01 (±0.03)	4 stars in common

TRANSMISSION CURVES

As derived from Fig 3 of [113].

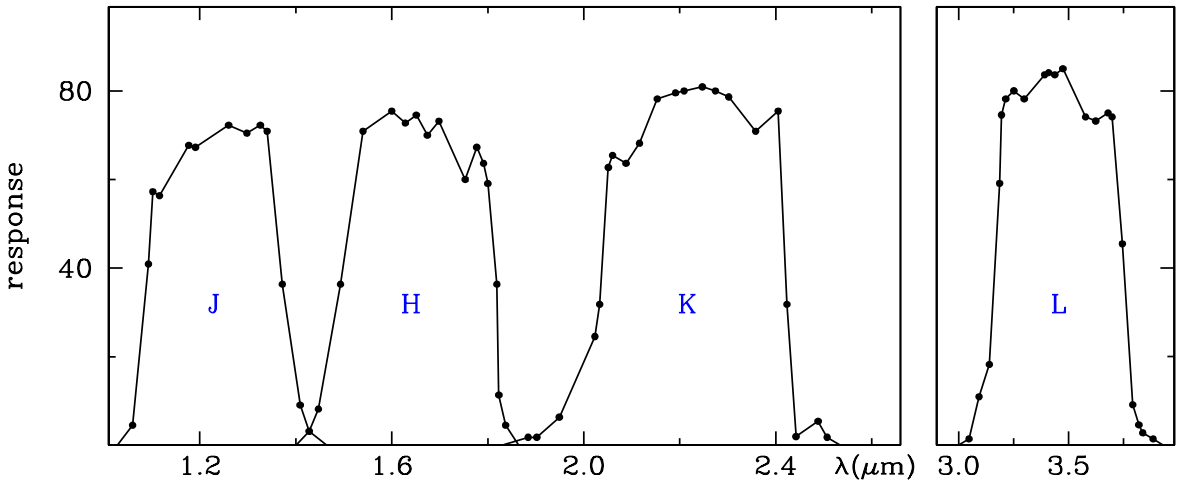
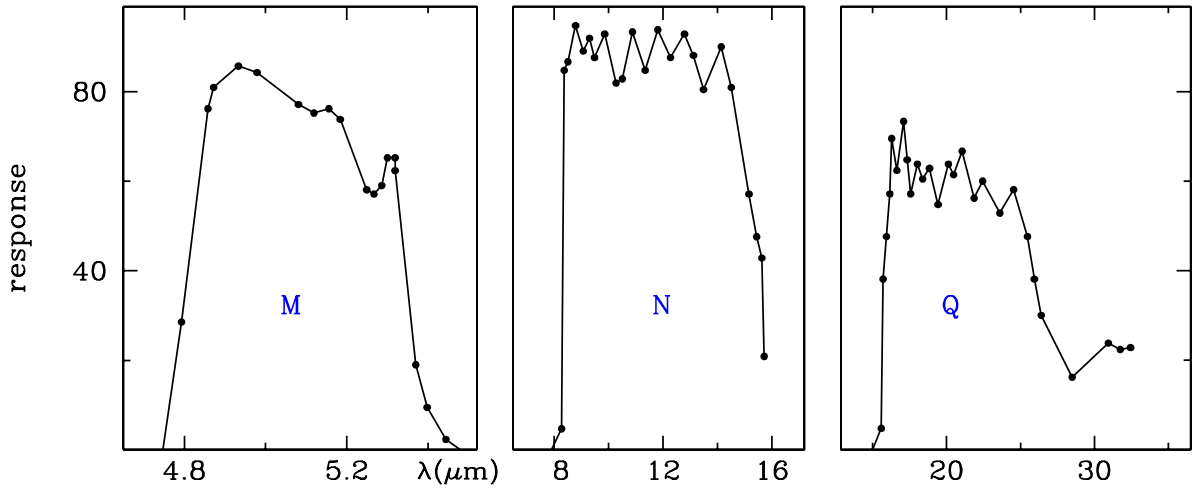


Fig. 75. The photometric system *JHKL* SAAO – Glass – 1973



J		*H*		*K*		*L*		*M*		*N*		*Q*	
λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ
1.028	0.00	1.400	0.00	1.828	0.00	3.000	0.00	4.747	0.00	7.907	0.00	15.00	0.00
1.060	4.54	1.428	3.18	1.884	1.82	3.047	1.36	4.793	28.57	8.279	4.76	15.58	4.76
1.093	40.91	1.447	8.18	1.902	1.82	3.093	10.91	4.858	76.19	8.372	84.76	15.70	38.10
1.102	57.27	1.493	36.36	1.949	6.36	3.140	18.18	4.872	80.95	8.512	86.67	15.93	47.62
1.116	56.36	1.540	70.91	2.023	24.55	3.186	59.09	4.933	85.71	8.791	94.76	16.16	57.14
1.177	67.73	1.600	75.45	2.033	31.82	3.195	74.55	4.979	84.29	9.070	89.05	16.28	69.52
1.191	67.27	1.628	72.73	2.051	62.73	3.214	78.18	5.081	77.14	9.302	91.90	16.63	62.38
1.260	72.27	1.651	74.55	2.060	65.45	3.251	80.00	5.119	75.24	9.488	87.62	17.09	73.33
1.298	70.45	1.674	70.00	2.088	63.64	3.298	78.18	5.156	76.19	9.860	92.86	17.33	64.76
1.326	72.27	1.698	73.18	2.116	68.18	3.391	83.64	5.184	73.81	10.28	81.90	17.56	57.14
1.340	70.91	1.753	60.00	2.153	78.18	3.409	84.09	5.249	58.10	10.51	82.86	18.02	63.81
1.372	36.36	1.777	67.27	2.191	79.55	3.437	83.64	5.267	57.14	10.88	93.33	18.37	60.48
1.409	9.09	1.791	63.64	2.209	80.00	3.474	85.00	5.286	59.05	11.35	84.76	18.84	62.86
1.428	3.18	1.800	59.09	2.247	80.91	3.577	74.09	5.300	65.24	11.81	93.81	19.42	54.76
1.465	0.00	1.819	36.36	2.274	80.00	3.623	73.18	5.319	65.24	12.28	87.62	20.12	63.81
		1.823	11.36	2.302	78.64	3.679	75.00	5.319	62.38	12.79	92.86	20.47	61.43
		1.837	4.54	2.358	70.91	3.698	74.09	5.370	19.05	13.12	88.10	21.05	66.67
		1.865	0.00	2.405	75.45	3.744	45.45	5.398	9.52	13.49	80.48	21.86	56.19
				2.423	31.82	3.791	9.09	5.444	2.38	14.14	90.00	22.44	60.00
				2.442	2.00	3.819	4.54	5.481	0.00	14.51	80.95	23.60	52.86
				2.488	5.45	3.837	2.73			15.16	57.14	24.53	58.10
				2.507	1.82	3.884	1.36			15.44	47.62	25.47	47.62
				2.535	0.00	3.930	0.00			15.63	42.86	25.93	38.10
										15.72	20.95	26.40	30.00
												28.49	16.19
												30.93	23.81
												31.74	22.38
												32.44	22.86

Fig. 75. continued

WBVR - Straižys - 1973

Generale purpose system.

GENERAL INFORMATION

AUTHORS	V. Straižys
TELESCOPE	0.25m (reflector), Moletai Obs.
DETECTOR	FZU 106 (S-20 cathode) [178], pg. 64
MAIN ARTICLE	Straižys, V. 1973, A&A 28, 349

SYSTEM DESCRIPTION

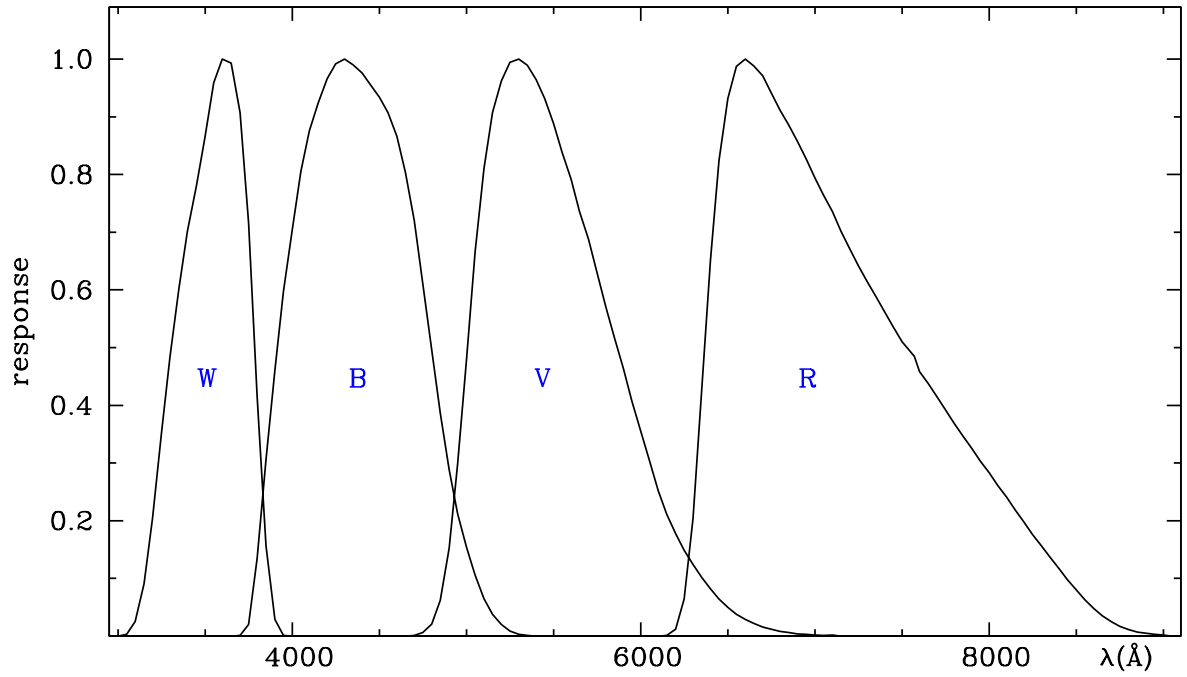
BANDS DESCRIPTION [178], pg. 64					
band	filter	λ_0 (Å)	half-width (Å)	*WHM (Å)*	λ_c (Å)
W	3.0mm UFS2 + 1.5mm BS 5 (#)	3500	510	480	3545
B	2.0mm ZhS 10 + 2.0mm SS 5 + 1.7mm SZS 21	4435	950	885	4355
V	3.0mm ZhS 18+ 1.7mm SZS 21	5540	800	860	5435
R	5.0mm KS 14	6930	900	1160	6945

(#) Filter for suppressing the red leak: $CuSO_4 \cdot 5H_2O$ crystal plate.
Alternative filter for *W*: Schott UG11 + BG32 or Corning 5840.

ZERO POINT: Color indices are 0.00 for unreddened O-type stars. [207]

Fig. 76. The photometric system *WBVR* – Straižys – 1973

TRANSMISSION CURVES [211]



W		*B*				*V*				*R*					
λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ
3000	0.000	3600	0.000	5000	0.154	4650	0.000	6050	0.305	6050	0.000	7450	0.536	8850	0.007
3050	0.003	3650	0.000	5050	0.106	4700	0.001	6100	0.252	6100	0.000	7500	0.510	8900	0.005
3100	0.025	3700	0.001	5100	0.065	4750	0.006	6150	0.211	6150	0.001	7570	0.485	8950	0.003
3150	0.091	3750	0.020	5150	0.038	4800	0.021	6200	0.178	6200	0.012	7600	0.458	9000	0.002
3200	0.205	3800	0.134	5200	0.020	4850	0.062	6250	0.149	6250	0.064	7650	0.438	9050	0.000
3250	0.352	3850	0.306	5250	0.009	4900	0.152	6300	0.124	6300	0.204	7700	0.415		
3300	0.484	3900	0.461	5300	0.003	4950	0.299	6350	0.102	6350	0.423	7750	0.392		
3350	0.602	3950	0.597	5350	0.001	5000	0.480	6400	0.082	6400	0.651	7800	0.368		
3400	0.702	4000	0.705	5400	0.000	5050	0.665	6450	0.064	6450	0.824	7850	0.347		
3450	0.779	4050	0.805	5450	0.000	5100	0.810	6500	0.050	6500	0.932	7900	0.325		
3500	0.863	4100	0.876			5150	0.907	6550	0.038	6550	0.987	7950	0.303		
3550	0.959	4150	0.924			5200	0.962	6600	0.029	6600	1.000	8000	0.283		
3600	1.000	4200	0.966			5250	0.994	6650	0.022	6650	0.988	8050	0.261		
3650	0.993	4250	0.992			5300	1.000	6700	0.016	6700	0.971	8100	0.241		
3700	0.907	4300	1.000			5350	0.989	6750	0.012	6750	0.941	8150	0.219		
3750	0.716	4350	0.990			5400	0.964	6800	0.008	6800	0.911	8200	0.197		
3800	0.416	4400	0.976			5450	0.931	6850	0.006	6850	0.886	8250	0.176		
3850	0.156	4450	0.955			5500	0.888	6900	0.004	6900	0.857	8300	0.156		
3900	0.029	4500	0.934			5550	0.838	6950	0.003	6950	0.827	8350	0.137		
3950	0.001	4550	0.907			5600	0.792	7000	0.002	7000	0.794	8400	0.117		
4000	0.000	4600	0.866			5650	0.735	7050	0.001	7050	0.764	8450	0.098		
4050	0.000	4650	0.804			5700	0.688	7100	0.002	7100	0.736	8500	0.080		
		4700	0.720			5750	0.630	7150	0.000	7150	0.702	8550	0.063		
		4750	0.610			5800	0.570			7200	0.671	8600	0.048		
		4800	0.496			5850	0.517			7250	0.642	8650	0.035		
		4850	0.387			5900	0.464			7300	0.614	8700	0.025		
		4900	0.289			5950	0.407			7350	0.589	8750	0.017		
		4950	0.212			6000	0.355			7400	0.562	8800	0.011		

Fig. 76. continued

MSSO - Thomas *et al.* - 1973

General purpose infrared system.

GENERAL INFORMATION

AUTHORS	J. A. Thomas, A. R. Hyland, and G. Robinson
TELESCOPE	1.25m (reflector), Mount Stromlo and Siding Spring Obs.
MAIN ARTICLE	Thomas, J. A., Hyland, A. R., Robinson, G. 1973, MNRAS 165, 201

SYSTEM DESCRIPTION

BANDS DESCRIPTION [300]		FLUX CALIBRATION [300]
band	λ_{eff} (μm)	F_λ (W cm^{-2} μm^{-1}) (#)
V	0.548	3.64 10^{-12}
R	0.7	1.74 10^{-12}
I	0.9	8.49 10^{-13}
J	1.25	3.03 10^{-13}
H	1.65	1.17 10^{-13}
K	2.2	4.02 10^{-14}
L	3.6	6.18 10^{-15}
M	4.8	2.13 10^{-15}
8.4	8.4	2.31 10^{-16}
N	10.2	1.05 10^{-16}
11.2	11.2	7.46 10^{-17}

(#) For the model by [260] of α Lyr normalized to the *V* flux measured by [236].

ZERO POINT: The colors are 0.00 for the [260] model of α Lyr.

colors of the Sun: (*V*–*R*) = 0.52, (*V*–*I*) = 0.80, (*V*–*J*) = 1.17,

(*V*–*H*) = 1.52, (*V*–*K*) = 1.52, (*V*–*L*) = 1.55,

(*V*–*M*) = 1.53, (*V*–*8.4*) = 1.55, (*V*–*N*) = 1,57, (*V*–*11.2*) = 1.56. [300]

Fig. 77. The photometric system MSSO – Thomas et al. – 1973

Alexander and Branch - 1974

Narrow-band measurement of C_2 absorption bands in G-K stars.

GENERAL INFORMATION

AUTHORS	J. B. Alexander and D. Branch
TELESCOPE	0.91m Yapp reflector, Herstmonceux, UK
DETECTOR	dual-channel photometer
MAIN ARTICLE	Alexander, J. B., Branch, D. 1974, MNRAS 167, 539

SYSTEM DESCRIPTION

BANDS DESCRIPTION [3]

band	λ_{peak} (Å)	half width (Å)	Υ_{peak} (%)
A	4564	66	55
B	4682	74	60
C	4797	72	57

Interference filters.

A beam splitter divides the incident starlight into two beams: a main beam in which measurements are made using the three filters *A*, *B* and *C* in turn, and a monitor beam to record the sky transparency with a broad band blue filter.

SYSTEM ANALYSIS

COLOR INDICES AND PARAMETERS [3]

If I_M is the intensity from the monitor beam, and $r_i = I_i/I_M$, then:

$c = 2r_B/(r_A + r_C)$: measures the absorption by the C_2 band.

Fig. 78. The photometric system Alexander and Branch – 1974

UBVR - Cathey - 1974

General purpose system. Photometry in globular clusters.

GENERAL INFORMATION

AUTHORS	L. R. Cathey
TELESCOPE	0.91m Crossley (reflector), Lick Obs.; 1.50m and 0.91m (reflectors), CTIO; 1.27m (reflector), KPNO
DETECTOR	FW-129 (S-11 cathode), FW-130 (S-20 cathode), and 1P21 (S-4 cathode)
MAIN ARTICLE	Cathey, L. R. 1974, AJ 79, 1370

SYSTEM DESCRIPTION

BANDS DESCRIPTION [63]

band	photocathode	filter
	Lick Obs.	
U	FW-129 (S-11)	1.0mm UG-1 6.5mm $CuSO_4$
B	FW-129 (S-11)	2.0mm GG-13 1.0mm BG-12 4.5mm Quartz
V	FW-129 (S-11)	2.0mm GG-14 5.5mm GG-13
V	FW-130 (S-20)	2.0mm GG-14 2.0mm BG-18
R	FW-130 (S-20)	2.0mm RG-2 2.0mm GG-13
	KPNO and *CTIO*	
U *B*	1P21 (S-4) (#) 1P21 (S-4) (#)	2.0mm Corning 9863 2.0mm Corning 5030 2.0mm GG-13
V	1P21 (S-4) (#)	2.0mm Corning 3384
Red-leak of U(##)	1P21 (S-4) (#)	2.0mm Corning 9863 + RG-1

(#) A FW-129 (S-11) photocathode can be used instead.

(##) To measure the red-leak of the *U* band that in the KPNO/CTIO version has no red-leak suppressor.

Fig. 79. The photometric system *UBVR* – Cathey – 1974

Hα,β,γ - Feinstein - 1974

Balmer lines in early-type stars.

GENERAL INFORMATION

AUTHORS	A. Feinstein
TELESCOPE	0.41m (reflector), KPNO; 0.41m and 0.91m (reflectors), CTIO
DETECTOR	1P21
MAIN ARTICLE	Feinstein, A. 1974, MNRAS 169, 171

SYSTEM DESCRIPTION

BANDS DESCRIPTION [105]

band	filter	λ_{peak} (Å)	half-width (Å)	Υ_{peak} (%)
Filters at KPNO				
Hα wide	KPNO 210	6595	159	88
Hα narrow	KPNO 71	6575	54	47
Hβ wide	KPNO 214	4900	150	70
Hβ narrow	KPNO 212	4861	31	62
Hγ wide	KPNO 49	4385	160	70
Hγ narrow	KPNO 48	4340	31	56
Filters at CTIO				
Hα wide	KPNO 210	6595	159	88
Hα narrow	KPNO 71	6575	54	47
Hβ wide	LP	4880	200	51
Hβ narrow	LP	4865	45	32
Hγ wide	LP	4340	170	60
Hγ narrow	LP	4340	50	25

Interference filters.

SYSTEM ANALYSIS

COLOR INDICES AND PARAMETERS [105]

$$\alpha = -2.5 \log\left(\frac{H\alpha\ narrow}{H\alpha\ wide}\right) \qquad \beta = -2.5 \log\left(\frac{H\beta\ narrow}{H\beta\ wide}\right) \qquad \gamma = -2.5 \log\left(\frac{H\gamma\ narrow}{H\gamma\ wide}\right)$$

RELATIONS WITH OTHER SYSTEMS [105]

Hγ - Beer - 1964

$R_\gamma = 1.40\,\gamma - 1.86$

Hα - Andrews - 1968

$R_\alpha = 3.08\,\alpha - 3.42$

Hα,β - Tebbe - 1969

$\alpha_{Tebbe} = 1.15\,\alpha + 0.085$

Fig. 80. The photometric system $H\alpha,\beta,\gamma$ – Feinstein – 1974

UBVRI - Fernie - 1974

Realization with a single photocathode of the optical bands of the *UBVRI(JHKLM) - Johnson - 1965* system. Later revised by Moffett and Barnes [213].

GENERAL INFORMATION

AUTHORS	J. D. Fernie
TELESCOPE	0.61m (reflector), David Dunlap Observatory
DETECTOR	EMI 9658R (refrigerated)
MAIN ARTICLE	Fernie, J. D. 1974, PASP 86, 837

SYSTEM DESCRIPTION

BANDS DESCRIPTION [106]

band	filter
U	2mm UG2 + 2mm BG18
B	4mm BG12 + 2mm BG18 + 1mm GG4
V	3mm GG14 + 2mm BG18
R	2mm OG550 + 1mm RG6
I	1mm BG3 + 2mm RG610

ZERO POINT: Color indices are 0.00 for unreddened A0 V stars. [213]

SYSTEM ANALYSIS

RELATIONS WITH OTHER SYSTEMS [213]

UBVRI(JHKLMN) - Johnson - 1965

$$(B-V) = -0.0044 + 1.0702\,(B-V)_{Johnson} - 0.0553\,(B-V)^2_{Johnson}$$

$$(V-R) = +0.05 + 0.82\,(V-R)_{Johnson}$$

Fig. 81. The photometric system *UBVRI* – Fernie – 1974

Hα,β - Guinan and McCook - 1974

Narrow-band photometry of Balmer lines.

GENERAL INFORMATION

AUTHORS	E. F. Guinan and G. P. McCook
TELESCOPE	0.38m Villanova University
DETECTOR	EMI 9558 QB (unrefrigerated)
MAIN ARTICLE	Guinan, E.F., McCook, G. P. 1974, PASP 86, 947

SYSTEM DESCRIPTION

BANDS DESCRIPTION [125]

band	λ_{peak} (Å)	half-width (Å)	Υ_{peak} (%)
Hα wide	6575	295	83
Hα narrow	6565	36	74
Hβ wide	4870	180	77
Hβ narrow	4863	25	70

Interference filters.

SYSTEM ANALYSIS

COLOR INDICES AND PARAMETERS [20]

$$H_\alpha = -2.5 \log(\frac{H\alpha\ narrow}{H\alpha\ wide}) + const.$$

$$H_\beta = -2.5 \log(\frac{H\beta\ narrow}{H\beta\ wide}) + const.$$

Fig. 82. The photometric system *Hα,β* – Guinan and McCook – 1974

NQ - Low and Rieke - 1974

General purpose infrared photometric system.

GENERAL INFORMATION

AUTHORS	F. J. Low and G. H. Rieke
TELESCOPE	1.54m (reector), Catalina station of the Lun. Plan. Lab.
DETECTOR	Ge:Ga bolometer
MAIN ARTICLE	Low, F. J., Rieke, G. H. 1794, *Methods of Experimental Physics* Vol. 12, Part A (N. Carleton ed., Academic, New York), pg. 456

SYSTEM DESCRIPTION

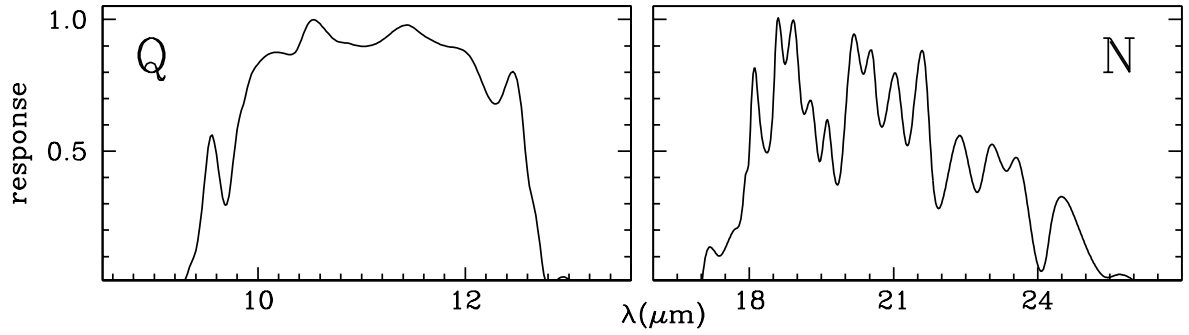
BANDS DESCRIPTION [251]			FLUX CALIBRATION (#)	
band	λ_{eff} (μm)	bandpass (μm)	$F_{\lambda,0}$ (W cm^{-2} μm^{-1})	$F_{\nu,0}$ (Jy)
Q	10.6	8 – 13	9.6 10^{-17}	36.0 ± 1.2
N	21	17 – 25	6.4 10^{-18}	9.4 ± 0.5

(#) For a 0.0 mag star. [251]

ZERO POINT: $K_{Johnson} - N = K_{Johnson} - Q = 0.00$ for α Lyr. [251]

TRANSMISSION CURVES

As derived from Fig 1 and 2 of [251].



Q								*N*							
λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ
9.17	0.000	10.16	0.875	11.55	0.952	12.72	0.149	17.01	0.000	18.45	0.562	20.16	0.941	22.77	0.348
9.31	0.024	10.27	0.869	11.67	0.923	12.75	0.060	17.04	0.051	18.51	0.716	20.37	0.792	22.98	0.511
9.34	0.060	10.39	0.893	11.79	0.902	12.89	0.013	17.35	0.102	18.56	0.946	20.58	0.838	23.36	0.424
9.40	0.119	10.45	0.952	11.90	0.893	13.07	0.000	17.71	0.204	18.72	0.838	20.64	0.716	23.57	0.475
9.46	0.268	10.50	0.994	12.08	0.839			17.87	0.307	18.93	0.992	20.80	0.603	24.16	0.077
9.54	0.560	10.62	0.973	12.34	0.696			17.92	0.409	19.09	0.670	21.06	0.787	24.26	0.204
9.69	0.292	10.77	0.917	12.49	0.789			18.00	0.511	19.31	0.680	21.28	0.521	24.58	0.317
9.81	0.595	10.85	0.911	12.54	0.655			18.03	0.613	19.47	0.460	21.65	0.838	24.80	0.235
9.86	0.685	10.94	0.902	12.57	0.536			18.13	0.803	19.62	0.619	21.81	0.409	25.44	0.020
9.92	0.774	11.20	0.923	12.60	0.417			18.19	0.685	19.73	0.460	22.02	0.317	25.65	0.031
9.98	0.821	11.47	0.976	12.66	0.298			18.35	0.496	19.89	0.409	22.40	0.557	26.08	0.000

Fig. 83. The photometric system *NQ* – Low and Rieke – 1974

Hα - Vidal - 1974

Photometry of diffuse nebulae.

GENERAL INFORMATION

AUTHORS	J. -L. Vidal
TELESCOPE	0.60m (reector), Pic-du-Midi Obs.
DETECTOR	EMI 9558 B (S-20 cathode, refrigerated)
MAIN ARTICLE	Vidal, J.-L. 1974, A&A 34, 401

SYSTEM DESCRIPTION

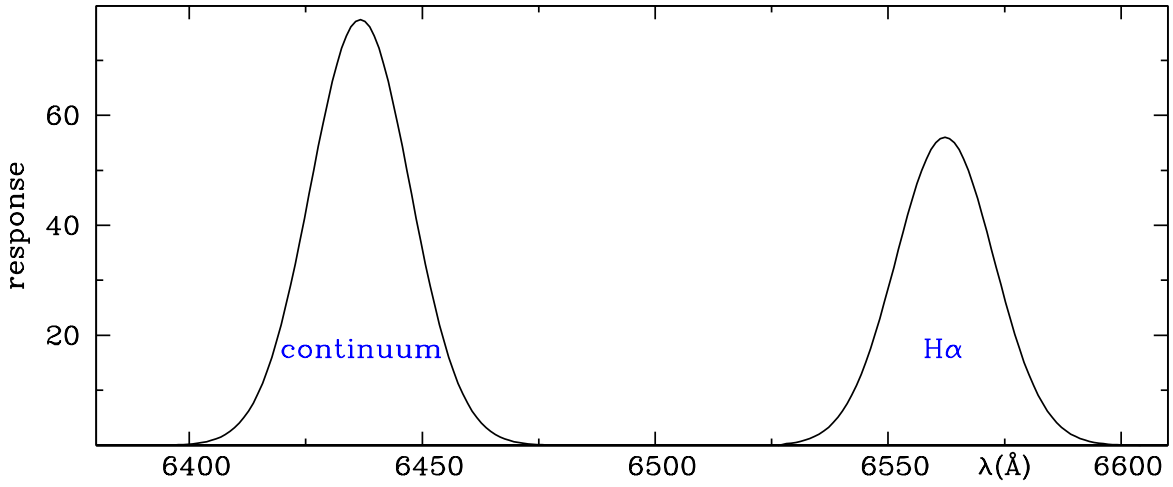
BANDS DESCRIPTION [309]

band	lter	λ_{peak} (A)	FWHM (A)	Υ_{peak} (%)
Hα continuum	interference	6435.7	10.7	77.4
Hα line	interference	6562.2	10.5	56

The light from the two beams is switched 100 times per second onto the same photomultiplier.

TRASMISSION CURVES

As derived from description given in [309].



Hα continuum				*Hα line*			
λ (A)	Υ (%)	λ (A)	Υ (%)	λ (A)	Υ (%)	λ (A)	Υ (%)
6396.7	0.00	6437.7	77.07	6525.2	0.00	6564.2	55.00
6400.7	0.27	6440.7	72.18	6530.2	0.54	6565.2	53.77
6405.7	1.16	6445.7	54.34	6535.2	2.05	6570.2	41.90
6410.7	4.04	6450.7	32.89	6540.2	6.24	6575.2	26.02
6415.7	11.28	6455.7	16.00	6545.2	15.1	6580.2	12.89
6420.7	25.31	6460.7	6.26	6550.2	29.15	6585.2	5.08
6425.7	45.64	6465.7	1.97	6555.2	44.84	6590.2	1.60
6430.7	66.15	6470.7	0.50	6560.2	55.00	6595.2	0.40
6435.7	77.07	6475.7	0.10	6561.2	55.75	6600.2	0.08
6436.7	77.40	6476.7	0.00	6562.2	56.00	6605.2	0.00
				6563.2	55.75		

Fig. 84. The photometric system Hα – Vidal – 1974

ANS - 1974

Ultraviolet photometry from the Astronomical Netherland Satellite.

GENERAL INFORMATION

TELESCOPE 0.22m (reflector)

MAIN ARTICLE Wesselius, P. R., van Duinen, R. J., Aalders, J. W., Kester, D. 1980, A&A 85, 221

SYSTEM DESCRIPTION

BANDS DESCRIPTION [318]			FLUX CALIBRATION (#) [318]
band	λ_c (Å)	bandwidth (Å)	F_λ (erg cm^{-2} s^{-1} Å^{-1})
15N	1545	50	16.70 10^{-14}
15W	1549	149	5.93 10^{-14}
18	1799	149	7.05 10^{-14}
22	2200	200	5.23 10^{-14}
25	2493	150	10.49 10^{-14}
33	3294	101	6.52 10^{-14}

(#) Corresponding to 1 count in the given band.

Slits on the focal plane of a spectrograph feed light to separate photomultipliers, one for each band.

SYSTEM ANALYSIS

REDDENING RATIOS [318]

$E(15N-V) = 5.13\,E(B-V)$

$E(15W-V) = 5.13\,(\pm0.48)\,E(B-V)$

$E(18-V) = 4.74\,(\pm0.42)\,E(B-V)$

$E(22-V) = 6.46\,(\pm0.47)\,E(B-V)$

$E(25-V) = 3.99\,(\pm0.37)\,E(B-V)$

$E(33-V) = 1.92\,(\pm0.24)\,E(B-V)$

RELATIONS WITH OTHER SYSTEMS [46]

KLMNPQR - Borgman - 1960

$33_{ANS} = R - 1.680\ (\pm0.007)$

OAO2 WEP - 1970

$33_{ANS} = 333_{OAO\ 2} + 0.084\ (\pm0.014)$

TD1 - 1972

$15_{ANS} = 157_{TD1} + 0.073\ (\pm0.007)$

$18_{ANS} = 180_{TD1} - 0.023\ (\pm0.005)$

$22_{ANS} = 220_{TD1} - 0.073\ (\pm0.007)$

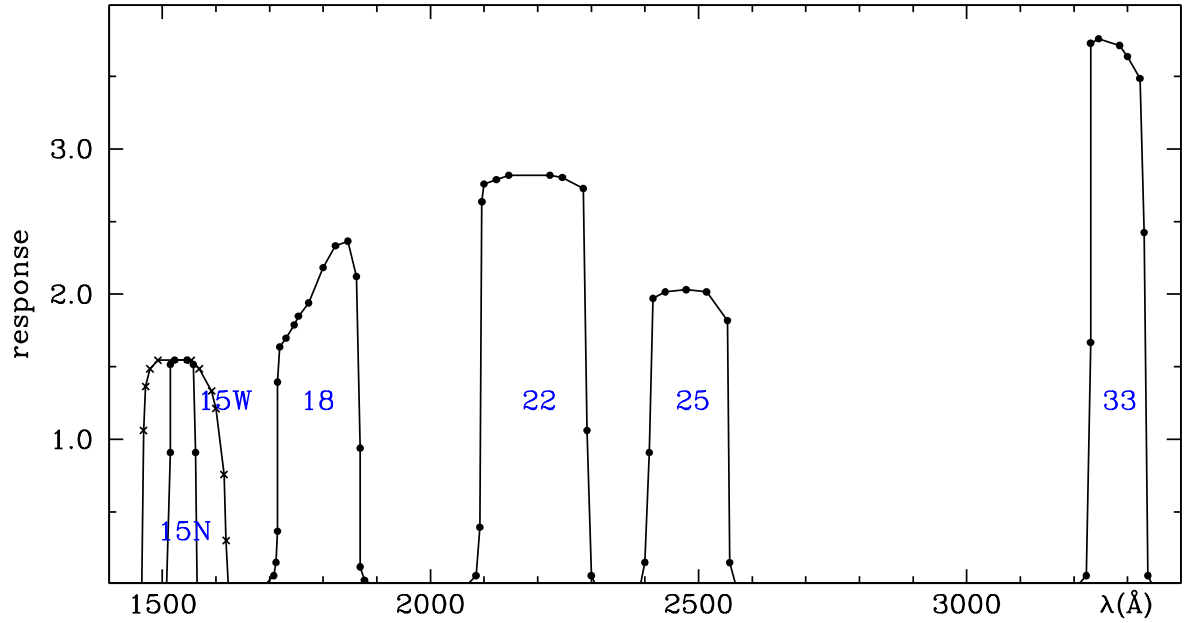
$25_{ANS} = 250_{TD1} - 0.055\ (\pm0.005)$

Fig. 85. The photometric system ANS – 1974

TRANSMISSION CURVES

As derived from Fig 1 of [318].

Response are in units of photon count^{-1} cm^{-2} .



15N		*15W*		*18*		*22*		*25*		*33*	
λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ
1508	0.000	1462	0.000	1692	0.000	2069	0.000	2392	0.000	3208	0.000
1515	0.909	1465	1.061	1708	0.061	2085	0.061	2400	0.152	3223	0.061
1515	1.515	1469	1.364	1712	0.152	2092	0.394	2408	0.909	3231	1.667
1523	1.545	1477	1.485	1715	0.367	2096	2.636	2415	1.970	3231	3.727
1546	1.545	1492	1.545	1715	1.394	2100	2.758	2438	2.015	3246	3.758
1558	1.515	1554	1.545	1719	1.636	2123	2.788	2477	2.030	3285	3.712
1562	0.909	1569	1.485	1731	1.697	2146	2.818	2515	2.015	3300	3.636
1565	0.000	1592	1.333	1746	1.788	2223	2.818	2554	1.818	3323	3.485
		1600	1.212	1754	1.848	2246	2.803	2558	0.151	3331	2.424
		1615	0.758	1773	1.939	2285	2.727	2569	0.000	3338	0.061
		1619	0.303	1800	2.182	2292	1.061			3346	0.000
		1623	0.000	1823	2.333	2300	0.061				
				1846	2.364	2308	0.000				
				1862	2.121						
				1869	0.939						
				1869	0.121						
				1877	0.030						
				1892	0.000						

Fig. 85. continued

Hα - Dachs and Schmidt-Kaler - 1975

Hα photometry .

GENERAL INFORMATION

AUTHORS	J. Dachs, and T. Schmidt-Kaler
TELESCOPE	0.61m Bochum reflector, ESO
DETECTOR	EMI 9558 (refrigerated)
MAIN ARTICLE	Dachs, J., Schmidt-Kaler, Th. 1975, A&AS 21, 81

SYSTEM DESCRIPTION

BANDS DESCRIPTION [81]

band	filter	λ_{peak} (Å)	half-width (Å)	Υ_{peak} (%)
Hα narrow	B11(X)	6560.5	13	46.5
Hα wide	B2	6566	157	59

Interference filters by Baird Atomic.

SYSTEM ANALYSIS

COLOR INDICES AND PARAMETERS [81]

$$\alpha_{Bochum} = -2.5 \log \frac{H\alpha\ narrow}{H\alpha\ wide}$$

RELATIONS WITH OTHER SYSTEMS [81]

*uvbyH*β - Strömgren and Crawford - 1956

$$\alpha_{Bochum} = 1.400 + 0.645\,\beta_{CM} \qquad \beta > 2.65$$

*H*α - Andrews - 1968

$$\alpha_{Bochum} = 2.965 + 1.050\,(R\alpha - 1.00) \qquad 0.97 < R_{\alpha} < 1.20$$

Hα, β, γ - Feinstein - 1974

$$\alpha_{Bochum} = 3.196 + 4.80\,(\alpha_{Feinstein} - 1.500) \quad \text{for O-B stars}$$
$$\alpha_{Bochum} = 3.154 + 4.80\,(\alpha_{Feinstein} - 1.500) \quad \text{for A-F stars}$$

Fig. 86. The photometric system Hα – Dachs and Schmidt-Kaler – 1975

Helt and Gyldenkerne - 1975

Narrow band photometry of M giants.

GENERAL INFORMATION

AUTHORS	B. E. Helt and K. Gyldenkerne
TELESCOPE	0.61m Morgan (reflector), Lowell Observatory, Arizona
DETECTOR	EMI 6265 S/A (S13 cathode, unrefrigerated)
MAIN ARTICLE	Helt, B. E., Gyldenkerne, K. 1975, A&AS 22, 171

SYSTEM DESCRIPTION

BANDS DESCRIPTION [136]

band	filter	λ_{peak} (Å)	half-width (Å)	Υ_{peak} (%)
405	Schott 405	4055	74	37
437	Baird 437	4380	65	40
451	Schott 451	4513	80	38
480	Baird 480	4803	61	70
494	Baird 494 (5° tilted)	4942	44	69
497	Schott 497	4973	93	40
501	Baird 501 (5° tilted)	5006	34	61
536	Baird 536	5365	62	72
550	Schott 550	5502	119	39

Interference filters.

SYSTEM ANALYSIS

COLOR INDICES AND PARAMETERS [136]

$m_2 = (438 - 480) - (480 - 536) = 438 - 2 \cdot 480 + 536$: temperature indicator.

$m_4 = (451 - 497) - (497 - 550) = 451 - 2 \cdot 497 + 550$: luminosity indicator.

$t = (494 - 501)$: measures the TiO absorption band at 4954 Å .

Fig. 87. The photometric system Helt and Gyldenkerne – 1975

UBViyz - Jennens and Helfer - 1975

Metal abundances and luminosities of G and K stars.

GENERAL INFORMATION

AUTHORS	P.A Jennens, and H. L. Helfer
TELESCOPE	KPNO telescopes; 0.90m and 1.50m (reflectors), CTIO [147]
DETECTOR	ITT FW 130 or EMI 9658 (S-20 cathode)
MAIN ARTICLE	Jennens P.A., Helfer H.L. 1975, MNRAS 172, 667

SYSTEM DESCRIPTION

BANDS DESCRIPTION [148]

band	filter	λ_{eff} (Å)	half-width (Å)
U	Corning 9863 + $CuSO_4$ (#)	3660	600
B	Corning 5030 + 1mm Schott 9913 + $CuSO_4$	4400	900
V	Corning 3384 + 1.6mm Schott BG18	5500	700
i	3mm D RG 780	7900	600
y	Baird Atomic 12-39-5	4600	200
z	Baird Atomic 14-74-4	5160	200

(#) 2.5mm of 80% saturated copper sulphate solution, or a solid sulphate filter are used to block infrared leak [148].

SYSTEM ANALYSIS

RELATIONS WITH OTHER SYSTEMS [148]

UBVRI(JHKLMN) - Johnson - 1965

$$(R-I) \approx 1.333 + 0.60\,(V-i)$$

Fig. 88. The photometric system *UBViyz* – Jennens and Helfer – 1975

8 colors - Morguleff *et al.* - 1975

Square, narrow-band photometry of early-type stars.

GENERAL INFORMATION

AUTHORS	N. Morguleff, M. Gerbaldi and D. Barbier
TELESCOPE	0.80m (reflector), Haute-Provence Obs.
DETECTOR	Lallemand photomultipliers
MAIN ARTICLE	Morguleff, N., Gerbaldi, M. 1975, A&AS 19, 189

SYSTEM DESCRIPTION

BANDS DESCRIPTION [215]

band	bandpass (Å)	feature
361	3575 – 3650	blue side of the Balmer jump
375	3720 – 3780	red side of the Balmer jump
394	3925 – 3965	CaII
404	4010 – 4070	continuum
434	4310 – 4380	Hγ
460	4815 – 4905	Hβ
495	4900 – 5000	continuum
595	5900 – 6000	continuum

The bands are isolated on the focal plane of a prism spectrograph (dispersion 35 Å/mm at 3500, 60 Å/mm at 4000 and 160 Å/mm at 5550 Å) by diaphragms that direct to photomultipliers the selected spectral portions.

Fig. 89. The photometric system 8 colors – Morguleff et al. – 1975

ri - Weistrop - 1975

General purpose photometry in the red and near-infrared.

GENERAL INFORMATION

AUTHORS	D. Weistrop
TELESCOPE	0.90 m (reflector), KPNO
DETECTOR	RCA C31034A
MAIN ARTICLE	Weistrop, D. 1975 PASP 87, 367

SYSTEM DESCRIPTION

BANDS DESCRIPTION [317]

band	filter
r	2mm Schott OG5 + 2mm Schott KG3
i	2mm Schott RGN9

SYSTEM ANALYSIS

RELATIONS WITH OTHER SYSTEMS [317]

RI - Kron and Smith - 1951

$$R_{K-S} = r - 0.340\,(r-i) + 0.225$$
$$(R-I)_{K-S} = 0.895\,(r-i) - 0.142$$

Fig. 90. The photometric system *ri* – Weistrop – 1975

D2B Aura - 1975

Ultraviolet sky survey with the D2B-Aura satellite.

GENERAL INFORMATION

TELESCOPE	80 × 80 mm Al+MgF_2 coated objective grating
DETECTOR	EMR 541 N09 ASCOP photomultiplier
MAIN ARTICLE	Maucherat-Joubert, M., Cruvellier, P., Deharveng J. M. 1978, A&A 70, 467

SYSTEM DESCRIPTION

BANDS DESCRIPTION [200]

band	λ_c	bandpass (Å)
12	1250	500
17(#)	1690	330
22	2200	410
31	3100	500

On the focal plane of a concave (f/3) objective grating of 80 × 80 mm, 610 ln/mm, a series of exit slits are placed just ahead of a single photomultiplier. The different bands are obtained by rotation of the grating and the slit wheel. The bands aproximately have a square profile.

(#) To further attenuate the disturbance from the geocoronal Lyα, a CaF_2 window is placed in front of the corresponding slit.

Fig. 91. The photometric system D2B AURA – 1975

Washington - Canterna - 1976

General purpose system aimed to G and K stars.

GENERAL INFORMATION

AUTHORS	R. Canterna
TELESCOPE	0.42m (reflector), KPNO; 0.77m (reflector), Manastash Obs.
DETECTOR	RCA C31034 (refrigerated)
MAIN ARTICLE	Canterna, R. 1976, AJ 81, 228

SYSTEM DESCRIPTION

BANDS DESCRIPTION

	photoelectric [57]			photographic [111]		
band	filter	λ_0 (Å)	FWHM (Å)	filter	plate	λ_{eff} (Å)
C	4mm Corning CS-7-59 + 2.5mm 80%$CuSO_4 \cdot H_2O$	3910	1100	3mm BG1	103a-O	3870
M	3mm Schott GG455 + 5mm Corning CS-4-96	5085	1050	3mm GG455	IIIa-J	5119
T_1	1.5mm Schott BG38 + 3mm Schott OG 590	6330	800	3mm OG590	O98-04	6533
T_2	3mm Schott RGN9	7885	1400	3mmm RGN-9	IVN(IN)	8056

ZERO POINT: $(C-M) = (M-T_1) = (T_1-T_2) = 0.0$ for unreddened A0 V stars [57]

CCD VERSION: Geisler, D. 1996, AJ 111, 480

PHOTOGRAPHIC VERSION: Geisler, D., Kapradinis, S. 1983, AJ 88, 461

SYSTEM ANALYSIS

COLOR INDICES AND PARAMETERS [238]

(T_1-T_2) : temperature index similar to $(R-I)_{Cousins}$; relatively insensitive to metallicity and surface gravity.

$(M-T_1)$: sensitive to metallicity.

(M – 51) : luminosity class indicator (band *51* is from the *DDO - McClure and Van den Bergh - 1968* system).

REDDENING RATIOS [57]

$E(C-M) = 1.10\,E(B-V)_{Johnson}$ $\quad$ $E(M-T_1) = 0.95\,E(B-V)_{Johnson}$

$E(T_1-T_2) = 0.72\,E(B-V)_{Johnson}$

RELATIONS WITH OTHER SYSTEMS

RI - Cousins - 1976 [33]

$(R-T_1)$	=	$-0.012 + 0.046\,(T_1-T_2) - 0.082\,(T_1-T_2)^2$
$(V-I)$	=	$0.003 + 1.794\,(T_1-T_2) + 0.517\,(T_1-T_2)^2 - 0.402\,(T_1-T_2)^3$
$(V-R)$	=	$0.008 + 1.016\,(V-T_1)$
$(M-V)$	=	$0.006 + 0.240\,(V-I)$
$(M-T_2)$	=	$1.242\,(V-I) + 0.018\,(V-I)^2$

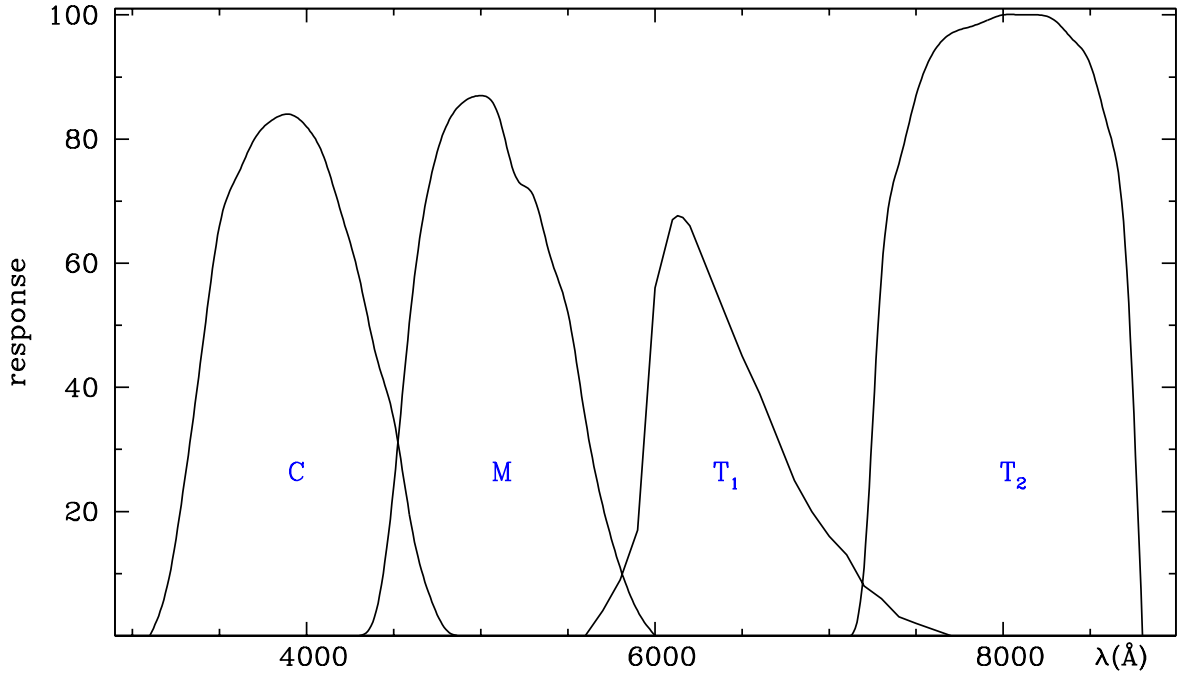
Fig. 92. The photometric system Washington – Canterna – 1976

UBVRI - Landolt - 1983 [119]

$(V-R)$	=	$1.062\ (\pm 0.031)\ (V-T_1)$	$(V-T_1) < 0.30$
$(V-R)$	=	$-0.055\ (\pm 0.020)\ +1.141\ (\pm 0.031)\ (V-T_1)$	$(V-T_1) > 0.30$
$(R-I)$	=	$0.970\ (\pm 0.016)\ (T_1-T_2)$	$(T_1-T_2) < 0.40$
$(R-I)$	=	$0.064\ (\pm 0.007)\ +0.849(\pm 0.010)\ (T_1-T_2)$	$(T_1-T_2) > 0.40$

TRANSMISSION CURVES

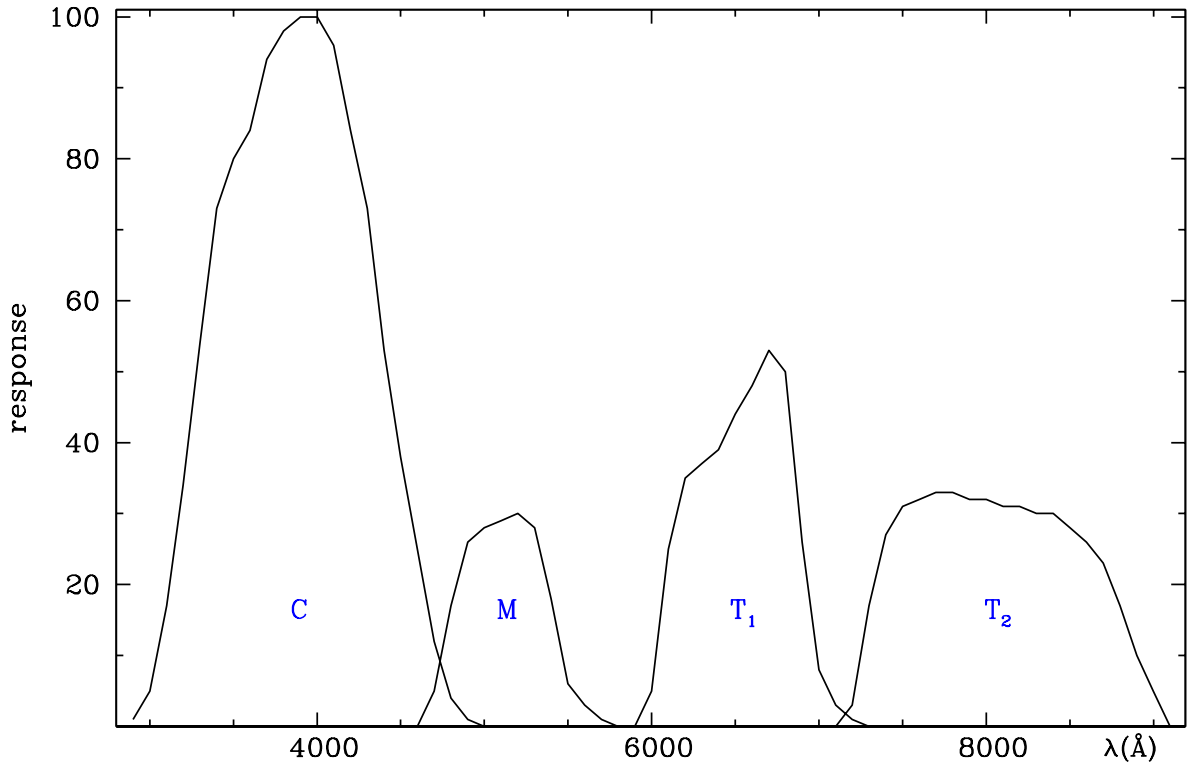
PHOTOELECTRIC VERSION [58], pg 489



C				*M*				T_1				T_2			
λ (A)	ϒ(%)	λ (A)	ϒ(%)	λ (A)	ϒ(%)	λ (A)	ϒ(%)	λ (A)	ϒ(%)	λ (A)	ϒ(%)	λ (A)	ϒ(%)	λ (A)	ϒ (%)
3100	0	4200	68	4300	0	5400	61	5600	0	6700	32	7100	0	8200	100
3200	8	4300	58	4400	4	5500	52	5700	4	6800	25	7200	11	8300	99
3300	25	4400	45	4500	24	5600	35	5800	9	6900	20	7300	58	8400	96
3400	46	4500	35	4600	53	5700	21	5900	17	7000	16	7400	76	8500	92
3500	66	4600	18	4700	72	5800	11	6000	56	7100	13	7500	87	8600	82
3600	74	4700	7	4800	82	5900	4	6100	67	7200	8	7600	94	8700	63
3700	80	4800	1	4900	86	6000	0	6200	66	7300	6	7700	97	8800	0
3800	83	4900	0	5000	87			6300	59	7400	3	7800	98		
3900	84			5100	84			6400	52	7500	2	7900	99		
4000	82			5200	74			6500	45	7600	1	8000	100		
4100	77			5300	71			6600	39	7700	0	8100	100		

Fig. 92. continued

PHOTOGRAPHIC VERSION [111]



C				*M*		*T*$_1$		*T*$_2$			
λ (A)	ϒ (%)	λ (A)	ϒ (%)	λ (A)	ϒ (%)	λ (A)	ϒ (%)	λ (A)	ϒ (%)	λ (A)	ϒ (%)
2900	1	4400	53	4600	0	5900	0	7100	0	8600	26
3000	5	4500	38	4700	5	6000	5	7200	3	8700	23
3100	17	4600	25	4800	17	6100	25	7300	17	8800	17
3200	34	4700	12	4900	26	6200	35	7400	27	8900	10
3300	54	4800	4	5000	28	6300	37	7500	31	9000	5
3400	73	4900	1	5100	29	6400	39	7600	32	9100	0
3500	80	5000	0	5200	30	6500	44	7700	33		
3600	84			5300	28	6600	48	7800	33		
3700	94			5400	18	6700	53	7900	32		
3800	98			5500	6	6800	50	8000	32		
3900	100			5600	3	6900	26	8100	31		
4000	100			5700	1	7000	8	8200	31		
4100	96			5800	0	7100	3	8300	30		
4200	84					7200	1	8400	30		
4300	73					7300	0	8500	28		

Fig. 92. continued

RI - Cousins - 1976

Photometry in the red and near-infrared.

GENERAL INFORMATION

AUTHORS	A. W. J. Cousins
TELESCOPE	0.45m (reflector), South African Astronomical Obs.
DETECTOR	RCA C31034A (refrigerated), at Cape Obs.
	EMI 9659A (S-20 cathode), at Sutherland station
MAIN ARTICLE	Cousins A.W.J. 1976, Mem. R. Astr. Soc. 81, 25

SYSTEM DESCRIPTION

BANDS DESCRIPTION [178], pg. 83							FLUX CALIBRATION	
band	$filter_{Cape}$	$filter_{Sutherland}$	λ_0 (Å)	λ_{eff} (μm)	*WHM* (Å)	λ_c (Å)	F_ν (#)	F_λ (##)
R	interference	2mm OG570 + 2mm KG3	6700	0.64	1515	6470	3.08	2.254
I	3mm RGN9	Wratten 88A	8100	0.79	1090	7865	2.55	1.196
Added band								
V	2mm Omag 302	3mm GG495 + 1mm BG38		0.55			3.64	3.607

(#) For a 0.0 mag star, in units of 10^{-23} W m^{-2} Hz^{-1} [31]

(##) For a V = 0.0 A0V star, in units of 10^{-9} erg cm^{-2} s^{-1} Å^{-1} [178], pg. 82

The *V* band is a realization with the EMI 9659 photomultiplier of the equivalent band in the *UBV - Johnson and Morgan - 1953*, originally obtained with a 1P21 tube.
An *UBVRI* system composed by the *UBV* bands from *UBV - Johnson and Morgan - 1953* and the Cousins' *RI* is sometimes called Johnson–Cousins in literature.

ZERO POINT: All color indices for unreddened A0 V stars are 0.00. [178], pg. 83

PHOTOGRAPHIC VERSION: Bessell, M. S. 1979, PASP 91, 589

SYSTEM ANALYSIS

REDDENING RATIOS [258]

$A_R = 2.66E(B-V)$ $\quad$ $A_I = 2.10E(B-V)$

RELATIONS WITH OTHER SYSTEMS [31]

UVBGRI - Stebbins and Whitford - 1943

$$(V-I)_C = 1.5\,(G-R)_{St-W} + 0.75$$

RI - Kron and Smith - 1951

$(R-I)_C$	$= 0.118 + 1.03\,(R-I)_{KS}$	$(R-I)_{KS} < 0.35$
$(R-I)_C$	$= 0.033 + 1.246\,(R-I)_{KS}$	$0.35 < (R-I)_{KS} < 1.30$
$(V-I)_C$	$= 0.27 + 0.936\,(V-I)_{KS}$	$(V-I)_{KS} > 0.5$
$(V-I)_C$	$= 0.24 + 1.00\,(V-I)_{KS}$	$(V-I)_{Ks} < 0.5$

Fig. 93. The photometric system *RI* – Cousins – 1976

uvbyHβ - Strömgren and Crawford - 1956

$(V-I)_C$	=	$2.60\,(b-y)\,+\,0.02$	$(b-y)\,<\,-0.05$
$(V-I)_C$	=	$2.12\,(b-y)$	$-0.05\,<\,(b-y)\,<\,0.12$
$(V-I)_C$	=	$1.53\,(b-y)\,+\,0.075$	$0.12\,<\,(b-y)\,<\,0.60$

USNO - Kron and Mayall - 1960

$(V-I)_C$	=	$0.188\,+\,0.946\,(V-I)_{KM}$	$-0.4\,<\,(V-I)_{KM}\,<\,2.5$
$(V-I)_C$	=	$0.91\,(V-I)_{KM}\,+\,0.26$	$2.2\,<\,(V-I)_{KM}\,<\,4.3$

UBVRI(JHKLMN) - Johnson - 1965

$(V-I)_C$	=	$0.713\,(V-I)_J$	$(V-I)\,<\,0$
$(V-I)_C$	=	$0.778\,(V-I)_J$	$0\,<\,(V-I)_J\,<\,2.0$
$(V-I)_C$	=	$0.835\,(V-I)_J\,-\,0.13$	$2.0\,<\,(V-I)_J\,<\,3.0$
$(R-I)_C$	=	$0.856\,(R-I)_J\,+\,0.025\,+\,\Delta(R-I)_J$	
$(V-R)_C$	=	$0.73\,(V-R)_J\,-\,0.03$	$(V-R)_J\,<\,1.0$
$(V-R)_C$	=	$0.62\,(V-R)_J\,-\,0.08$	$1.0\,<\,(V-R)_J\,<\,1.7$
R_J	=	$0.988\,R_C\,-\,0.002\,(\pm0.02)$	[316]
I_J	=	$0.990\,I_C\,-\,0.007\,(\pm0.02)$	[316]

ri - Argue - 1967

$(V-R)_C$	=	$0.838\,(\pm0.007)\,(V_{Johnson}-r)\,+0.162\,(\pm0.003)$	$-0.25\,<\,(V_{Johnson}-r)\,<\,0.79$ [296]

ri - Weistrop - 1975

$(R-I)_C$	=	$1.053\,(\pm0.008)\,(r-i)\,-\,0.077\,(\pm0.010)$	$0.77\,<\,(r-i)\,<2.15$, class V only [296]

Washington - Canterna - 1976

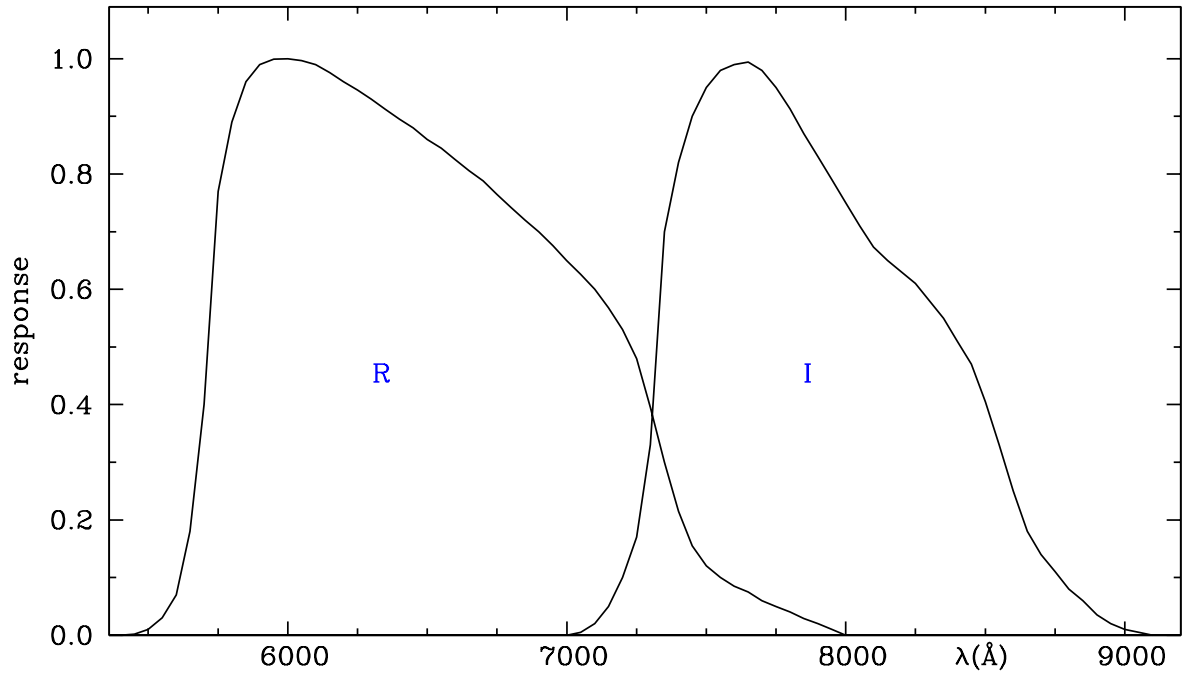
$(R-I)_C$	=	$0.980\,(T_1-T_2)$	$-0.15\,<\,(T_1-T_2)\,<\,0.40$
$(R-I)_C$	=	$0.875\,(T_1-T_2)\,+\,0.044$	$0.40\,<\,(T_1-T_2)\,<\,0.85$
$(V-R)_C$	=	$0.98\,(V-T_1)\,+\,0.015$	$0\,<\,(V-T_1)\,<\,0.30$

BVRI - Kunkel and Rydgren - 1979

$(R-I)_C$	=	$1.12\,(r-i)$	$(r-i)\,<\,1.0$
$(R-I)_C$	=	$1.233\,(r-i)\,-\,0.133$	$(r-i)\,>\,1.0$
$(V-I)_C$	=	$1.02\,(V-i)\,+\,0.03$	$(V-i)\,<\,1.6$
$(V-I)_C$	=	$0.96\,(V-i)\,+\,0.13$	$(V-i)\,>\,1.6$

Fig. 93. continued

TRANSMISSION CURVES [211]



R						*I*			
λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ
5400	0.000	6500	0.860	7600	0.085	7000	0.000	8100	0.673
5450	0.002	6550	0.845	7650	0.075	7050	0.005	8150	0.650
5500	0.010	6600	0.825	7700	0.060	7100	0.020	8200	0.630
5550	0.030	6650	0.806	7750	0.050	7150	0.050	8250	0.610
5600	0.070	6700	0.788	7800	0.040	7200	0.100	8300	0.580
5650	0.180	6750	0.765	7850	0.029	7250	0.170	8350	0.550
5700	0.400	6800	0.742	7900	0.020	7300	0.330	8400	0.510
5750	0.770	6850	0.720	7950	0.010	7350	0.700	8450	0.470
5800	0.890	6900	0.700	8000	0.000	7400	0.820	8500	0.405
5850	0.960	6950	0.676			7450	0.900	8550	0.330
5900	0.990	7000	0.650			7500	0.950	8600	0.250
5950	0.999	7050	0.626			7550	0.980	8650	0.180
6000	1.000	7100	0.600			7600	0.990	8700	0.140
6050	0.997	7150	0.568			7650	0.994	8750	0.110
6100	0.990	7200	0.530			7700	0.980	8800	0.080
6150	0.976	7250	0.480			7750	0.950	8850	0.060
6200	0.960	7300	0.395			7800	0.913	8900	0.035
6250	0.946	7350	0.300			7850	0.870	8950	0.020
6300	0.930	7400	0.215			7900	0.830	9000	0.010
6350	0.912	7450	0.155			7950	0.790	9050	0.005
6400	0.895	7500	0.120			8000	0.750	9100	0.000
6450	0.880	7550	0.100			8050	0.710		

Fig. 93. continued

uvby - Eggen - 1976

Intermediate-band system.

GENERAL INFORMATION

AUTHORS	O. J. Eggen
TELESCOPE	1m and 0.61m (reflectors), Siding Spring Mountain Observatory
MAIN ARTICLE	Eggen, O. J. 1976, PASP 88, 732

NOTES

The system originates from an attempt to reproduce the *uvby Hβ - Strömgren and Crawford - 1956* system, using filters from a bulk order placed to the manufacturer by Crawford. However, during Eggen's observations it became evident that the set of filters differred from the original one (mainly in the *v* filter, which FWHM instead of 190 Å was only 100 Å).
The effect was particularly noteworthy for stars cooler than $(b-v)$ 0.200.
Therefore the Eggen's observations at Siding Spring evolved into an independent system.

Fig. 94. The photometric system *uvby* – Eggen – 1976

13 colors - Johnson and Mitchell - 1976

General purpose system.

GENERAL INFORMATION

AUTHORS	H. L. Johnson, and R. I. Mitchell
TELESCOPE	$\delta > -20$: 0.53m and 0.71m, Catalina observing station of the Lun. Plan. Lab. $\delta < -20$: 0.41m and 0.61m, CTIO
DETECTOR	RCA 1P21 (S-4 cathode) for the *33, 35, 37, 40, 45, 52, 58, 63* bands (8-C sub-system) RCA-7102 (S-1 cathode) for the *58', 72, 80, 86, 99, 110* bands (6-RC sub-system)
MAIN ARTICLE	Johnson, H.L., Mitchell, R.I. 1976, RMex.A.A. 1, 299

SYSTEM DESCRIPTION

The 8-C sub-system is indeed the *LPL - Johnson et al - 1967* system [154].

BANDS DESCRIPTION [155], [178] pg. 70				FLUX CALIBRATION (##)	
band	λ_0 (Å)	ERP (%) (#)	bandwidth (μ m)	(W cm^{-2} μm^{-1}) [155]	(erg cm^{-2} s^{-1} Å^{-1} Å) [178], pg. 70
33	3371	3.3	0.01	$3.37\ 10^{-12}$	$3.63\ 10^{-9}$
35	3536	3.6	0.01	$3.26\ 10^{-12}$	$3.57\ 10^{-9}$
37	3751	3.4	0.01	$4.28\ 10^{-12}$	$4.89\ 10^{-9}$
40	4030	5.6	0.02	$7.75\ 10^{-12}$	$8.40\ 10^{-9}$
45	4571	6.1	0.023	$6.11\ 10^{-12}$	$6.67\ 10^{-9}$
52	5183	5.0	0.023	$4.30\ 10^{-12}$	$4.69\ 10^{-9}$
58	5827	3.8	0.02	$2.32\ 10^{-12}$	$3.36\ 10^{-9}$
63	6356	5.1	0.02	$2.32\ 10^{-12}$	$2.51\ 10^{-9}$
72	7241	8.1	0.06	$1.58\ 10^{-12}$	$1.73\ 10^{-9}$
80	8000	5.4	0.45	$1.15\ 10^{-12}$	$1.25\ 10^{-9}$
86	8584	5.6	0.51	$0.94\ 10^{-12}$	$1.02\ 10^{-9}$
99	9831	5.9	0.57	$0.70\ 10^{-12}$	$0.76\ 10^{-9}$
110	11084	7.4	0.70	$0.48\ 10^{-12}$	$0.52\ 10^{-9}$

(#) Effective Rectangular Passband. (##) For a 0.00 mag star.

ZERO POINT: The mean color of the following six A0 V unreddened stars is taken to be 0.00: α Lyr, γ UMa, 109 Vir, α CrB, γ Oph and HR3314. [155]

SYSTEM ANALYSIS

REDDENING-FREE PARAMETERS [264]

Luminosity indicators:

$\ell = (37-45) - 0.467\ (40-58)$

$\lambda = (33-37) - 0.307\ (40-58)$

$\beta = (37-40) - 0.355\ (40-45)$

Temperature indicators:

$\tau = (35-40) - 0.304\ (40-58)$

$\gamma = (35-40) - 0.882\ (40-45)$

$\delta = (33-35) - 0.365\ (40-45)$

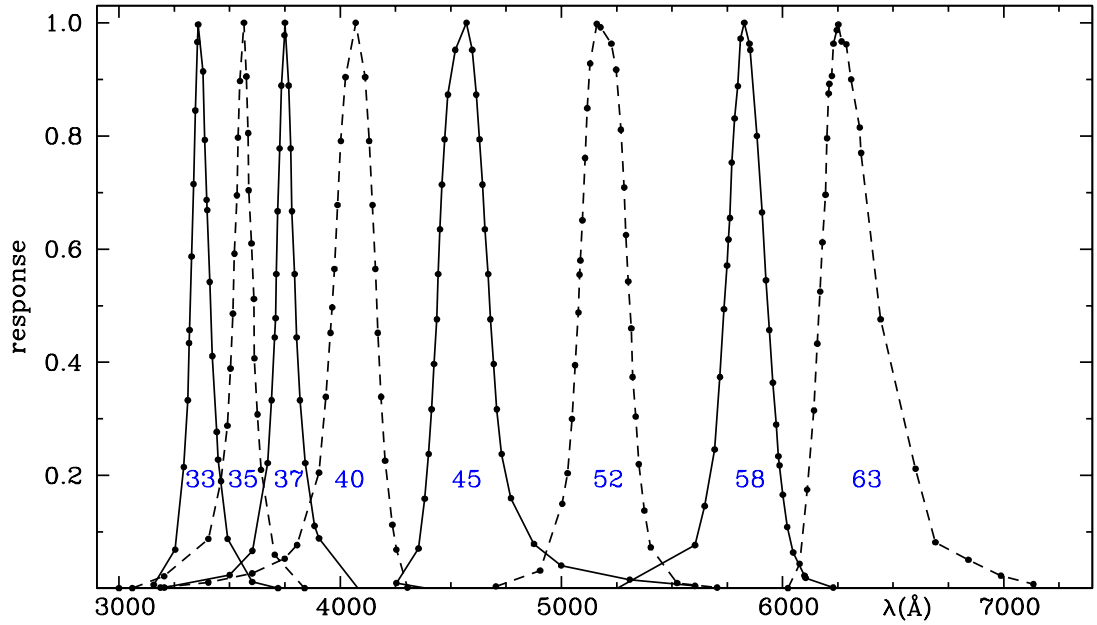
RELATIONS WITH OTHER SYSTEMS [264]

UBVRI(JHKLMN) - Johnson - 1965

$(B-V)$	=	$0.814\ (40-52) + 0.015$
$(U-B)$	=	$0.692\ (35-45) - 0.003$
$(R-I)$	=	$1.721\ (72-86) - 0.064$

Fig. 95. The photometric system 13 colors – Johnson and Mitchell – 1976

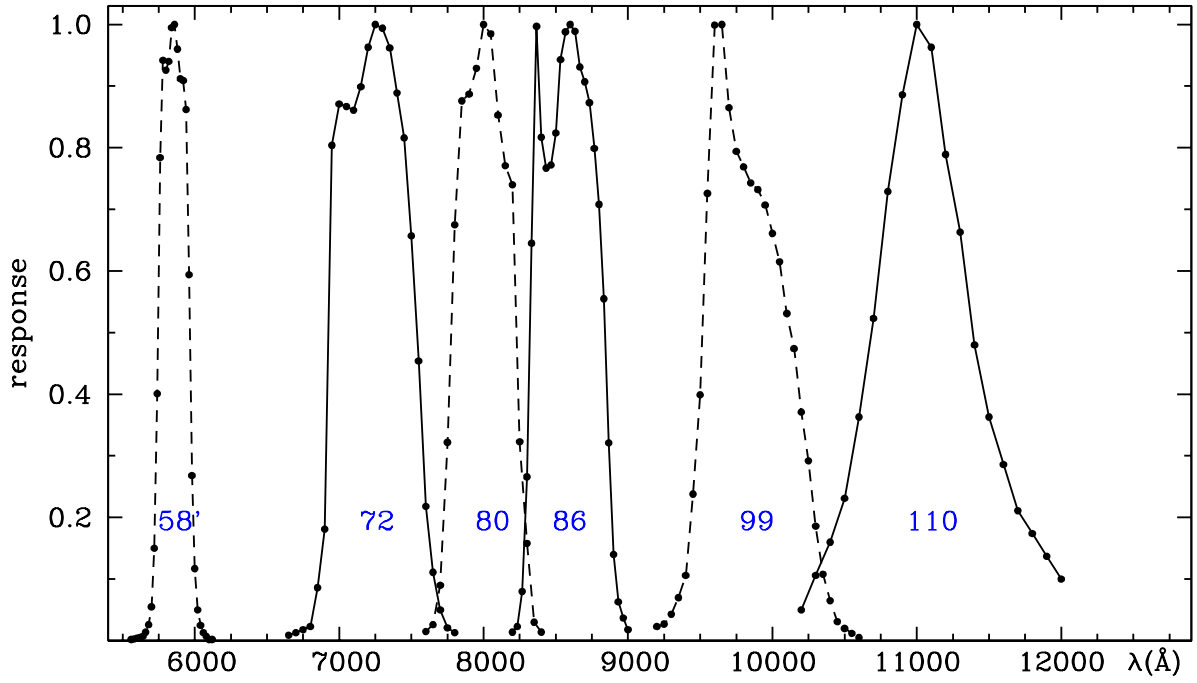
TRANSMISSION CURVES [155]



8−C sub-system

33		*35*		*37*		*40*		*45*		*52*		*58*		*63*	
λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ
3157	0.007	3060	0.001	3204	0.002	3187	0.002	4004	0.001	4704	0.004	5249	0.000	6024	0.001
3254	0.069	3204	0.022	3500	0.024	3404	0.011	4254	0.010	4904	0.032	5604	0.077	6077	0.044
3293	0.215	3404	0.088	3603	0.067	3602	0.027	4354	0.071	5004	0.150	5648	0.146	6111	0.175
3311	0.333	3461	0.190	3672	0.222	3749	0.053	4382	0.159	5028	0.204	5693	0.246	6142	0.315
3317	0.434	3490	0.288	3690	0.333	3805	0.077	4400	0.238	5048	0.300	5717	0.374	6157	0.433
3319	0.457	3504	0.389	3704	0.444	3904	0.205	4413	0.317	5062	0.395	5735	0.494	6170	0.525
3328	0.587	3515	0.486	3708	0.478	3935	0.339	4424	0.397	5077	0.488	5749	0.571	6180	0.612
3337	0.715	3522	0.592	3711	0.556	3956	0.452	4437	0.476	5082	0.555	5755	0.617	6194	0.696
3345	0.845	3533	0.695	3717	0.667	3964	0.497	4443	0.556	5086	0.580	5762	0.655	6201	0.796
3354	0.966	3538	0.797	3726	0.778	3974	0.565	4451	0.635	5095	0.651	5770	0.753	6208	0.875
3358	0.997	3547	0.897	3734	0.889	3988	0.678	4460	0.714	5107	0.761	5783	0.831	6211	0.892
3380	0.914	3565	1.000	3748	0.978	4003	0.791	4472	0.794	5117	0.849	5798	0.888	6223	0.906
3388	0.793	3576	0.905	3750	1.000	4024	0.904	4487	0.873	5130	0.928	5810	0.972	6230	0.963
3396	0.687	3584	0.805	3767	0.889	4070	1.000	4520	0.952	5160	0.998	5827	1.000	6245	0.987
3399	0.669	3586	0.704	3776	0.778	4113	0.904	4571	1.000	5177	0.992	5850	0.963	6252	0.997
3410	0.542	3599	0.610	3782	0.667	4131	0.791	4597	0.952	5226	0.963	5854	0.952	6267	0.967
3422	0.411	3610	0.512	3794	0.556	4146	0.678	4615	0.873	5248	0.917	5884	0.800	6288	0.962
3442	0.277	3612	0.407	3803	0.444	4159	0.565	4630	0.794	5269	0.811	5907	0.665	6310	0.900
3448	0.228	3626	0.308	3818	0.333	4170	0.452	4643	0.714	5284	0.709	5925	0.545	6349	0.815
3491	0.088	3642	0.210	3842	0.222	4185	0.339	4654	0.635	5292	0.625	5940	0.457	6355	0.770
3602	0.012	3704	0.060	3884	0.111	4203	0.226	4669	0.556	5302	0.543	5956	0.364	6443	0.476
3719	0.001	3830	0.001	3904	0.089	4236	0.113	4679	0.476	5316	0.460	5971	0.290	6601	0.212
				4082	0.000	4254	0.069	4694	0.397	5322	0.374	5981	0.234	6691	0.082
						4304	0.002	4708	0.317	5336	0.304	5986	0.218	6840	0.051
						4564	0.000	4730	0.238	5350	0.220	6001	0.166	6987	0.023
								4772	0.160	5375	0.138	6021	0.109	7134	0.008
								4876	0.079	5404	0.073	6048	0.064		
								4999	0.041	5523	0.010	6099	0.023		
								5309	0.016	5704	0.002	6104	0.019		
								5604	0.005			6229	0.002		

Fig. 95. continued



6–RC sub-system												
58'		*72*		*80*		*86*		*99*		*110*	
λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ
5560	0.002	6650	0.009	7600	0.015	8200	0.014	9200	0.023	10200	0.050
5580	0.003	6700	0.013	7650	0.026	8233	0.023	9250	0.027	10300	0.106
5600	0.004	6750	0.018	7700	0.090	8267	0.080	9300	0.043	10400	0.160
5620	0.005	6800	0.023	7750	0.322	8300	0.266	9350	0.070	10500	0.231
5640	0.007	6850	0.086	7800	0.675	8333	0.645	9400	0.106	10600	0.363
5660	0.014	6900	0.181	7850	0.876	8367	0.997	9450	0.238	10700	0.523
5680	0.026	6950	0.804	7900	0.887	8400	0.817	9500	0.399	10800	0.729
5700	0.055	7000	0.871	7950	0.929	8433	0.767	9550	0.726	10900	0.886
5720	0.150	7050	0.867	8000	1.000	8467	0.772	9600	0.999	11000	1.000
5740	0.401	7100	0.861	8050	0.985	8500	0.824	9650	1.000	11100	0.963
5760	0.784	7150	0.899	8100	0.853	8533	0.943	9700	0.865	11200	0.789
5780	0.942	7200	0.963	8150	0.771	8567	0.988	9750	0.794	11300	0.663
5800	0.926	7250	1.000	8200	0.740	8600	1.000	9800	0.769	11400	0.480
5820	0.940	7300	0.994	8250	0.323	8633	0.989	9850	0.743	11500	0.363
5840	0.995	7350	0.962	8300	0.158	8667	0.931	9900	0.732	11600	0.286
5860	1.000	7400	0.889	8350	0.030	8700	0.907	9950	0.707	11700	0.211
5880	0.960	7450	0.816	8400	0.014	8733	0.873	10000	0.661	11800	0.174
5900	0.912	7500	0.657			8767	0.799	10050	0.615	11900	0.137
5920	0.909	7550	0.454			8800	0.708	10100	0.531	12000	0.100
5940	0.862	7600	0.218			8833	0.555	10150	0.474		
5960	0.594	7650	0.111			8867	0.321	10200	0.371		
5980	0.268	7700	0.050			8900	0.140	10250	0.292		
6000	0.117	7750	0.021			8933	0.063	10300	0.186		
6020	0.050	7800	0.013			8967	0.037	10350	0.108		
6040	0.025					9000	0.018	10400	0.065		
6060	0.013							10450	0.031		
6080	0.007							10500	0.020		
6100	0.002							10550	0.012		
6120	0.002							10600	0.005		
6140	0.000										

Fig. 95. continued

$vbyg_1g_2$ - Maitzen - 1976

Extension of the *uvbyH*β *-Strömgren and Crawford -1956* system to Ap stars.

GENERAL INFORMATION

AUTHORS	H. M. Maitzen
TELESCOPE	1m (reflector), ESO; 0.61m (reflector), Bochum
DETECTOR	EMI 6256 and EMI 9502
MAIN ARTICLE	Maitzen, H. M. 1976, A&A 51, 223

SYSTEM DESCRIPTION

BANDS DESCRIPTION [195]			
band	λ_0 (Å)	*WHM* (Å)	λ_c (Å)
g_1	5020	126	5020
g_2	5240	135	5240

Interference filters.

The system includes also the *v,b,y* bands of *uvbyH*β - *Strömgren and Crawford - 1956* system.

SYSTEM ANALYSIS

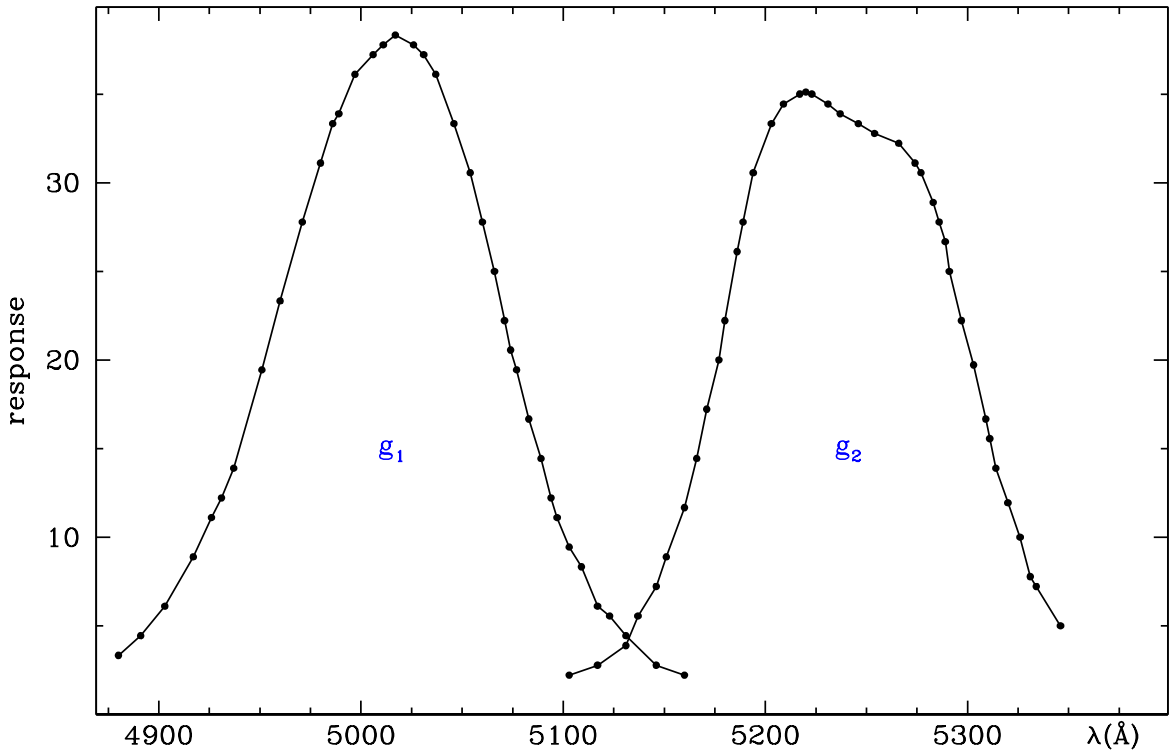
COLOR INDICES AND PARAMETERS [195]

$a^1 = g_2 - (g_1 + y) / 2$: measures the flux depression at 5200 Å . Ap stars (but not the Am) show an excess in a^1 compared to normal A stars.

Fig. 96. The photometric system $vbyg_1g_2$ – Maitzen – 1976

TRANSMISSION CURVES

As derived from Fig 1 of [195].



g_1								g_2							
λ (A)	ϒ (%)	λ (A)	ϒ (%)	λ (A)	ϒ (%)	λ (A)	ϒ (%)	λ (A)	ϒ (%)	λ (A)	ϒ (%)	λ (A)	ϒ (%)	λ (A)	ϒ (%)
4880	3.33	4980	31.11	5046	33.33	5097	11.11	5103	2.22	5180	22.22	5237	33.89	5297	22.22
4891	4.44	4986	33.33	5054	30.56	5103	9.44	5117	2.78	5186	26.11	5246	33.33	5303	19.72
4903	6.11	4989	33.89	5060	27.78	5109	8.33	5131	3.89	5189	27.78	5254	32.78	5309	16.67
4917	8.89	4997	36.11	5066	25.00	5117	6.11	5137	5.56	5194	30.56	5266	32.22	5311	15.56
4926	11.11	5006	37.22	5071	22.22	5123	5.56	5146	7.22	5203	33.33	5274	31.11	5314	13.89
4931	12.22	5011	37.78	5074	20.56	5131	4.44	5151	8.89	5209	34.44	5277	30.56	5320	11.94
4937	13.89	5017	38.33	5077	19.44	5146	2.78	5160	11.67	5217	35.00	5283	28.89	5326	10.00
4951	19.44	5026	37.78	5083	16.67	5160	2.22	5166	14.44	5220	35.11	5286	27.78	5331	7.78
4960	23.33	5031	37.22	5089	14.44			5171	17.22	5223	35.00	5289	26.67	5334	7.22
4971	27.78	5037	36.11	5094	12.22			5177	20.00	5231	34.44	5291	25.00	5346	5.00

Fig. 96. continued

uvgr - Thuan and Gunn - 1976

Generale purpose system.

GENERAL INFORMATION

AUTHORS	T. X. Thuan and J. E. Gunn
TELESCOPE	1.52m (reflector), Palomar Obs.
DETECTOR	ITT FW-130 (S-20 cathode, refrigerated)
MAIN ARTICLE	Thuan, X. T., and Gunn, J. E. 1976, PASP 88, 543

SYSTEM DESCRIPTION

BANDS DESCRIPTION [301]

band	filter	λ_{eff} (Å)	FWHM (Å)
u	1mm Schott BG38 + 4mm Schott UG11	3530	400
v	3mm Schott BG38 + 4mm Schott UG3 +		
	1mm Schott BG1 + 1mm Schott GG13	3980	400
g	Corion interference	4930	700
r	3mm Schott BG610 + Balzer B1 short-pass	6550	900

ZERO POINT: BD +17°4708 (F8) has the following magnitudes and color indices:
$g = 9.50$, $(g-r) = 0.00$, $(u-v) = 0.00$, $(v-g) = 0.00$ [301]

A revision made in 1985 by Kent [162] changed these values to:
$g = 9.50$, $(g-r) = 0.001$, $(u-v) = -0.001$, $(v-g) = 0.001$.

SYSTEM ANALYSIS

REDDENING RATIOS [162]

$E(u-v) = 0.574\,E(v-g)$ $\quad$ $E(v-g) = 0.797\,E(g-r)$ $\quad$ $E(v-g) = 0.89\,E(B-V)_{Johnson}$

RELATIONS WITH OTHER SYSTEMS

UBV - Johnson and Morgan - 1953 [301]

$(B-g)$	=	$0.14 + 0.63\,(B-V)$	for $-0.34 < (B-V) < 1.45$, $-1.35 < (U-B) < 1.16$
$(u-b)$	=	$-0.28 + 0.94\,(U-B)$	for $-0.34 < (B-V) < 1.45$, $-1.35 < (U-B) < 1.16$
$(v-V)$	=	$-0.69 + 1.69\,(B-V)$	for $-0.34 < (B-V) < 1.45$, $-1.35 < (U-B) < 1.16$

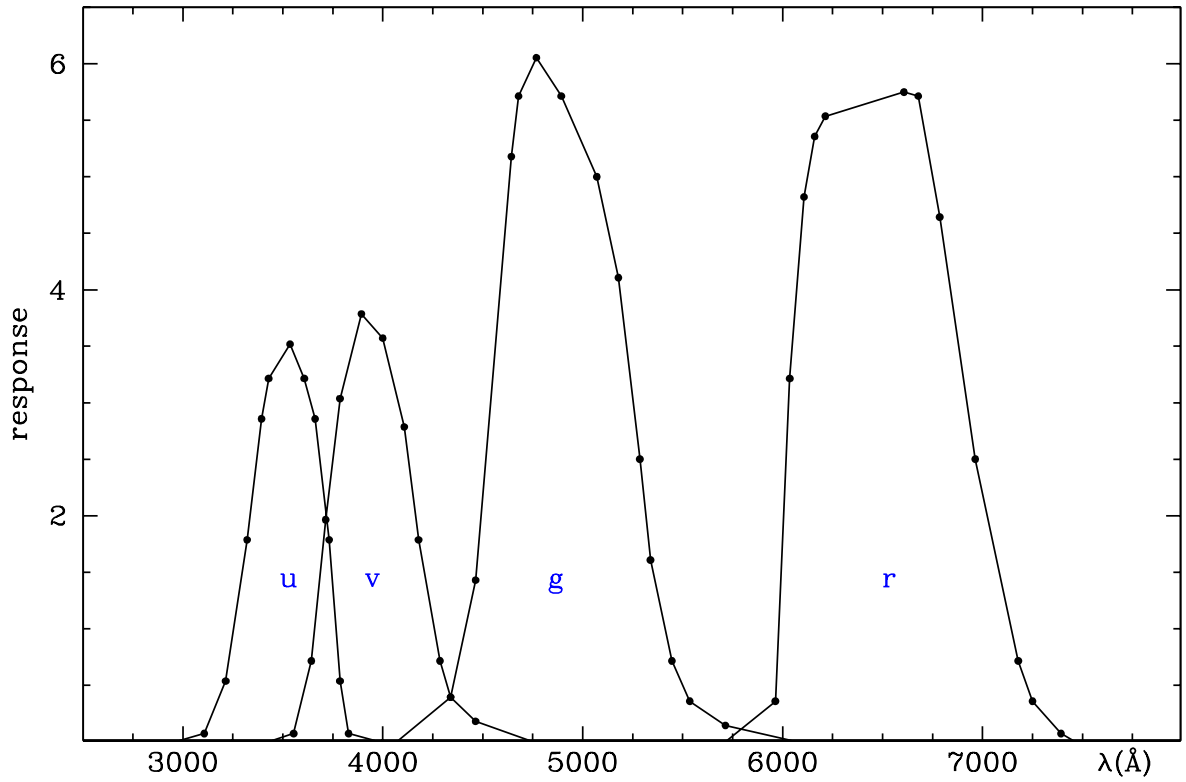
UBVRI(JHKLMN) - Johnson - 1965 [162]

g	=	$V - 0.19 + 0.41\,(B-V)$
r	=	$R + 0.43 + 0.15\,(B-V)$
$(v-g)$	=	$-0.47 + 1.37\,(B-V)$
$(g-r)$	=	$-0.53 + 0.98\,(B-V)$
$(g-r)$	=	$-0.66 + 1.37\,(V-R)$

Fig. 97. The photometric system *uvgr* – Thuan and Gunn – 1976

TRANSMISSION CURVES

As derived from Fig 1 of [301].



u		*v*		*g*		*r*	
λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ
2964	0.000	3429	0.000	4071	0.000	5714	0.000
3107	0.071	3554	0.071	4339	0.393	5964	0.357
3214	0.536	3643	0.714	4464	1.429	6036	3.214
3321	1.786	3714	1.964	4643	5.179	6107	4.821
3393	2.857	3786	3.036	4679	5.714	6161	5.357
3429	3.214	3893	3.786	4768	6.054	6214	5.536
3536	3.518	4000	3.571	4893	5.714	6607	5.750
3607	3.214	4107	2.786	5071	5.000	6679	5.714
3661	2.857	4179	1.786	5179	4.107	6786	4.643
3732	1.786	4286	0.714	5286	2.500	6964	2.500
3786	0.536	4339	0.393	5339	1.607	7179	0.714
3829	0.071	4464	0.179	5446	0.714	7250	0.357
3982	0.000	4750	0.000	5536	0.357	7393	0.071
				5714	0.143	7464	0.000
				6071	0.000		

Fig. 97. continued

Apollo-Soyuz - 1976

Extreme ultraviolet photometry during the Apollo-Soyuz mission.

GENERAL INFORMATION

TELESCOPE	0.37m grazing-incidence mirror
DETECTOR	channel electron-multiplier photon detectors
MAIN ARTICLE	Lampton, M., Margon, B., Paresce, F., Stern, R., Bowyer, S. 1976, ApJ 203, L71

SYSTEM DESCRIPTION

BANDS DESCRIPTION [179]

band	filter material	bandpass (Å) (#)	bandpass (eV) (#)
102	Parylene	55 – 150	83 – 225
132	Beryllium	114 – 150	83 – 109
395	Aluminium	170 – 620	20 – 73
640	Tin	500 – 780	16 – 25
1445	BaF_2	1350 – 1540	8.0 – 9.2

(#) bandpasses at 10% peak transmission.

Fig. 98. The photometric system Apollo-Soyuz – 1976

Trieste - Cester *et al.* - 1977

Hα photometry of O-F stars.

GENERAL INFORMATION

AUTHORS	B. Cester, G. Giuricin, F. Mardirossian, M. Pucillo, F. Castelli, and F. Flora
TELESCOPE	0.30m (reflector), Trieste Obs.
DETECTOR	9658 B EMI (S-20 cathode)
MAIN ARTICLE	Cester, B., Giuricin, G., Mardirossian, F., Pucillo, M., Castelli, F., Flora, U. 1977, A&AS 30, 1

SYSTEM DESCRIPTION

BANDS DESCRIPTION [64]

band	λ_c (Å)	half-width (Å)
Hα line	6563	30
Hα continuum	6622	29

SYSTEM ANALYSIS

COLOR INDICES AND PARAMETERS [64]

$$\alpha = -2.5 \log \frac{I(6563)}{I(6622)} - 2.5 \log(\int F_\lambda \Upsilon_{6563}\, d\lambda)/(\int F_\lambda \Upsilon_{6622}\, d\lambda)$$

where Υ is the band response function and F_λ is the monochromatic stellar flux.

RELATIONS WITH OTHER SYSTEMS [64]

uvbyHβ - Strömgren and Crawford - 1956

$\alpha_{Trieste} = 0.722\beta - 1.719$ for $\beta > 2.580$

Hγ - Beer - 1964

$\alpha_{Trieste} = 0.478\gamma + 0.125$ for $\gamma > 0.080$, where $\gamma = 2.5 \log R_\gamma$

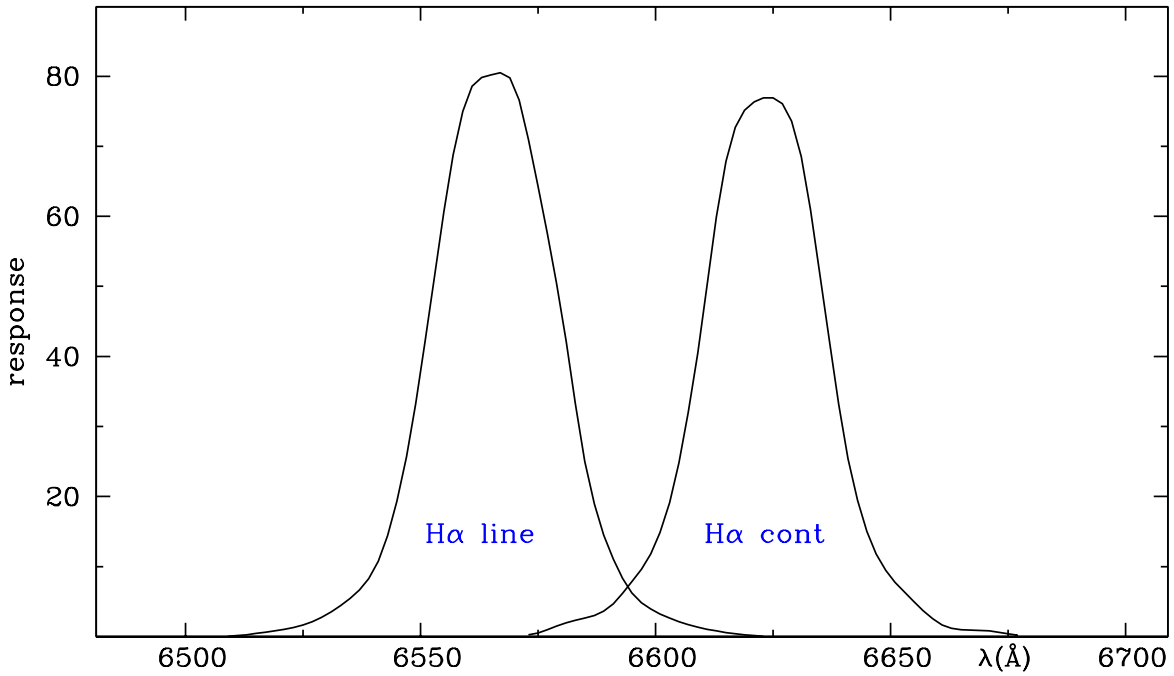
Hα - Andrews - 1968

$\alpha_{Trieste} = 0.911\alpha_{Andrews} + 0.075$ where $\alpha_{Andrews} = 2.5 \log R_\alpha$

Fig. 99. The photometric system Trieste – Cester et al. – 1977

TRANSMISSION CURVES

As derived from Fig 1 of [64].



Hα line						*Hα continuum*					
λ (A)	ϒ (%)	λ (A)	ϒ (%)	λ (A)	ϒ (%)	λ (A)	ϒ (%)	λ (A)	ϒ (%)	λ (A)	ϒ (%)
6509	0.00	6549	33.26	6589	14.52	6573	0.24	6613	59.90	6653	6.31
6511	0.13	6551	42.06	6591	11.10	6575	0.53	6615	67.86	6655	5.00
6513	0.28	6553	51.51	6593	8.32	6577	0.97	6617	72.70	6657	3.70
6515	0.45	6555	60.71	6595	6.22	6579	1.49	6619	75.13	6659	2.53
6517	0.63	6557	68.79	6597	4.83	6581	1.96	6621	76.34	6661	1.68
6519	0.81	6559	74.98	6599	3.92	6583	2.34	6623	76.92	6663	1.20
6521	1.03	6561	78.55	6601	3.24	6585	2.67	6625	76.89	6665	0.97
6523	1.31	6563	79.83	6603	2.65	6587	3.03	6627	76.06	6667	0.92
6525	1.67	6565	80.17	6605	2.14	6589	3.64	6629	73.59	6669	0.90
6527	2.14	6567	80.48	6607	1.71	6591	4.68	6631	68.53	6671	0.81
6529	2.75	6569	79.77	6609	1.35	6593	6.17	6633	60.93	6673	0.62
6531	3.52	6571	76.62	6611	1.05	6595	7.86	6635	51.81	6675	0.41
6533	4.44	6573	71.00	6613	0.80	6597	9.62	6637	42.24	6677	0.22
6535	5.48	6575	64.29	6615	0.59	6599	11.81	6639	33.15		
6537	6.65	6577	57.55	6617	0.41	6601	14.88	6641	25.45		
6539	8.29	6579	50.40	6619	0.25	6603	19.15	6643	19.47		
6541	10.77	6581	42.12	6621	0.14	6605	24.81	6645	15.00		
6543	14.38	6583	33.14	6623	0.00	6607	31.98	6647	11.79		
6545	19.29	6585	25.00			6609	40.52	6649	9.49		
6547	25.61	6587	18.91			6611	50.17	6651	7.75		

Fig. 99. continued

JHK H_2O CO - Persson *et al.* - 1977

Broad and intermediate band infrared photometry.

GENERAL INFORMATION

AUTHORS	S. E. Persson, M. Aaronson, J. A. Frogel and J. R. Baldwin
TELESCOPE	1.5m Hale (reflector), Mount Wilson Obs.; 1.52m Tillingast reflector, Mt. Hopkins Obs.
DETECTOR	InSb
MAIN ARTICLE	Persson, S. E., Aaronson, M., Frogel, J.A. 1977, AJ 82, 729
	Baldwin, J. R., Frogel, J. A., Persson, S. E. 1973, ApJ 184, 427

SYSTEM DESCRIPTION

BANDS DESCRIPTION

band		λ_{eff} (μm)	FWHM (μm)
J	[242]	1.25 ± 0.02	0.24 ± 0.01
H	[242]	1.65 ± 0.02	0.30 ± 0.01
K	[242]	2.20 ± 0.02	0.40 ± 0.01
H_2O	[19]	2.10 ± 0.01	0.052 ± 0.005
2.20	[19]	2.20 ± 0.01	0.080 ± 0.005
CO	[19]	2.31 ± 0.01	0.095 ± 0.005

ZERO POINT: α Lyr has magnitude 0.00 at all wavelenghts [242].

Later on the λ_{eff} (and the FWHM) of the *H_2O*, *2.20* and *CO* bands have been revised to 2.00 (0.080), 2.20 (0.110) and 2.36 (0.080) μm, respectively [242].

SYSTEM ANALYSIS

COLOR INDICES AND PARAMETERS [19]

[*H_2O - 2.20*] : strength of the H_2O absorption band.

[CO - *2.20*] : strength of the CO absorption band.

RELATIONS WITH OTHER SYSTEMS [108]

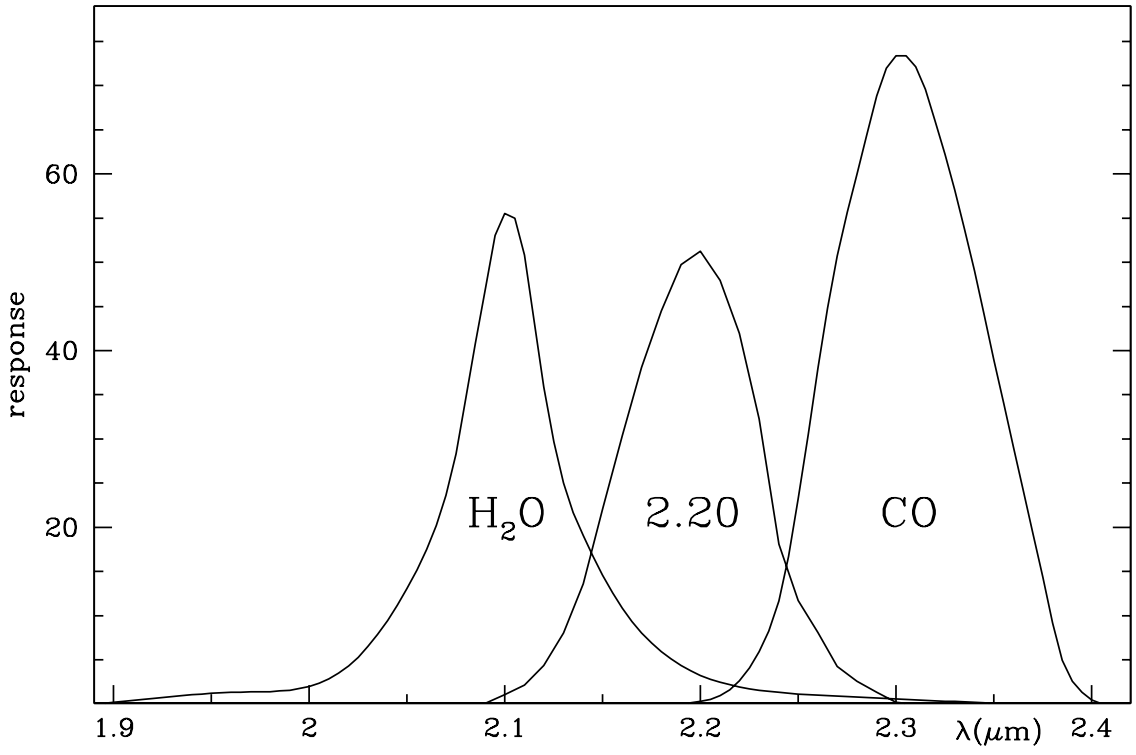
UBVRI(JHKLMN) - Johnson - 1965

$$J_{Johnson} = 1.09\,(J-H) + H$$

Fig. 100. The photometric system *JHK H_2O CO* – Persson et al. – 1977

TRANSMISSION CURVES

As derived from Fig 1 of [19].



H_2O				*2.20*				*CO*			
λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ
1.891	0.0	2.102	55.6	2.089	0.0	2.212	46.8	2.188	0.0	2.322	64.8
1.922	0.7	2.108	53.5	2.103	1.3	2.222	40.1	2.207	0.7	2.332	56.7
1.964	1.3	2.113	46.5	2.116	3.3	2.233	28.7	2.216	1.7	2.349	40.1
2.000	2.0	2.117	40.1	2.127	6.7	2.241	16.7	2.229	5.6	2.361	28.2
2.010	2.9	2.127	27.9	2.140	13.4	2.256	10.0	2.241	12.7	2.376	13.0
2.028	5.9	2.140	18.9	2.151	22.6	2.263	6.7	2.250	22.9	2.383	6.3
2.045	11.0	2.157	11.7	2.164	33.8	2.275	3.3	2.262	40.4	2.386	4.1
2.062	18.4	2.175	7.0	2.173	40.1	2.290	1.3	2.273	53.5	2.393	1.7
2.075	28.7	2.195	3.7	2.185	47.1	2.304	0.0	2.284	63.4	2.407	0.0
2.082	37.4	2.216	2.1	2.191	50.1			2.292	70.2		
2.089	45.8	2.250	1.1	2.197	51.3			2.302	73.5		
2.096	53.8	2.284	0.7	2.205	50.1			2.314	70.2		

Fig. 100. continued

ubVr - Sandage and Visvanathan - 1978

Photometry of galaxies.

GENERAL INFORMATION

AUTHORS	A. Sandage and N. Visvanathan
TELESCOPE	1.5m and 5m (reflectors), Palomar Obs. ;
	1m Swope reflector, Las Campanas Obs.
DETECTOR	ITT-FW130 (S-20 cathode)
MAIN ARTICLE	Sandage, A., Visvanathan, N. 1978, ApJ 223, 707

SYSTEM DESCRIPTION

BANDS DESCRIPTION [257]

band	filter	λ_{eff} (Å)	bandwidth (Å) [310]
u_1	interference	3466	200
u_2	interference	3625	100
u	(#)	3550	$\approx$ 250
b	interference	4522	300
V	GG14 + BG18	5400	$\approx$ 800
r	interference	6738	300

(#) The band u is obtained during data reduction by adding the fluxes collected in the u_1 and u_2 bands.

ZERO POINT: The zero point of colors is defined by the 13 standard stars listed in [257].

SYSTEM ANALYSIS

RELATIONS WITH OTHER SYSTEMS [257]

UBV - Johnson and Morgan - 1953

$$(U-V)_J = 1.05\,(u-V) - 0.94$$
$$(B-V)_J = 1.25\,(b-V) + 0.22$$

Fig. 101. The photometric system *ubVr* – Sandage and Visvanathan – 1978

8 colors - White and Wing - 1978

Narrow band photometry of M stars.

GENERAL INFORMATION

AUTHORS	N. M. White and R. F. Wing
TELESCOPE	telescopes at Lowell Observatory and CTIO
DETECTOR	ITT FW-118 (S-1 cathode, refrigerated)
MAIN ARTICLE	White, N. M., Wing, R. F. 1978, ApJ 222, 209

SYSTEM DESCRIPTION

BANDS DESCRIPTION [322]

band	λ_c (Å)	FWHM (Å)	feature	contaminants
0.71	7120	60	TiO	CN
0.75	7540	50	continuum for K4-M6 stars	CN
0.78	7810	40	continuum for G,K, Carbon stars	TiO
0.81	8120	50	CN	TiO
1.04	10395	50	continuum	
1.05	10540	60	VO	
1.08	10810	60	continuum	He I (10830 Å)
1.10	10975	70	CN	

Interference filters.

ZERO POINT: α Lyr has m(*1.04*) = 0.00 [322].
For the other bands the measurements are reduced to a system of absolute fluxes per unit wavelength interval defined by the model atmosphere energy distribution of Vega by [260].

Fig. 102. The photometric system 8 colors – White and Wing – 1978

U'JF - van der Kruit - 1979

Broad-band photographic system for the Palomar-Westerbork survey of galaxies.

GENERAL INFORMATION

AUTHORS	P. C. van der Kruit
TELESCOPE	1.20 Schmidt, Palomar Obs.
DETECTOR	photographic plates
MAIN ARTICLE	Wevers, B. M. H. R., van der Kruit, P. C., Allen, R. J. 1986, A&AS 66, 505

SYSTEM DESCRIPTION

BANDS DESCRIPTION [321]						
band	emulsion	filter	wav. range (Å)	λ_0 (Å)	*WHM* (Å)	λ_c (Å)
U'	IIIa-J	UG 5	3400-4250	≈ 3760	510	3728
J	IIIa-J	Wr2C	3950-5450	≈ 4700	1385	4675
F	IIIa-F	Wr23A	5800-6900	≈ 6400	1000	6355

SYSTEM ANALYSIS

RELATIONS WITH OTHER SYSTEMS [321]

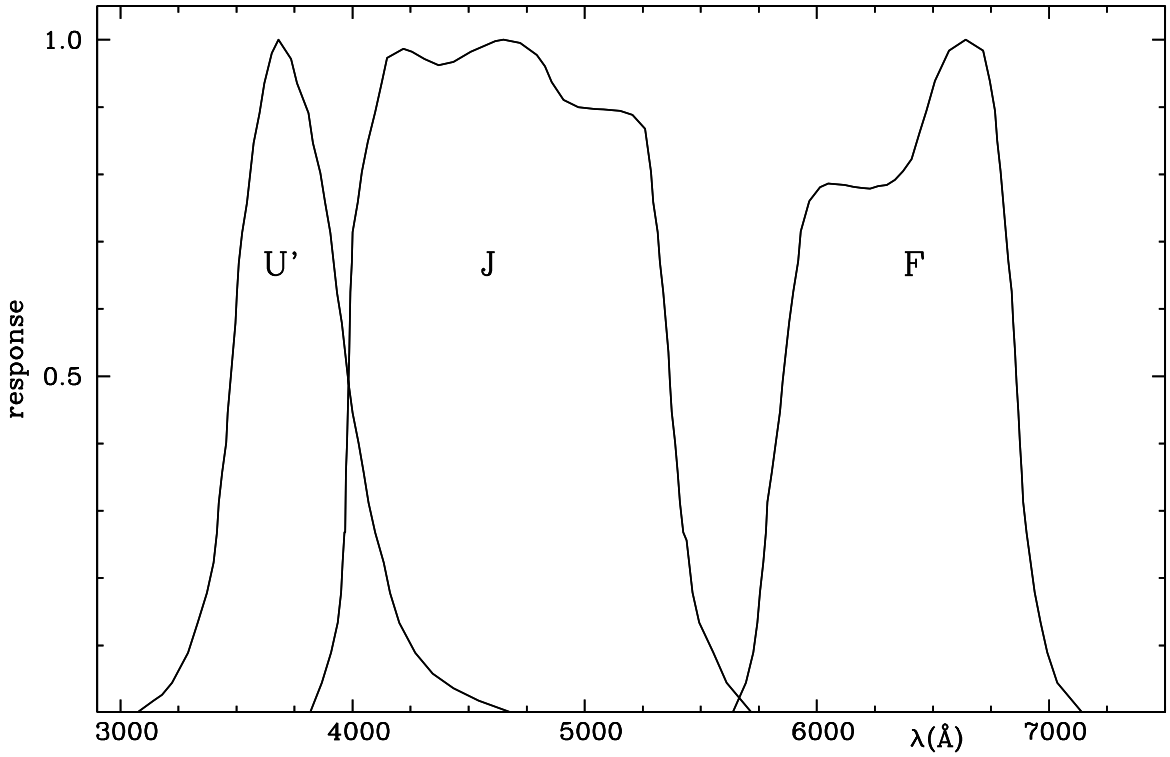
UBV - Johnson and Morgan - 1953

J	=	$B - 0.24\,(\pm 0.04)\,(B-V) \pm 0.01$	
$(U'-J)$	=	$1.08\,(\pm 0.15)\,(U-B) \pm 0.10$	for galaxies and F-G-K-M stars
$(J-F)$	=	$1.25\,(\pm 0.10)\,(B-V) \pm 0.03$	

Fig. 103. The photometric system *U'JF* – van der Kruit – 1979

TRANSMISSION CURVES

As derived from Fig *a* of [321].



U'				*J*				*F*			
λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ
3040	0.000	3800	0.909	3800	0.000	4840	0.953	5620	0.000	6540	0.968
3080	0.002	3840	0.828	3840	0.018	4880	0.923	5660	0.015	6580	0.987
3120	0.012	3880	0.763	3880	0.057	4920	0.907	5700	0.051	6620	0.995
3160	0.022	3920	0.663	3920	0.105	5000	0.899	5740	0.119	6660	1.000
3200	0.034	3960	0.563	3960	0.244	5080	0.896	5780	0.267	6700	0.997
3240	0.054	4000	0.448	4000	0.702	5160	0.894	5820	0.394	6740	0.947
3280	0.080	4040	0.373	4040	0.802	5240	0.885	5860	0.518	6780	0.841
3320	0.119	4080	0.293	4080	0.867	5280	0.823	5900	0.629	6820	0.687
3360	0.162	4120	0.241	4120	0.927	5320	0.689	5940	0.742	6860	0.493
3400	0.220	4160	0.182	4160	0.986	5360	0.539	5980	0.765	6900	0.275
3440	0.360	4200	0.135	4200	0.992	5400	0.357	6020	0.783	6940	0.177
3480	0.517	4240	0.106	4240	0.984	5440	0.256	6100	0.785	6980	0.109
3520	0.705	4320	0.067	4320	0.969	5480	0.147	6180	0.781	7020	0.058
3560	0.803	4400	0.044	4400	0.963	5520	0.114	6260	0.782	7060	0.029
3600	0.893	4480	0.028	4480	0.976	5560	0.085	6340	0.793	7100	0.012
3640	0.966	4560	0.015	4560	0.992	5600	0.053	6380	0.808	7140	0.000
3680	1.000	4640	0.005	4640	1.000	5680	0.012	6420	0.835		
3720	0.989	4720	0.000	4720	0.996	5720	0.000	6460	0.881		
3760	0.936			4800	0.976			6500	0.929		

Fig. 103. continued

BVRI - Kunkel and Rydgren - 1979

Exports the *BVRI* bands of the *UBVRI(JHKLMN) - Johnson - 1965* system (based on 1P21 and S-1 photomultipliers) to a natural system based on the RCA 31034A.

GENERAL INFORMATION

AUTHORS	W. E. Kunkel and A. E. Rydgren
TELESCOPE	CTIO telescopes
DETECTOR	S-1 and RCA 31034A photomultipliers
MAIN ARTICLE	Kunkel W.E., Rydgren A.E. 1979, AJ. 84, 633

SYSTEM DESCRIPTION

BANDS DESCRIPTION [176]

band	filter
B	Corning 5030 + 2mm BG18 + 2mm GG385
V	Corning 3384 + Corning 9780
R	3mm KG1 + 2mm OG5 + 1.5mm RG6
I	3mm RG715 + 1mm RG780

All filters by Schott unless otherwise noted. Corning filters have standard optical thickness. [176]

ZERO POINT: Unreddened A0 V stars have 0.00 colors. [176]

SYSTEM ANALYSIS

For the 48 faint equatorial standard stars (covering a large range in color) in common with Landolt [181]

S-1 photomultiplier - RCA 31034A photomultiplier

Transformation relations between the S-1 (natural) and the RCA 31034A (natural) systems

$(V-R)_{S1\ nat}$	=	$1.067\,(V-R)_{RCA\ nat} + 0.054$	$\sigma = \pm 0.013$ mag
$(V_I)_{S1\ nat}$	=	$1.163\,(V-I)_{RCA\ nat} + 0.028$	$\sigma = \pm 0.024$ mag

RELATIONS WITH OTHER SYSTEMS [176]

UBVRI(JHKLMN) - Johnson - 1965

with S-1 photomultiplier (S-1 nat)

$(V-R)_J$	=	$1.220\,(V-R)_{S1\ nat} - 0.002$	$\sigma = \pm 0.023$ mag
$(V-I)_J$	=	$1.136\,(V-I)_{S1\ nat} - 0.020$	$\sigma = \pm 0.032$ mag

with RCA 31034A photomultiplier (RCA nat)

$(V-R)_J$	=	$1.303\,(V-R)_{RCA\ nat} + 0.064$	$\sigma = \pm 0.014$ mag
$(V-I)_J$	=	$1.331\,(V-I)_{RCA\ nat} + 0.004$	$\sigma = \pm 0.027$ mag

Fig. 104. The photometric system *BVRI* – Kunkel and Rydgren – 1979

ri - Wade *et al.* - 1979

Near-infrared system. Related to photographic photometry with the IV-N emulsion.

GENERAL INFORMATION

AUTHORS	R. A. Wade, J. G. Hoessel, J. H. Elias and J. P. Huchra
TELESCOPE	1.5m (reflector), Palomar Observatory
DETECTOR	ITT FW118 (S-1 cathode, refrigerated)
MAIN ARTICLE	Wade, R. A., Hoessel, J. G., Elias, J. H.,and Huchra, J. P. 1979, PASP 91, 35

SYSTEM DESCRIPTION

BANDS DESCRIPTION [312]

band	filter	λ_{eff} (Å)	FWHM (Å)
r	3mm Schott RG610 + Balzers B1 (#)	6500	1000
i	Wratten 88a gelatin filter + Balzers infrared mirror	8200	1300

(#) The red leak at $1\mu m$ in the Balzers filter is blocked with Schott KG1 glass.

ZERO POINT: $i = r = 9.50$ for BD +17° 4708 (F8). [312]

SYSTEM ANALYSIS

RELATIONS WITH OTHER SYSTEMS [312]

UBVRI(JHKLMN) - Johnson - 1965

i	=	$0.690 + 0.999\,I_J + 0.419\,(R-I)_J$	($\sigma = 0.033$mag)	$-0.20 < (R-I) < +0.70$
$(r-i)$	=	$-0.252 + 0.765\,(R-I)_J$	($\sigma = 0.016$mag)	$-0.20 < (R-I) < +0.70$

Fig. 105. The photometric system *ri* – Wade et al. – 1979

$B_J R_F$ - Couch and Newell - 1980

Photoelectric porting of the photographic *JF* system (IIIa-J + GG385 and IIIa-F RG630 combinations).

GENERAL INFORMATION

AUTHORS	W. J. Couch and E. B. Newell
TELESCOPE	1m and 0.6m (reflectors), Siding Spring National Observatory; 1.5m and 0.9m (reflectors), CTIO
DETECTOR	EMI 9658AM (S-20 cathode, refrigerated) at SSNO ITT FW130 (S-20 cathode) at CTIO
MAIN ARTICLE	Couch, W. J., Newell, E. B. 1980, PASP 92, 746

SYSTEM DESCRIPTION

BANDS DESCRIPTION [74], photoel. ver.							
band	$filter_{photoel}$	λ_{eff} (Å) (#)	half-width (Å)	*WHM* (Å)		λ_c (Å)	
B_J	2mm GG385 + 2mm BG28 (#)	4385	1050	1055	1465	4422	4588
R_F	3mm RG630 + 3mm BG 20 + 1mm BG38 (#)	6676	500	490	525	6545	6685

(#) 2mm GG 385 + IIIa-J (B_J), and 2mm RG630 + IIIa-F (R_F) for the photographic version.

For *WHM* and λ_C, left values refer to the photoelectric version while those on the right to the photographic one.

(#) Based on A0 star model atmosphere. [74]

PHOTOGRAPHIC VERSION Couch, W. J., Newell, E. B. 1980, PASP 92, 746

SYSTEM ANALYSIS

RELATIONS WITH OTHER SYSTEMS [74]

UBVRI(JHKLMN) - Johnson - 1965 and *RI* - Cousin - 1976

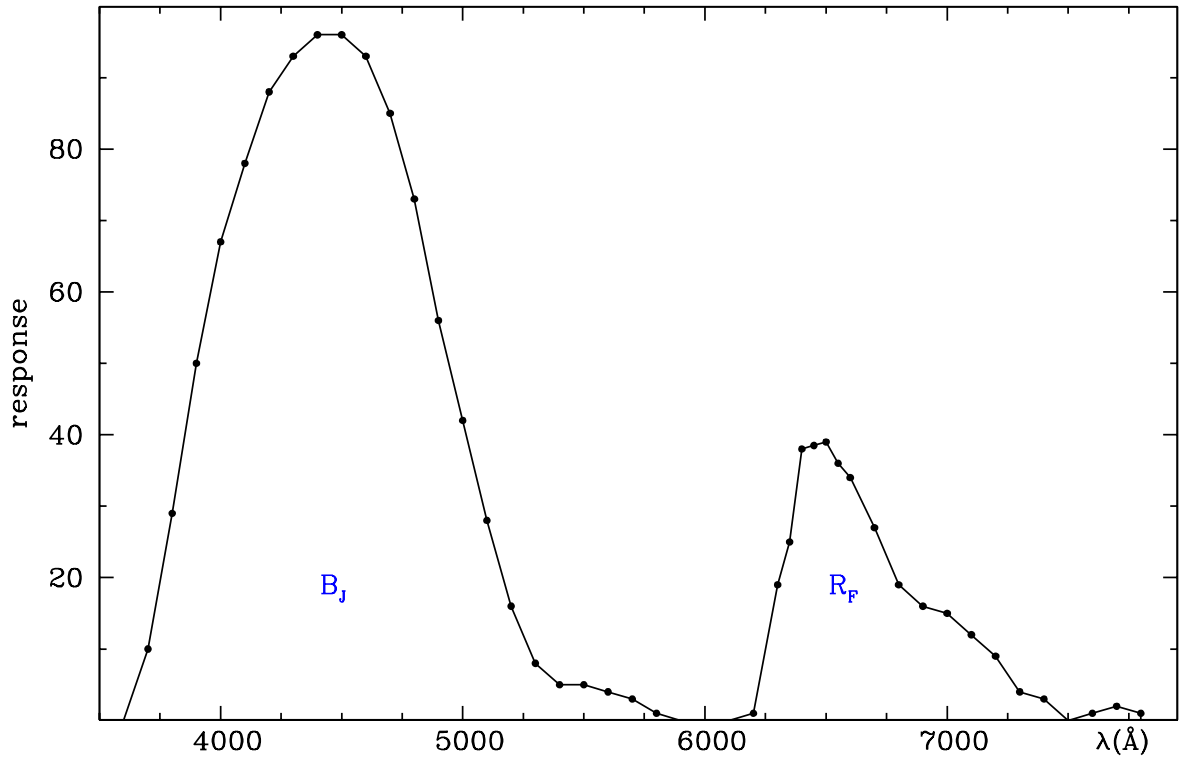
$$(B_J - R_F) = -0.027\,(B-R)^2 + 1.059\,(B-R) - 0.017 \quad \text{for } 0.0 \le (B-R) \le 2.5$$

TRANSMISSION CURVES [74]

photoelectric								photographic					
B_J				R_F				B_J				R_F	
λ (Å)	ϒ (%)	λ (Å)	ϒ (%)	λ (Å)	ϒ (%)	λ (Å)	ϒ (%)	λ (Å)	ϒ (%)	λ (Å)	ϒ (%)	λ (Å)	ϒ (%)
3600	0	4800	73	6100	0	7300	4	3600	0	4800	78	6200	0
3700	10	4900	56	6200	1	7400	0	3700	4	4900	78	6300	6
3800	29	5000	42	6300	19	7500	0	3800	24	5000	76	6400	18
3900	50	5100	28	6400	38	7600	1	3900	72	5100	74	6500	26
4000	67	5200	16	6500	39	7700	2	4000	92	5200	68	6600	29
4100	78	5300	8	6600	34	7800	1	4100	99	5300	56	6700	34
4200	88	5400	5	6700	27	7900	0	4200	99	5400	28	6800	40
4300	93	5500	5	6800	19			4300	94	5500	12	6900	29
4400	96	5600	4	6900	16			4400	90	5600	4	7000	11
4500	96	5700	3	7000	15			4500	86	5700	0	7100	3
4600	93	5800	1	7100	12			4600	84			7200	1
4700	85	5900	0	7200	9			4700	82			7300	0

Fig. 106. The photometric system $B_J R_F$ – Couch and Newell – 1980

PHOTOELECTRIC VERSION



PHOTOGRAPHIC VERSION

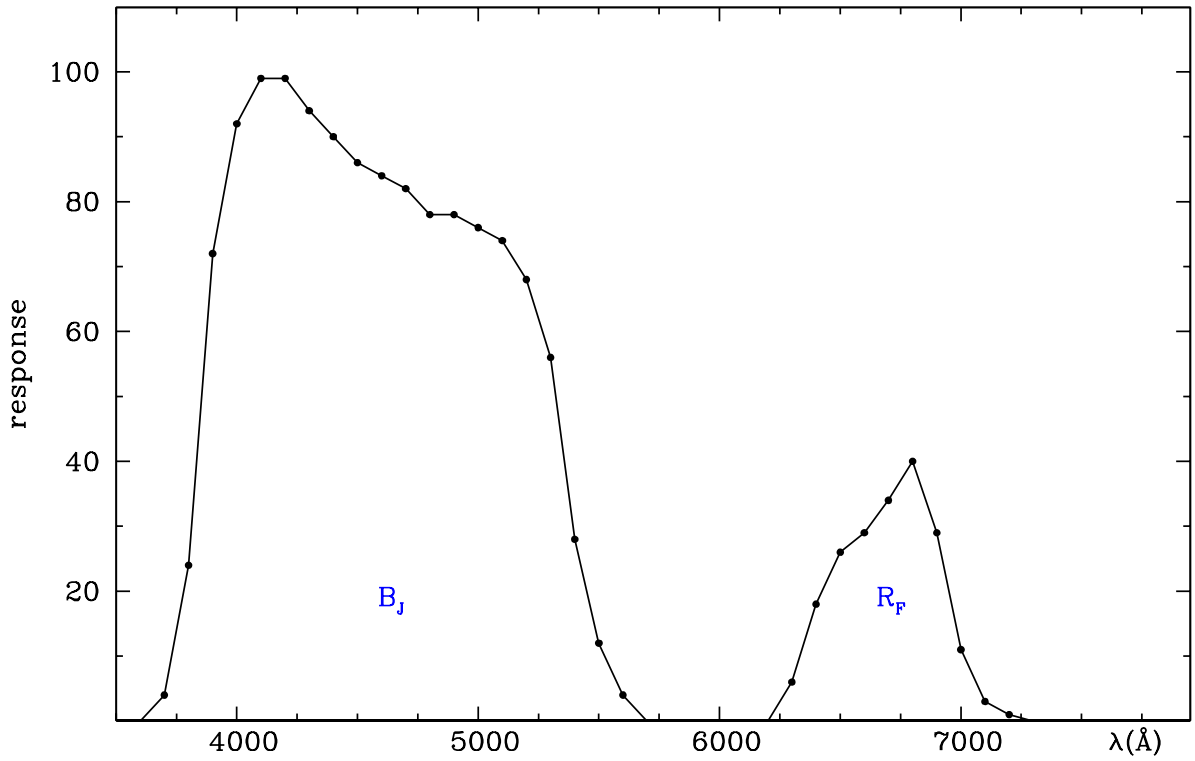


Fig. 106. continued

UBVRI - Neckel and Chini - 1980

An attempt to realize *UBVRI* bands of the *UBVRIJHKLMN - Johnson - 1965* system with EMI 6256 and RCA 31034A photomultipliers. Interstellar reddening law.

GENERAL INFORMATION

AUTHORS	T. Neckel and R. Chini
TELESCOPE	0.50m (reflector), Gamsberg, Namibia; 1.0m ESO, La Silla; 1.23m Calar Alto, Spain
DETECTOR	EMI 6256 (*UBV* bands) and RCA 31034 (*VRI* bands)
MAIN ARTICLE	Neckel, Th., Chini, R. 1980, A&AS 39, 411

SYSTEM DESCRIPTION

BANDS DESCRIPTION [222]

band	photomultiplier	filter
U	EMI 6256	1.5mm UG2
B	EMI 6256	1.0mm BG3 + 2.0mm GG385
V	EMI 6256	3.0mm GG495
	RCA 31034	3.0mm GG495 + 1.0mm BG18
R	RCA 31034	3.0mm OG590 + 2mm Calflex C
I	RCA 31034	3.0mm RG780

SYSTEM ANALYSIS

REDDENING RATIOS [223]

$\frac{E(V-R)}{E(B-V)} = 0.82\ (\pm 0.01)$ $\frac{E(V-I)}{E(B-V)} = 1.65\ (\pm 0.02)$

$R(V) = A_V/E(B-V) = 3.1$

RELATIONS WITH OTHER SYSTEMS [297]

RI - Cousins - 1976

only for [222] and [223] data

$$(V-R)_C = 0.758\ (\pm 0.004)\ (V-R)_{N-C} - 0.037\ (\pm 0.003)$$
$$(R-I)_C = 0.794\ (\pm 0.004)\ (R-I)_{N-C} + 0.039\ (\pm 0.002)$$

Fig. 107. The photometric system *UBVRI* – Neckel and Chini – 1980

uvgr 39_B 39_N - Zinn - 1980

Interstellar reddening and metallicity of globular clusters.

GENERAL INFORMATION

AUTHORS	R. Zinn
TELESCOPE	0.51m and 1.5m (reflectors), Mount Palomar Obs.; 1m and 2.5m (reflectors), Las Campanas Obs.
DETECTOR	1P21 (S-20 cathode)
MAIN ARTICLE	Zinn, R. 1980, ApJS 42, 19

SYSTEM DESCRIPTION

BANDS DESCRIPTION [335]

band	filter	λ_0 (Å)	λ_{peak} (Å)	FWHM (Å)
u	1mm Schott BG38 + 4mm Schott UG11	3540	3600	380
v	3mm Schott BG38 + 4mm Schott UG3 +			
	1mm Schott BG1 + 1mm Schott GG13	3990	3940	450
g	3mm Schott BG38 + 1mm Schott GG460 +			
	Kodak Wratten 44	4910	4930	700
r	6mm Schott RG2 + 3mm Schott BG20	6730	6550	810
39_B	interference	3910	3920	180
39_N	interference	3955	3950	70

ZERO POINT: BD +17° 4708 (F8) is taken to have $g = 9.500$ and all colors equal to 0.00 . [335]

SYSTEM ANALYSIS

COLOR INDICES AND PARAMETERS [335]

39_B : centered on H and K CaII lines.

39_N : sensitive to line blocking.

$[FE/H] = -1.98\ (\pm 0.03) + 4.40\ (\pm 0.21)\ Q39$

REDDENING-FREE PARAMETERS [335]

$Q(vgr) = (v-g) - 0.68\,(g-r)$ $\quad$ $Q(ugr) = (u-g) - 1.08\,(g-r)$

$Q(39_Bgr) = (39_B-g) - 0.76\,(g-r)$ $\quad$ $Q(39_Ngr) = (39_N-g) - 0.75\,(g-r)$

$Q(39uv) = (39_B-v) + (39_N-v) - 0.36\,(u-v)$ $\quad$ $Q(39vg) = (39_B-v) + (39_N-v) - 0.20\,(v-g)$

$Q\,39 = 1/2\,[Q(39uv) + Q(39vg)]$

Fig. 108. The photometric system *uvgr* 39_B 39_N – Zinn – 1980

REDDENING RATIOS [335]

Calculated for A0 V stars:

$\frac{E(u-v)}{E(v-g)} = 0.56$ $\frac{E(v-g)}{E(g-r)} = 0.63$ $\frac{E(u-g)}{E(g-r)} = 0.98$

$E(39_B - g) \,/\, E(g-r) = 0.69$ $\frac{E(B-V)_J}{E(g-r)} = 0.73$ $E(39_N - g) \,/\, E(g-r) = 0.67$

$[E(39_N - v) + E(39_B - v)] \,/\, E(u-v) = 0.29$ $[E(39_N - v) + E(39_B - v)] \,/\, E(v-g) = 0.16$

RELATIONS WITH OTHER SYSTEMS [335]

uvgr - Thuan and Gunn - 1976 (Kent's revision)

$(u-v)_{T-G}$	=	$0.948\ (\pm 0.006)\ (u-v) - 0.003\ (\pm 0.002)$	$\sigma = 0.007$
$(v-g)_{T-G}$	=	$1.023\ (\pm 0.004)\ (v-g) + 0.000\ (\pm 0.002)$	$\sigma = 0.008$
$(g-r)_{T-G}$	=	$0.930\ (\pm 0.006)\ (g-r) + 0.006\ (\pm 0.002)$	$\sigma = 0.008$
g_{T-G}	=	$g + 0.042\ (\pm 0.011)\ (g-r) - 0.009\ (\pm 0.004)$	$\sigma = 0.015$

Fig. 108. continued

VJHKLM ESO - Engels *et al.* - 1981

Infrared observations at ESO - La Silla.

GENERAL INFORMATION

AUTHORS	D. Engels, W.A. Sherwood, W. Wamsteker and G. V. Schultz
TELESCOPE	1m (reflector) ESO, La Silla
DETECTOR	InSb (liquid N_2 refrigerated)
MAIN ARTICLE	Engels, D., Sherwood, W. A., Wamsteker, W., Schultz, G. V. 1981, A&AS 45, 5

SYSTEM DESCRIPTION

BANDS DESCRIPTION [314]			FLUX CALIBRATION (#) [314]		
band	λ_0 (μm)	FWHM (μm)	$F_{\lambda,0}$ (W m^{-2} Å^{-1})	$F_{\nu,0}$ (W m^{-2} Hz^{-1})	$F_{\nu,0}$ (Jy)
V	0.55	0.09	3.64($\pm$ 0.02) 10^{-12}	3.67 10^{-23}	3670
J	1.25	0.3	3.18($\pm$ 0.11) 10^{-13}	1.65 10^{-23}	1650
H	1.65	0.4	1.18($\pm$ 0.04) 10^{-13}	1.07 10^{-23}	1070
K	2.2	0.6	4.17($\pm$ 0.13) 10^{-14}	6.73 10^{-24}	673
L	3.6	1.2	6.23($\pm$ 0.21) 10^{-15}	2.69 10^{-24}	269
M	4.8	0.8	2.07($\pm$ 0.09) 10^{-15}	1.58 10^{-24}	158

(#) For a mag = 0.0 star.

ZERO POINT: For *J, K, L* bands the zero point is the same as for the equivalent bands of the *UBVRI(JHKLMN) - Johnson - 1965*. The zero point of the *H* band is such that $(J - K) = 0.00 \Longrightarrow (H - K) = 0.00$. Finally, for the M band the zero point is set by the condition that $(V - M) = 1.54$ for the Sun. [99], [314]

Fig. 109. The photometric system *VJHKLM* ESO – Engels et al. – 1981

Δa - Joncas and Borra - 1981

Measurement of the continuum depression at 5200 A in Ap stars.

GENERAL INFORMATION

AUTHORS	G. Joncas and E. F. Borra
TELESCOPE	1.6m (reector), Mt. Megantic Obs., Canada
	reectors at Las Campanas Obs., Chile
DETECTOR	EMI 6256 S (S-11 cathode) at Mt. Megantic Obs
	EMI 9658 RF (S-20 red ext.) at Las Campanas
MAIN ARTICLE	Joncas J., Borra E. F. 1981, A&A 94, 134

SYSTEM DESCRIPTION

BANDS DESCRIPTION [157]				
band	λ_{peak} (A)	FWHM (A)	*WHM* (A)	λ_c (A)
F_1	5000	∼100	110	4995
F_2	5220	∼100	110	5223
F_3	5400	∼100	90	5405

Interference lters.

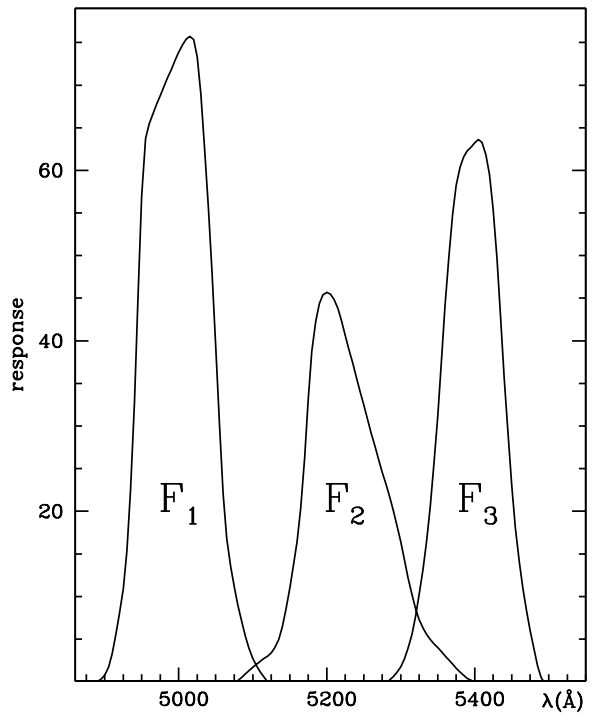
SYSTEM ANALYSIS

COLOR INDICES AND PARAMETERS [157]

$\Delta a = [F_2 - 0.5(F_1 + F_3)] - a_o$ where a_o is the a value of a depression-free *normal* star of the same Stromgren $(b-y)$ index that has to be measured with the same instrumentation.

TRANSMISSION CURVES

As derived from Fig 1 of [157].



F_1		F_2		F_3	
λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ
4889	0.0	5079	0.0	5282	0.0
4908	2.7	5116	2.7	5305	2.7
4918	6.8	5141	6.8	5318	6.8
4928	13.6	5155	13.6	5331	13.6
4938	27.3	5166	21.8	5340	20.5
4947	49.8	5178	36.8	5351	33.0
4954	62.7	5185	42.3	5363	47.7
4958	65.0	5201	45.7	5375	58.0
4972	68.2	5213	44.3	5384	61.4
4995	73.0	5224	40.9	5398	63.0
5014	75.7	5245	34.1	5409	63.4
5023	74.3	5273	25.2	5416	61.4
5030	68.9	5296	18.0	5423	57.3
5042	53.2	5319	8.9	5432	46.4
5049	42.3	5349	4.1	5444	30.3
5058	25.2	5375	1.6	5458	15.7
5065	17.0	5402	0.0	5467	9.8
5074	11.6			5476	5.5
5086	6.8			5488	1.0
5097	3.4			5513	0.0
5120	0.0				

Fig. 110. The photometric system Δa – Joncas and Borra – 1981

Jones *et al.* - 1981

Narrow-band photometry of M stars.

GENERAL INFORMATION

AUTHORS	D.H.P. Jones, J. E. Sinclair and J. B. Alexander
TELESCOPE	1.0m (reflector), Siding Spring Observatory; 1.0m (reflector), South African Astron. Obs; 2.5m and 0.9m (reflectors), Herstmonceux, UK
DETECTOR	FW130 (S-20, refrigerated)
MAIN ARTICLE	Jones, D.H.P., Sinclair, J.E., Alexander J.B. 1981, MNRAS 194, 403

SYSTEM DESCRIPTION

BANDS DESCRIPTION [160]

band	λ_0 (Å)	λ_{eff} (Å)	half-width (Å)	feature
608	6076	6089	44	continuum
683	6830	6835	41	CaH
710	7100	7101	54	TiO
746	7460	7465	44	continnuum

Interference filters.

ZERO POINT: *746* is taken to be equivalent to *I* band of *RI - Kron and Smith - 1951* system. [160]

SYSTEM ANALYSIS

REDDENING-FREE PARAMETERS [160]

$\delta = (710–746) - 0.24\ (608–746)$

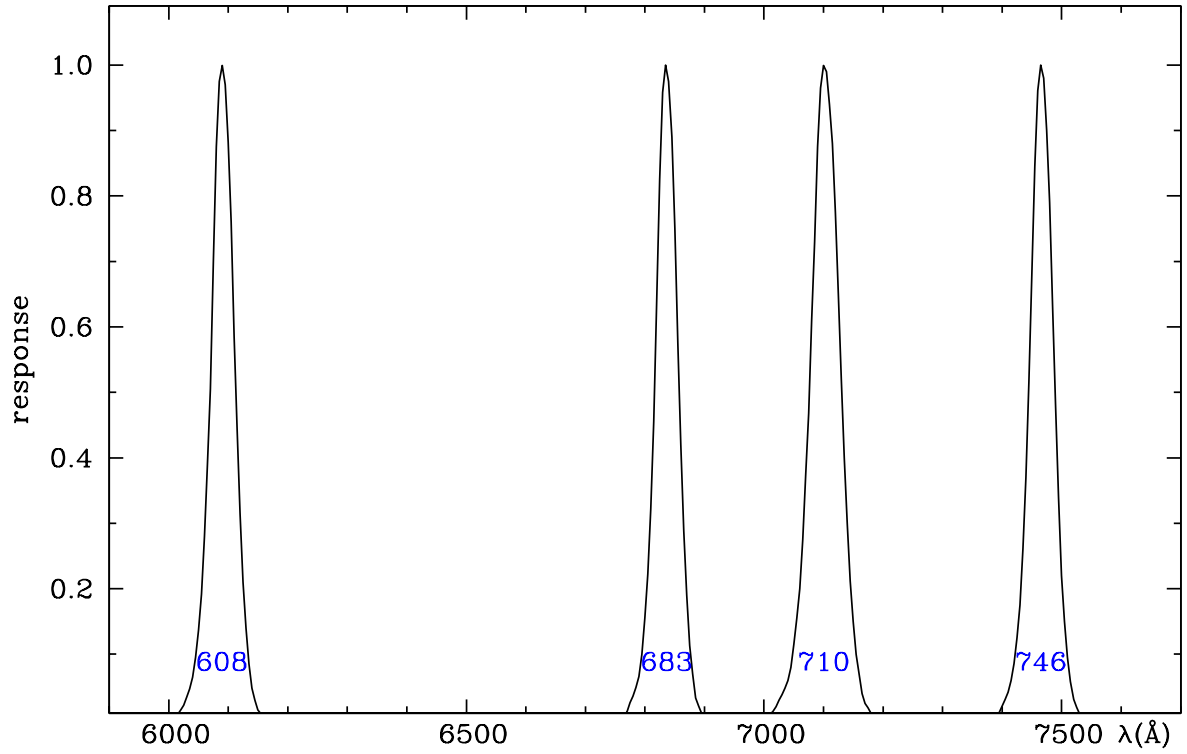
$T_{dwarfs} = -5.07\ (\pm 1.45)\ \delta^2 + 10.74(\pm 1.30)\ \delta + 0.13\ (\pm 0.25)$: to derive the spectral type for dwarfs.

$T_{giants} = -5.44\ (\pm 0.72)\ \delta^2 + 11.11(\pm 0.70)\ \delta - 0.71\ (\pm 0.13)$: to derive the spectral type for giants.

where it is $T = -6$ at K0, T = -1 at K5, $T = 0$ at M0, $T = 8$ at M8.

Fig. 111. The photometric system Jones et al. – 1981

TRANSMISSION CURVES [4]



608				*683*				*710*				*746*			
λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ
5995	0.000	6105	0.760	6750	0.000	6860	0.420	6985	0.000	7095	0.965	7370	0.000	7480	0.790
6000	0.001	6110	0.585	6755	0.001	6865	0.288	6990	0.001	7100	0.999	7375	0.001	7485	0.631
6005	0.002	6115	0.445	6760	0.002	6870	0.190	6995	0.002	7105	0.990	7380	0.002	7490	0.480
6010	0.005	6120	0.315	6765	0.006	6875	0.113	7000	0.003	7110	0.940	7385	0.003	7495	0.340
6015	0.008	6125	0.210	6770	0.012	6880	0.070	7005	0.004	7115	0.880	7390	0.008	7500	0.220
6020	0.015	6130	0.140	6775	0.026	6885	0.033	7010	0.009	7120	0.775	7395	0.011	7505	0.150
6025	0.022	6135	0.085	6780	0.036	6890	0.021	7015	0.012	7125	0.650	7400	0.021	7510	0.095
6030	0.034	6140	0.048	6785	0.049	6895	0.010	7020	0.020	7130	0.520	7405	0.031	7515	0.058
6035	0.047	6145	0.030	6790	0.066	6900	0.005	7025	0.030	7135	0.400	7410	0.042	7520	0.031
6040	0.065	6150	0.015	6795	0.100	6905	0.000	7030	0.038	7140	0.300	7415	0.060	7525	0.019
6045	0.095	6155	0.009	6800	0.155			7035	0.048	7145	0.212	7420	0.086	7530	0.009
6050	0.137	6160	0.004	6805	0.222			7040	0.060	7150	0.150	7425	0.125	7535	0.004
6055	0.192	6165	0.000	6810	0.322			7045	0.080	7155	0.100	7430	0.175	7540	0.000
6060	0.280			6815	0.455			7050	0.115	7160	0.070	7435	0.261		
6065	0.390			6820	0.640			7055	0.155	7165	0.040	7440	0.370		
6070	0.505			6825	0.825			7060	0.200	7170	0.025	7445	0.515		
6075	0.700			6830	0.958			7065	0.275	7175	0.018	7450	0.680		
6080	0.875			6835	1.000			7070	0.375	7180	0.010	7455	0.845		
6085	0.975			6840	0.975			7075	0.468	7185	0.006	7460	0.961		
6090	0.999			6845	0.890			7080	0.610	7190	0.001	7465	1.000		
6095	0.970			6850	0.750			7085	0.730	7195	0.000	7470	0.980		
6100	0.882			6855	0.575			7090	0.875			7475	0.900		

Fig. 111. continued

Hα - Strauss and Ducati - 1981

Hα photometry.

GENERAL INFORMATION

AUTHORS	F. M. Strauss and J. R. Ducati
TELESCOPE	0.50m (reflector), Universidade Federal do Rio Grande do Sul, Brazil
DETECTOR	9658 AR (S-20 cathode, refrigerated)
MAIN ARTICLE	Strauss, F. M., Ducati, J.R. 1981, A&AS 44, 337

SYSTEM DESCRIPTION

BANDS DESCRIPTION [292]

band	λ_{peak} (Å)	bandwith (Å)	Υ_{peak} (%)
Hα narrow	6563	37	84
Hα wide	6563	208	84

SYSTEM ANALYSIS

COLOR INDICES AND PARAMETERS [292]

The β index is taken from the *uvbyHβ - Strömgren and Crawford* - 1956

$x = \beta - 0.4\,\alpha$: depends on spectral type. Separates quite well early ($\leq$ A0) from late ($>$ A0) supergiants.

$y = \beta - 2.18\,\alpha$: correlates with luminosity class for B supergiants. Emission line indicator.

RELATIONS WITH OTHER SYSTEMS [292]

H_α - Andrews - 1968

$R_\alpha = 1.40\,(\pm 0.09)\,\alpha - 1.6\,(\pm 0.2)$ for 17 stars in common

Hα, β, γ - Feinstein - 1974

$\alpha_{Feinstein} = 0.33\,(\pm 0.03)\,\alpha + 0.8\,(\pm 0.1)$ for 26 stars in common

Hα - Dachs and Schmidt-Kaler - 1975

$\alpha_{D\&S-K} = 1.46\,(\pm 0.04)\,\alpha + 0.3\,(\pm 0.1)$ for 27 stars in common

Fig. 112. The photometric system *Hα* – Strauss and Ducati – 1981

JHKL CTIO - Elias *et al.* - 1982

Infrared photometry at CTIO.

GENERAL INFORMATION

AUTHORS	J. H. Elias, J. A. Frogel, K. Matthews and G. Neugebauer
TELESCOPE	4.0m and 1.5m (reflectors), CTIO
MAIN ARTICLE	Elias, J. H, Frogel, J. A., Matthews K., Neugebauer, G. 1982, AJ 87, 1029

SYSTEM DESCRIPTION

BANDS DESCRIPTION [96]

band	λ_{eff} (μm)	bandpass (μm)
J	1.2	1.13 – 1.37
H	1.6	1.50 – 1.80
K	2.2	2.01 – 2.42
L	3.5	3.22 – 3.76

The system also includes the CO and H_2O filters defined in the *JHK H_2O CO - Persson et al. - 1977* system.

ZERO POINT: The magnitude of α Lyr is taken as 0.00 at all wavelengths. [96]

SYSTEM ANALYSIS

RELATIONS WITH OTHER SYSTEMS [97]

JHKL' AAO - Allen and Crag - 1983

$$(J-K)_{CTIO} = 0.897\ (\pm 0.005)(J-K)_{AAO} + 0.006\ (\pm 0.004)$$
$$(J-H)_{CTIO} = 0.869\ (\pm 0.005)(J-H)_{AAO} + 0.012\ (\pm 0.003)$$
$$(H-K)_{CTIO} = 0.954\ (\pm 0.013)(H-K)_{AAO} - 0.04\ (\pm 0.03)$$
$$K_{CTIO} = K_{AAO} - 0.011\ (\pm 0.004)$$

Fig. 113. The photometric system *JHKL* CTIO – Elias et al. – 1982

JHKL MSO - Jones and Hyland - 1982

Infrared photometry at Mount Stromlo Observatory.

GENERAL INFORMATION

AUTHORS T. J. Jones and A. R. Hyland

MAIN ARTICLE Jones, T. J. Hyland, A. R. 1982, MNRAS 200, 509

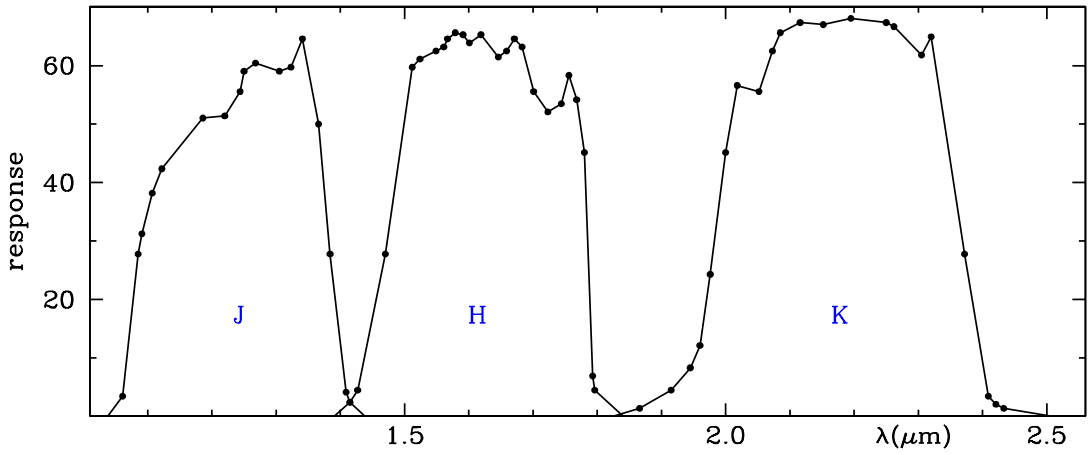
SYSTEM DESCRIPTION

BANDS DESCRIPTION

band	*WHM* (μm)	λ_c (μm)
J	0.288	1.236
H	0.307	1.631
K	0.377	2.176

TRANSMISSION CURVES

As derived from Fig A3 of [161].



J				*H*				*K*			
λ (μm)	ϒ (%)	λ (μm)	ϒ (%)	λ (μm)	ϒ (%)	λ (μm)	ϒ (%)	λ (μm)	ϒ (%)	λ (μm)	ϒ (%)
1.037	0.00	1.341	64.58	1.390	0.00	1.646	61.46	1.823	0.00	2.195	68.06
1.061	3.47	1.366	50.00	1.415	2.43	1.659	62.50	1.866	1.39	2.250	67.36
1.085	27.78	1.384	27.78	1.427	4.51	1.671	64.58	1.915	4.51	2.262	66.67
1.091	31.25	1.409	4.17	1.470	27.78	1.683	63.19	1.945	8.33	2.305	61.81
1.107	38.19	1.415	2.43	1.512	59.72	1.701	55.56	1.960	12.15	2.320	64.93
1.122	42.36	1.439	0.00	1.524	61.11	1.723	52.08	1.976	24.31	2.372	27.78
1.186	51.04			1.549	62.50	1.744	53.47	2.000	45.14	2.409	3.47
1.220	51.39			1.561	63.19	1.756	58.33	2.018	56.60	2.421	2.08
1.244	55.56			1.567	64.58	1.768	54.17	2.052	55.56	2.433	1.39
1.250	59.03			1.579	65.62	1.780	45.14	2.073	62.50	2.512	0.00
1.268	60.42			1.591	65.28	1.793	6.94	2.085	65.62		
1.305	59.03			1.601	63.89	1.796	4.51	2.116	67.36		
1.323	59.72			1.619	65.28	1.841	0.00	2.152	67.01		

Fig. 114. The photometric system *JHKL* MSO – Jones and Hyland – 1982

VilGen - North *et al.* - 1982

Combines bands from the *Vilnius - Straižys et al. - 1965* and *Geneva - Golay - 1962* systems.

GENERAL INFORMATION

AUTHORS P. North, B. Hauck and V. Straižys

MAIN ARTICLE North, P., Hauck, B., Straižys, V. 1982, A&A 108, 373

SYSTEM DESCRIPTION

BANDS DESCRIPTION [234]

band	old name	Schott filter	Soviet-made filter	λ_0 (Å)	half-width (Å)	Υ_{peak} (%)
35	*U*	WG5 + UG11	BS5 + UFS2	3500	510	61
37	*P*	BG23 + UG1	SZS22 + UFS6	3740	260	40
40	*B1*	GG395 + UG3 + BG23	ZhS10 + FS7 + SZS21	4020	400	47
47	*Y*	GG435 + BG12 + BG23	ZhS12 + SS15 + SZS21	4680	450	48
52	*Z*	GG495 + VG3 + BG23	ZhS17 + ZS7 + SZS22	5160	210	44
V	*V*	GG495 + BG23	ZhS18 + SZS21	5500	800	85
66	*S*	interference	interference	6560	190	75

SYSTEM ANALYSIS

RELATIONS WITH OTHER SYSTEMS [234]

Geneva - Golay - 1962

$(35-V)$	=	$(U-V)_{Gen} + 1.32$	
$(40-V)$	=	$(B1-V)_{Gen} + 0.64$	

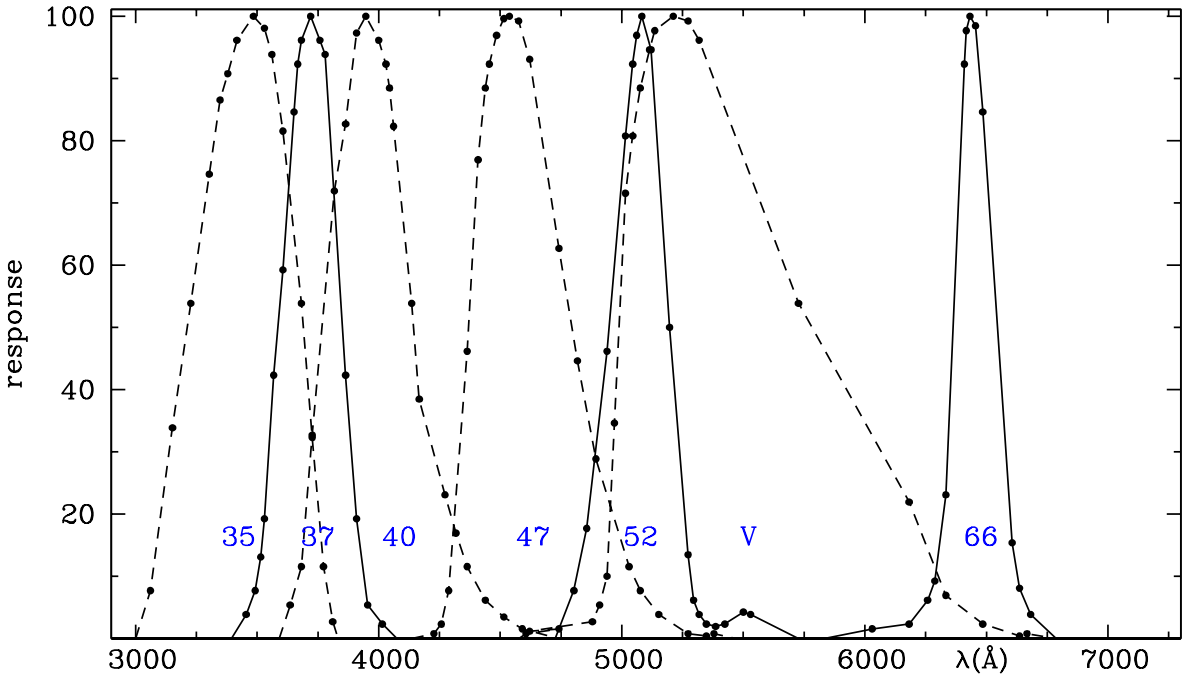
Vilnius - Straižys *et al.* - 1965

$(37-V)$	=	$(P-V)_{Vil}$	
$(47-V)$	=	$1.01\,(Y-V)_{Vil}$	for luminosity class IV-I
$(47-V)$	=	$1.03\,(Y-V)_{Vil}$	for luminosity class V
$(52-V)$	=	$(Z-V)_{Vil}$	
$(V-66)$	=	$(V-S)_{Vil}$	

Fig. 115. The photometric system VilGen – North et al. – 1982

TRANSMISSION CURVES

As derived from Fig 1 of [234].



35		*37*		*40*		*47*		*52*		*V*		*66*	
λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ
3000	0.00	3394	0.00	3591	0.00	4136	0.00	4727	0.00	4576	0.00	5833	0.00
3061	7.69	3455	3.85	3636	5.38	4227	0.77	4803	7.69	4606	0.77	6030	1.54
3152	33.85	3492	7.69	3682	11.54	4258	2.31	4856	17.69	4742	1.54	6182	2.31
3227	53.85	3515	13.08	3727	32.69	4288	7.69	4939	46.15	4621	1.15	6258	6.15
3303	74.62	3530	19.23	3818	71.92	4364	46.15	5015	80.77	4879	2.69	6288	9.23
3348	86.54	3568	42.31	3864	82.69	4409	76.92	5045	92.31	4909	5.38	6333	23.08
3379	90.77	3606	59.23	3909	97.31	4439	88.46	5061	96.92	4939	10.00	6409	92.31
3417	96.15	3652	84.62	3947	100.00	4455	92.31	5083	100.00	4970	34.62	6417	97.69
3485	100.00	3667	92.31	4000	96.15	4485	96.92	5121	94.62	5015	71.54	6432	100.00
3530	98.08	3682	96.15	4030	92.31	4515	99.62	5197	50.00	5045	80.77	6455	98.46
3561	93.85	3720	100.00	4045	88.46	4538	100.00	5273	13.46	5076	88.46	6485	84.62
3606	81.54	3758	96.15	4061	82.31	4576	99.23	5295	6.15	5114	94.62	6606	15.38
3682	53.85	3780	93.85	4136	53.85	4621	93.08	5318	3.85	5136	97.69	6636	8.08
3727	32.31	3864	42.31	4167	38.46	4742	62.69	5348	2.31	5212	100.00	6682	3.85
3773	11.54	3909	19.23	4273	23.08	4818	44.62	5386	1.92	5273	99.23	6788	0.00
3811	2.69	3955	5.38	4318	16.92	4894	28.85	5424	2.31	5318	96.15		
3833	0.00	4015	2.31	4364	11.54	5030	11.54	5500	4.23	5727	53.85		
		4076	0.00	4439	6.15	5076	7.69	5530	3.85	6182	21.92		
				4515	3.46	5152	3.85	5727	0.00	6333	6.92		
				4591	1.54	5273	0.77			6485	2.31		
				4742	0.00	5348	0.38			6636	0.38		
						5379	0.77			6667	0.77		
						5470	0.00			6788	0.00		

Fig. 115. continued

Solheim *et al.* - 1982

Intermediate band photometry of galaxies.

GENERAL INFORMATION

AUTHORS	J. -E. Solheim, G. de Vaucouleurs and A. de Vaucouleurs
TELESCOPE	0.91cm (reector), McDonald Obs.
DETECTOR	1P21
MAIN ARTICLE	Solheim, J. -E., de Vaucouleurs, G., de Vaucouleurs, A. 1982, A&AS 49, 109

SYSTEM DESCRIPTION

BANDS DESCRIPTION [273]

band	λ_{eff} (A)	bandwidth (A)	feature	band	λ_{eff} (A)	bandwidth (A)	feature
F34	3409	119	continuum	*F45*	4502	175	continuum
F37	3704	103	[OII]	*F49*	4865	135	Hβ
F39	3894	123	[NeIII], CN, CaII H & K	*F50*	5013	224	[OIII]
F41	4103	135	Hδ	*F53*	5262	122	Mg, cont.
F43	4303	110	Hγ, G band	*F55*	5498	87	continuum

Interference lters by Film Products Inc.

SYSTEM ANALYSIS

RELATIONS WITH OTHER SYSTEMS [273]

UBV - Johnson and Morgan - 1953

$$m_{55} = V - 0.039\,(B-V)$$
$$m_{43} = B + 0.108\,(B-V)$$

TRANSMISSION CURVES

As derived from Fig 1 of [273].

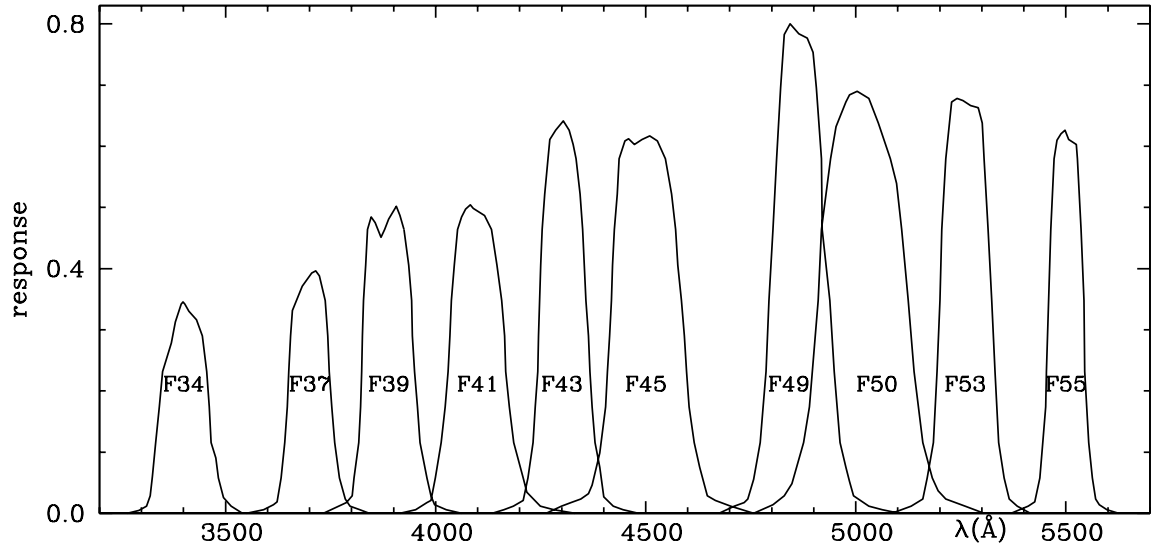


Fig. 116. The photometric system Solheim et al. – 1982

F34		*F37*		*F39*		*F41*		*F43*		*F45*		*F49*	
λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ
3266	0.000	3550	0.000	3733	0.000	3915	0.000	4135	0.000	4263	0.000	4675	0.000
3294	0.005	3591	0.006	3769	0.012	3952	0.006	4162	0.006	4281	0.006	4711	0.012
3312	0.012	3614	0.014	3787	0.017	3979	0.017	4185	0.012	4300	0.012	4734	0.017
3321	0.029	3623	0.019	3801	0.029	3989	0.021	4208	0.021	4322	0.017	4743	0.023
3326	0.060	3632	0.058	3806	0.058	4000	0.058	4220	0.058	4345	0.023	4757	0.056
3334	0.116	3641	0.116	3817	0.116	4013	0.116	4232	0.116	4364	0.032	4772	0.116
3342	0.174	3647	0.174	3821	0.174	4022	0.174	4237	0.174	4373	0.046	4780	0.174
3350	0.232	3650	0.232	3824	0.232	4030	0.232	4243	0.232	4391	0.099	4786	0.232
3371	0.278	3655	0.290	3826	0.290	4034	0.290	4245	0.290	4405	0.174	4793	0.348
3380	0.313	3659	0.332	3829	0.348	4037	0.348	4247	0.348	4409	0.232	4803	0.464
3394	0.342	3682	0.371	3833	0.406	4044	0.406	4250	0.406	4414	0.290	4812	0.580
3399	0.346	3705	0.393	3838	0.464	4053	0.464	4254	0.464	4418	0.348	4821	0.696
3403	0.342	3714	0.397	3847	0.485	4062	0.485	4259	0.522	4421	0.406	4830	0.783
3412	0.330	3723	0.388	3856	0.475	4071	0.497	4268	0.580	4426	0.464	4844	0.800
3431	0.317	3737	0.348	3870	0.451	4083	0.504	4272	0.611	4432	0.522	4865	0.784
3444	0.290	3744	0.290	3879	0.464	4089	0.499	4286	0.626	4437	0.580	4885	0.777
3455	0.232	3747	0.232	3888	0.481	4117	0.487	4304	0.641	4450	0.609	4899	0.754
3461	0.174	3753	0.174	3906	0.502	4133	0.464	4318	0.626	4460	0.612	4906	0.696
3466	0.116	3760	0.116	3915	0.487	4146	0.406	4327	0.603	4473	0.603	4919	0.580
3477	0.090	3771	0.058	3925	0.464	4157	0.348	4334	0.580	4492	0.611	4920	0.464
3483	0.058	3785	0.023	3936	0.406	4164	0.290	4343	0.522	4510	0.617	4938	0.348
3495	0.026	3797	0.012	3943	0.348	4167	0.232	4350	0.464	4528	0.609	4949	0.232
3513	0.012	3819	0.006	3945	0.290	4175	0.174	4358	0.348	4546	0.580	4963	0.116
3541	0.000	3842	0.000	3950	0.232	4186	0.116	4364	0.290	4562	0.522	4976	0.075
				3957	0.174	4208	0.058	4367	0.232	4571	0.464	4985	0.052
				3963	0.116	4217	0.035	4373	0.174	4577	0.406	4995	0.029
				3979	0.058	4249	0.012	4379	0.116	4585	0.348	5031	0.012
				3989	0.029	4281	0.006	4391	0.075	4592	0.290	5063	0.006
				3998	0.014	4332	0.000	4400	0.027	4597	0.232	5104	0.000
				4025	0.006			4423	0.012	4603	0.174		
				4062	0.000			4446	0.006	4615	0.116		
								4482	0.000	4629	0.075		
										4647	0.029		
										4665	0.021		
										4702	0.012		
										4757	0.000		

F50				*F53*				*F55*			
λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ
4757	0.000	5031	0.678	5086	0.000	5301	0.638	5370	0.000	5507	0.611
4803	0.014	5054	0.638	5132	0.012	5306	0.580	5411	0.012	5525	0.603
4830	0.029	5082	0.580	5159	0.023	5315	0.464	5426	0.019	5528	0.580
4848	0.049	5097	0.539	5170	0.058	5324	0.348	5434	0.044	5536	0.464
4876	0.116	5109	0.464	5185	0.116	5331	0.232	5438	0.058	5543	0.348
4889	0.174	5124	0.348	5193	0.232	5340	0.116	5445	0.116	5545	0.232
4897	0.232	5139	0.232	5200	0.348	5353	0.058	5452	0.174	5554	0.116
4910	0.348	5159	0.116	5205	0.464	5365	0.023	5454	0.232	5563	0.058
4919	0.464	5182	0.058	5214	0.580	5384	0.012	5459	0.348	5571	0.023
4940	0.580	5196	0.037	5228	0.672	5415	0.000	5464	0.464	5580	0.014
4953	0.632	5214	0.023	5242	0.678			5472	0.580	5598	0.006
4976	0.672	5260	0.012	5255	0.675			5479	0.610	5626	0.000
4985	0.684	5306	0.000	5274	0.667			5488	0.620		
5004	0.690			5292	0.663			5498	0.626		

Fig. 116. continued

8colors - Tedesco *et al.* - 1982

Spectral reflectance of asteroids and planetary satellites.

GENERAL INFORMATION

AUTHORS	E. F. Tedesco, D. J. Tholen and B. Zellner
TELESCOPE	1.54m, Catalina reflector, Univesity of Arizona
DETECTOR	blue channel: EMI 9789QB (bialkali photocathode, uncooled)
	red channel: RCA C31034-O5 (GaAs cathode, thermoelelectrically cooled)
	or Varian VPM 159A.12D (InGaAsP cathode, refrigerated)
MAIN ARTICLE	Tedesco, E. F., Tholen, D. J., Zellner, B. 1982, AJ 87, 1585

SYSTEM DESCRIPTION

BANDS DESCRIPTION [299]

band	filter	λ_{eff} (μm) (#)	FWHM (μm) (#)
s	(##)	0.337	0.047
u	3mm Corning 9683	0.359	0.060
b	2mm Schott GG13 + 6mm Corning CS 5-57	0.437	0.090
v	Corion interference	0.550 (0.552)	0.057 (0.058)
w	Corion interference	0.701 (0.702)	0.058 (0.063)
x	Corion interference	0.853 (0.849)	0.081 (0.069)
p	Corion interference	0.948	0.080
z	Corion interference	1.041	0.067

(#) for the Sun spectrum.
Upper values refer to Varian phototube, those in brackets to the RCA one.

(##) 3mm Corning CS 7-54 and 1.6mm UV transparent T-12 Optosil grade I glass with 7.5 mm of a solution composed by 98% $NiSO_4 \cdot 6H_2O$ (420g/l) and 2% $CuSO_4 \cdot 5H_2O$ (260 g/l).

ZERO POINT: The unweighted mean of color indices for the solar analogs 16 CygB, Hyades VB64 , Hyades VB106 and Hyades VB142 is adopted as the zero-point for each of the seven colors. [299]

Fig. 117. The photometric system 8 colors – Tedesco et al. – 1982

JHKL' AAO - Allen and Crag - 1983

Infrared photometry at the Anglo Australian Observatory.

GENERAL INFORMATION

AUTHORS	D. A. Allen, and T. A. Cragg
TELESCOPE	3.9m (reflector), Anglo-Australian Obs.
DETECTOR	InSb (cooled at 50 K)
MAIN ARTICLE	Allen, D. A., Cragg, T. A. 1983, MNRAS 203, 777

SYSTEM DESCRIPTION

BANDS DESCRIPTION [6]			FLUX CALIBRATION [6]	
band	λ_{eff} (μm)	FWHM (μm)	F_λ (W cm^{-2} μm) (#)	F_ν Jy (#)
J	1.20	0.30	34 10^{-14}	1640
H	1.64	0.30	11.5 10^{-14}	1030
K	2.19	0.45	4.1 10^{-14}	650
L'	3.80	0.60	0.52 10^{-14}	250

(#) Fluxes corresponding to a 0.0 mag star.

ZERO POINT: The star HR 3314 (A0 V) is taken to have

$$(J-H) = -0.01, (H-K) = 0.00, (H-L') = -0.01$$ [6]

Fig. 118. The photometric system *JHKL'* AAO – Allen and Cragg – 1983

UBVRI - Landolt - 1983

Establishment of a set of equatorial standard stars that realizes the *UBV - Johnson and Morgan - 1953* and *RI - Cousins - 1976* systems.

GENERAL INFORMATION

AUTHORS	A. U. Landolt
TELESCOPE	0.4m, 0.9m and 1.5m (reectors), CTIO
DETECTOR	RCA 31034A (GaAs photocathode, refrigerated)
	Hamamatsu R943-02 (GaAs photocathode, refrigerated)
MAIN ARTICLE	Landolt, A. U. 1983, AJ 88, 439

SYSTEM DESCRIPTION

BANDS DESCRIPTION [182]			
band	lters	*WHM* (A)	λ_c (A)
U	Corning 9863 + solid $CuSO_4$ cristal	980	3400
B	2mm GG 385 + 2mm BG 18 + 2mm BG 12	860	4305
V	2mm GG 495 + 2mm BG 18	865	5400
R	2mm KG 3 + 2mm OG 570	1590	6360
I	3mm RG 715 + 1mm RG 780	1320	8150

SYSTEM ANALYSIS

A long term effort initiated by [181] and [182] has culminated with the establishment of 526 equatorial *UBVRI* standard stars by [183]. The deviations from the original *UBV - Johnson and Morgan - 1953* and *RI - Cousins - 1976* systems (as realized by the respective standard stars given in [150] and [336]) are discussed in detail by [32], [33], [183], [337] and the references therein.

TRANSMISSION CURVES

As obtained by combining the transmission curves of the original set of lters with the sensitivity of the RCA 31034A photomultiplier (serial number N49701) given in Tables 6-11 of [183].

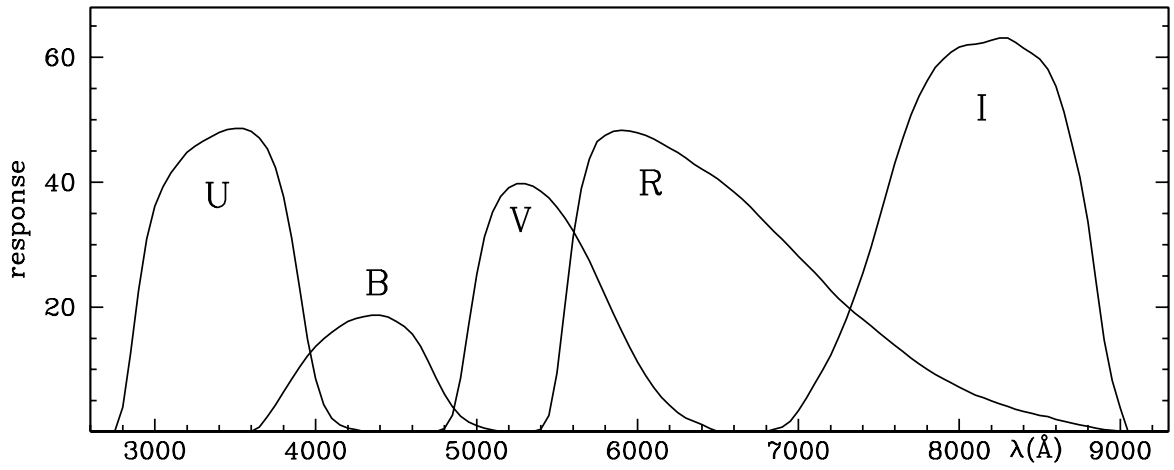


Fig. 119. The photometric system *UBVRI* – Landolt – 1983

U		*B*		*V*		*R*				*I*	
λ (Å)	ϒ (%)	λ (Å)	ϒ (%)	λ (Å)	ϒ (%)	λ (Å)	ϒ (%)	λ (Å)	ϒ (%)	λ (Å)	ϒ (%)
2750	0.00	3600	0.00	4750	0.00	5350	0.00	7650	12.78	6800	0.00
2800	3.86	3650	0.71	4800	0.43	5400	0.32	7700	11.77	6850	0.31
2850	12.43	3700	2.36	4850	2.60	5450	2.52	7750	10.83	6900	0.69
2900	22.68	3750	4.26	4900	8.57	5500	9.34	7800	9.95	6950	1.63
2950	30.85	3800	6.33	4950	17.07	5550	20.37	7850	9.13	7000	3.28
3000	36.11	3850	8.40	5000	25.18	5600	31.22	7900	8.44	7050	5.35
3050	39.22	3900	10.33	5050	31.22	5650	38.90	7950	7.77	7100	7.62
3100	41.50	3950	12.08	5100	35.20	5700	43.68	8000	7.09	7150	9.84
3150	43.15	4000	13.59	5150	37.67	5750	46.47	8050	6.43	7200	12.24
3200	44.72	4050	14.82	5200	39.06	5800	47.47	8100	5.84	7250	15.02
3250	45.71	4100	15.88	5250	39.70	5850	48.09	8150	5.40	7300	18.13
3300	46.53	4150	16.83	5300	39.70	5900	48.30	8200	4.87	7350	21.68
3350	47.23	4200	17.61	5350	39.33	5950	48.16	8250	4.42	7400	25.34
3400	47.92	4250	18.09	5400	38.51	6000	47.86	8300	3.98	7450	29.39
3450	48.41	4300	18.41	5450	37.46	6050	47.50	8350	3.56	7500	33.95
3500	48.58	4350	18.60	5500	35.96	6100	46.89	8400	3.20	7550	38.54
3550	48.60	4400	18.64	5550	34.20	6150	46.22	8450	2.87	7600	43.01
3600	48.12	4450	18.35	5600	32.15	6200	45.44	8500	2.55	7650	47.03
3650	47.06	4500	17.66	5650	29.84	6250	44.76	8550	2.35	7700	50.72
3700	45.32	4550	16.83	5700	27.39	6300	43.89	8600	1.92	7750	53.79
3750	42.28	4600	15.62	5750	24.61	6350	42.87	8650	1.60	7800	56.22
3800	37.65	4650	13.70	5800	21.76	6400	42.06	8700	1.30	7850	58.37
3850	30.96	4700	11.20	5850	18.90	6450	41.28	8750	1.04	7900	59.71
3900	22.81	4750	8.50	5900	16.17	6500	40.45	8800	0.78	7950	60.81
3950	14.81	4800	6.01	5950	13.55	6550	39.45	8850	0.50	8000	61.63
4000	8.45	4850	3.94	6000	11.10	6600	38.36	8900	0.28	8050	61.97
4050	4.31	4900	2.43	6050	8.93	6650	37.29	8950	0.14	8100	62.11
4100	2.07	4950	1.48	6100	7.06	6700	36.04	9000	0.06	8150	62.32
4150	1.01	5000	0.90	6150	5.45	6750	34.67	9050	0.00	8200	62.72
4200	0.53	5050	0.50	6200	4.15	6800	33.30			8250	63.10
4250	0.30	5100	0.25	6250	3.04	6850	32.03			8300	63.08
4300	0.01	5150	0.00	6300	2.16	6900	30.82			8350	62.42
4350	0.00			6350	1.60	6950	29.44			8400	61.44
				6400	1.08	7000	28.04			8450	60.64
				6450	0.44	7050	26.80			8500	59.68
				6500	0.00	7100	25.51			8550	58.06
						7150	24.09			8600	55.32
						7200	22.61			8650	51.18
						7250	21.32			8700	46.21
						7300	20.13			8750	40.75
						7350	18.99			8800	33.59
						7400	17.98			8850	24.01
						7450	16.94			8900	14.66
						7500	15.86			8950	8.13
						7550	14.80			9000	3.70
						7600	13.77			9050	0.00

Fig. 119. continued

griz - Schneider *et al.* - 1983

Generale purpose system.

GENERAL INFORMATION

AUTHORS	D. P. Schneider, J. E. Gunn, J. G. Hoessel
TELESCOPE	1.52m (reector), Palomar Obs.
DETECTOR	800 X 800 CCD (Texas Instruments)
MAIN ARTICLE	D. P. Schneider, J. E. Gunn, J. G. Hoessel 1983, ApJ 264, 337

SYSTEM DESCRIPTION

BANDS DESCRIPTION					
band	lter	λ_{eff} (A)	FWHM (A)	*WHM* (A)	λ_c (A)
g [301]	Corion interference	4930	700	977	5140
r [301]	3mm Schott BG610 + Balzer B1 short-pass	6550	900	905	6530
i [312]	Wratten 88a gelatin lter + Blazers infrared mirror	8200	1300	1300	7860
z [261]	3mm RG 850			1165	9015

Filters *g, r* are from the *uvgr - Thuan and Gunn - 1976* system,
lter *i* is equivalent to *i* lter of the *ri - Wade et al. - 1979* system.

SYSTEM ANALYSIS

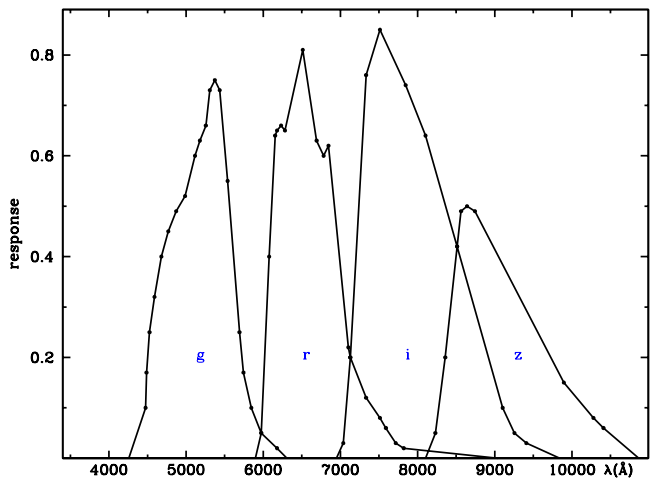
REDDENING RATIOS [261]

$A(g) = 3.29\,E(B-V)_{Johnson}$ $A(r) = 2.23\,E(B-V)_{Johnson}$ $A(i) = 1.63\,E(B-V)_{Johnson}$

$A(z) = 1.22\,E(B-V)_{Johnson}$

TRANSMISSION CURVES

As derived from Fig 4 of [261].



g		*r*		*i*		*z*	
λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ
4256	0.00	5897	0.00	6949	0.00	8103	0.00
4474	0.10	5974	0.05	7038	0.03	8231	0.05
4487	0.17	6077	0.40	7128	0.20	8359	0.20
4526	0.25	6154	0.64	7333	0.76	8513	0.42
4590	0.32	6179	0.65	7513	0.85	8564	0.49
4679	0.40	6231	0.66	7846	0.74	8641	0.50
4769	0.45	6282	0.65	8103	0.64	8744	0.49
4872	0.49	6513	0.81	8513	0.42	9897	0.15
4987	0.52	6692	0.63	9103	0.10	10280	0.08
5115	0.60	6782	0.60	9256	0.05	10410	0.06
5179	0.63	6846	0.62	9410	0.03	10870	0.00
5256	0.66	7103	0.22	9846	0.00		
5308	0.73	7128	0.20				
5372	0.75	7333	0.12				
5436	0.73	7513	0.08				
5538	0.55	7590	0.06				
5692	0.25	7718	0.03				
5744	0.17	7821	0.02				
5846	0.10	9051	0.00				
5974	0.05						
6179	0.02						
6308	0.00						

Fig. 120. The photometric system *griz* – Schneider et al. – 1983

RGU - Trefzger *et al.* - 1983

Photoelectric version of the *RGU* - *Becker* - *1946* photographic system. [25]

GENERAL INFORMATION

AUTHORS	C. F. Trefzger, L. M. Cameron, A. Spaenhauer and U. W. Steinlin
TELESCOPE	1m (reector), Gornergrat Obs.
DETECTOR	RCA 7265 (S-20 cathode, refrigerated)
MAIN ARTICLE	Trefzger, C. F., Cameron, L. M., Spaenhauer, A., Steinlin, U.W. 1983, A&A 117, 347

SYSTEM DESCRIPTION

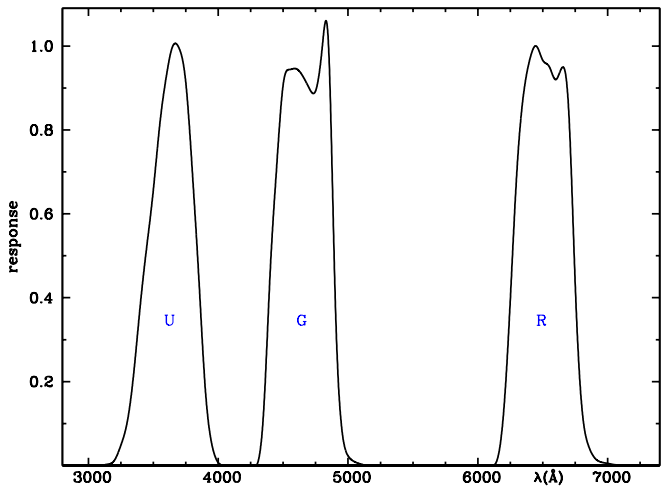
BANDS DESCRIPTION [305]

band	lter		λ_{max} (A) (#)	FWHM (A)
U	K-36 ltrae	x	3650	440
G	custom lter	(#)	4650	500
R	K-65 ltrae	x	6550	490

(#) in addition 2mm BG13 is needed to suppress the red-leak. [305]

ZERO POINT: As for the photographic version unreddened A0 V stars have:
$G = V_{Johnson}$, $(G-R) = 0.32$ and $(U-G) = 1.240$ [305]

TRANSMISSION CURVES [305]



U		*G*		*R*	
λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ
3100	0.000	4250	0.000	6100	0.000
3150	0.003	4300	0.003	6150	0.015
3200	0.012	4350	0.130	6200	0.133
3250	0.048	4400	0.459	6250	0.396
3300	0.105	4450	0.711	6300	0.698
3350	0.222	4500	0.907	6350	0.881
3400	0.383	4550	0.944	6400	0.968
3450	0.523	4600	0.946	6450	1.000
3500	0.656	4650	0.929	6500	0.966
3550	0.813	4700	0.900	6550	0.951
3600	0.927	4750	0.893	6600	0.920
3650	1.000	4800	0.993	6650	0.949
3700	0.914	4850	1.000	6700	0.844
3750	0.994	4900	0.412	6750	0.432
3800	0.704	4950	0.093	6800	0.142
3850	0.451	5000	0.023	6850	0.049
3900	0.185	5050	0.009	6900	0.018
3950	0.052	5100	0.003	6950	0.008
4000	0.007	5250	0.000	7000	0.005
4050	0.000			7050	0.002
				7100	0.001
				7150	0.000

Fig. 121. The photometric system *RGU* – Trefzger et al. – 1983

IRAS - 1983

Infrared photometry by the IRAS satellite.

GENERAL INFORMATION

TELESCOPE	0.57m (reflector)
DETECTOR	Si:As (*12*), Si:Sb (*25*), Ge:Ga (*60, 100*)
MAIN ARTICLE	Beichman, C. A., Neugebauer, G., Habing, H. J., Clegg, P. E., Chester, T. J. 1988, *Infrared Astronomical Satellite (IRAS) Catalogs and Atlases*, NASA RP-1190, Vol. 1

SYSTEM DESCRIPTION

BANDS DESCRIPTION [227]					FLUX CALIBRATION [185]	
band	λ_c (μm)	bandpass (μm)	*WHM* (μm)	λ_c (μm)	F_λ (W m^{-2} μm^{-1})	F_ν (Jy)
12	12	8.5 – 15	6.93	11.43	5.84 10^{-13} ± 4%	28.0 ± 4%
25	25	19 – 30	11.35	23.92	3.81 10^{-14} ± 6%	7.94 ± 6%
60	60	40 – 80	33.00	62.00	5.97 10^{-15} ± 6%	7.17 ± 6%
100	100	83 – 120	32.10	101.00	2.28 10^{-15} ± 10%	7.61 ± 10 %

TRANSMISSION CURVES [28], pg II-18

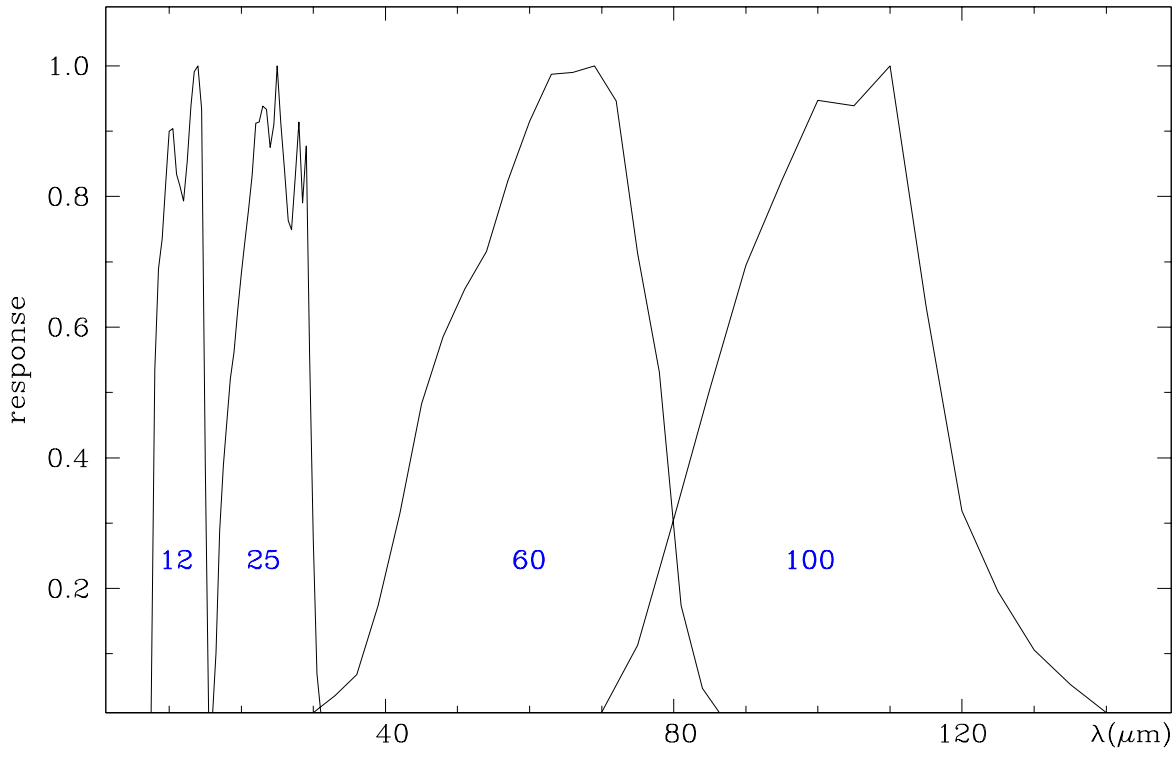


Fig. 122. The photometric system IRAS – 1983

12		*25*				*60*		*100*	
λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ
7.0	0.000	16.0	0.007	26.5	0.763	27.0	0.000	65.0	0.000
7.5	0.008	16.5	0.101	27.0	0.749	30.0	0.01	70.0	0.01
8.0	0.535	17.0	0.288	27.5	0.829	33.0	0.036	75.0	0.113
8.5	0.689	17.5	0.388	28.0	0.914	36.0	0.068	80.0	0.306
9.0	0.735	18.0	0.452	28.5	0.790	39.0	0.174	85.0	0.505
9.5	0.815	18.5	0.521	29.0	0.877	42.0	0.315	90.0	0.695
10.0	0.900	19.0	0.562	29.5	0.558	45.0	0.483	95.0	0.824
10.5	0.904	19.5	0.626	30.0	0.274	48.0	0.585	100.0	0.947
11.0	0.834	20.0	0.683	30.5	0.069	51.0	0.658	105.0	0.939
11.5	0.816	20.5	0.729	31.0	0.012	54.0	0.716	110.0	1.000
12.0	0.793	21.0	0.778	31.5	0.000	57.0	0.824	115.0	0.631
12.5	0.854	21.5	0.832			60.0	0.915	120.0	0.319
13.0	0.938	22.0	0.912			63.0	0.987	125.0	0.195
13.5	0.991	22.5	0.914			66.0	0.990	130.0	0.106
14.0	1.000	23.0	0.938			69.0	1.000	135.0	0.053
14.5	0.934	23.5	0.933			72.0	0.946	140.0	0.01
15.0	0.388	24.0	0.875			75.0	0.713		
15.5	0.000	24.5	0.910			78.0	0.531		
		25.0	1.000			81.0	0.174		
		25.5	0.911			84.0	0.047		
		26.0	0.840			87.0	0.000		

Fig. 122. continued

VWFSC Spacelab 1 - 1983

Ultraviolet photometry with the Very Wide Field Survey Camera on board of Spacelab-1.

GENERAL INFORMATION

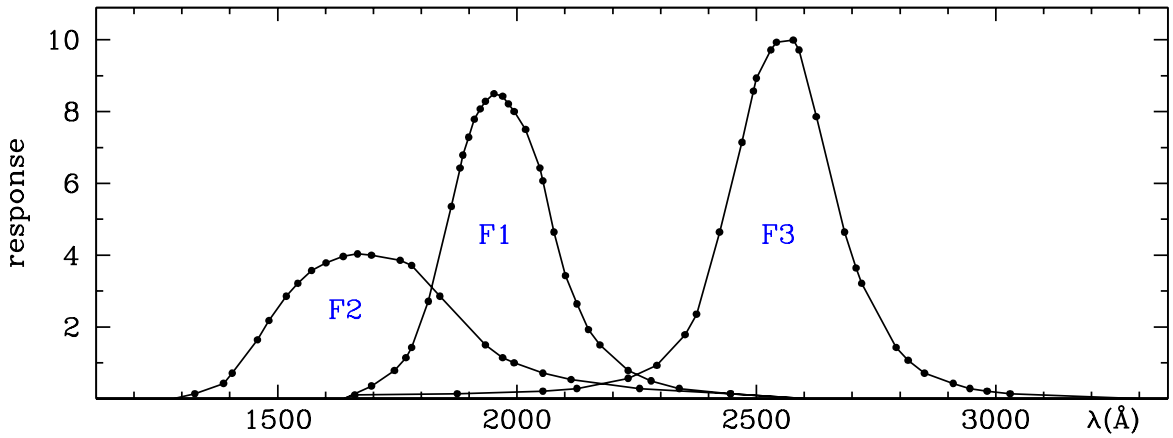
TELESCOPE	all reection f/1.9 Schmidt Camera
DETECTOR	ITT image intensier (CsTe photocathode) + Kodak IIa-O
MAIN ARTICLE	Viton, M., Burgarella, D., Cassatella, A., Prévot, L. 1988, A&A 205, 147

SYSTEM DESCRIPTION

BANDS DESCRIPTION [311]					
band	lter	λ_c (A)	half-width (A)	*WHM* (A)	λ_c (A)
F2	interference	1680	410	430	1690
F1	interference	1950	230	243	1963
F3	interference	2540	230	253	2556

TRANSMISSION CURVES

As derived from Fig 1 of [304].



F2				*F1*				*F3*			
λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ
1280	0.000	1839	2.857	1637	0.000	1982	8.214	1637	0.000	2577	9.989
1327	0.143	1934	1.500	1696	0.357	1994	8.000	1661	0.107	2589	9.714
1387	0.429	1970	1.143	1744	0.786	2018	7.500	1875	0.143	2625	7.857
1405	0.714	1994	1.000	1768	1.143	2048	6.429	2054	0.214	2684	4.643
1458	1.643	2054	0.714	1780	1.429	2054	6.071	2125	0.286	2708	3.643
1482	2.179	2113	0.536	1815	2.714	2077	4.643	2232	0.571	2720	3.214
1518	2.857	2256	0.286	1863	5.357	2101	3.429	2292	0.929	2792	1.429
1542	3.214	2446	0.143	1875	5.714	2125	2.643	2351	1.786	2817	1.071
1571	3.571	2613	0.000	1887	6.786	2149	1.929	2375	2.357	2851	0.714
1601	3.786			1899	7.286	2173	1.500	2423	4.643	2911	0.429
1637	3.964			1911	7.786	2232	0.786	2470	7.143	2946	0.286
1667	4.036			1923	8.071	2280	0.500	2494	8.571	2982	0.214
1696	4.000			1934	8.286	2339	0.286	2500	8.929	3030	0.143
1756	3.857			1952	8.500	2446	0.143	2530	9.714	3315	0.000
1780	3.714			1970	8.429	2613	0.000	2542	9.929		

Fig. 123. The photometric system VWFSC Spacelab 1 – 1983

JHKLMNQ OAN - Roth *et al.* - 1984

Infrared photometry at the San Pedro Màrtir National Observatory.

GENERAL INFORMATION

AUTHORS	M. Roth, A. Iriarte, M. Tapia and G. Resendiz
TELESCOPE	2.1m (reflector), San Pedro Mártir National Obs., Mexico
DETECTOR	InSb cell (1–5 μm) and Ge bolometer (5–20 μm),
MAIN ARTICLE	Roth, M., Iriarte, M., Tapia, M., Resendiz, G. 1984, RMxAA 9, 25

SYSTEM DESCRIPTION

BANDS DESCRIPTION [252]				FLUX CALIBRATION (#) [61]	
band	λ_0 (μm)	width (μm)	λ_{eff} (μm) [61]	$F_{\lambda,0}$ (W cm^{-2} μm^{-1})	$F_{\nu,0}$ (Jy)
J	1.25	0.32	1.198	3.420 10^{-13}	1642
H	1.65	0.28	1.580	1.295 10^{-13}	1105
K	2.23	0.35	2.210	3.920 10^{-14}	632
L'	3.80	0.70			
M (InSb)	4.70	0.6			
M (Ge)	4.84	0.9			
N_1	8.00	0.6			
N_2	8.60	0.91			
N	10.39	5.34			
N_3	10.92	0.58			
N_4	11.31	1.95			
Q_1	18.00	3.63			
Q	19.60	8.6			

(#) For a 0.0 mag star.

ZERO POINT: $J = H = K = 0.0$. for α Lyr. [61]

SYSTEM ANALYSIS

RELATIONS WITH OTHER SYSTEMS [61]

UBVRI(JHKLMN) - Johnson - 1965

$$K_J = K_{OAN} + 0.029 - 0.011\,(V-K)_{OAN}$$
$$(J-K)_J = 0.038 + 0.974\,(J-K)_{OAN}$$
$$(H-K)_J = 0.014 + 0.834\,(H-K)_{OAN}$$

VJHKLM ESO - Engels *et al* - 1981

$$K_{ESO} = 0.0321\,(\pm0.0157) + 0.9989\,(\pm0.0040)\,K_{OAN}$$
$$(J-K)_{ESO} = 0.0422\,(\pm0.0058) + 0.9591\,(\pm0.0216)\,(J-K)_{OAN}$$
$$(H-K)_{ESO} = 0.0322\,(\pm0.0047) + 0.8057\,(\pm0.0922)\,(H-K)_{OAN}$$

JHKL CTIO - Elias *et al* - 1982

$$K_{CTIO} = -0.0176\,(\pm0.0141) + 1.0047\,(\pm0.0030)\,K_{OAN}$$
$$(J-K)_{CTIO} = 0.0356\,(\pm0.0048) + 0.8962\,(\pm0.0083)\,(J-K)_{OAN}$$
$$(H-K)_{CTIO} = 0.0138\,(\pm0.0042) + 0.8593\,(\pm0.0264)\,(H-K)_{OAN}$$

JHKL' AAO - Allen and Cragg - 1983

$$K_{AAO} = -0.0044\,(\pm0.0186) + 1.0047\,(\pm0.0046)\,K_{OAN}$$
$$(J-K)_{AAO} = 0.0429\,(\pm0.0052) + 1.0010\,(\pm0.0126)\,(J-K)_{OAN}$$
$$(H-K)_{AAO} = 0.0176\,(\pm0.0046) + 0.8196\,(\pm0.0614)\,(H-K)_{OAN}$$

Fig. 124. The photometric system *JHKLMNQ* OAN – Roth et al. – 1984

WBVR - Khaliullin *et al.* - 1985

General purpose system. Evolved from the *WBVR -Straižys - 1973*

GENERAL INFORMATION

AUTHORS	K. H. Khaliullin, A. V. Mironov and V. G. Moshkalyov
TELESCOPE	0.48m (reflector), Thien-Shan High Altitude Obs.
DETECTOR	S-20 photomultiplier
MAIN ARTICLE	Khaliullin, K. H., Mironov, A. V., Moshkalyov, V. G. 1984, Ap&SS 111, 291

SYSTEM DESCRIPTION

BANDS DESCRIPTION [164]			
band	λ_{peak} (Å)	*WHM (Å)*	λ_c (Å)
W	3500	930	3490
B	4400	905	4400
V	5300	805	5455
R	6600	1085	6925

ZERO POINT: HD 221525 (A7 IV) defines the zero point of magnitudes as follows:
$W = 5.922 \quad B = 5.800 \quad V = 5.574 \quad R = 5.346$

Unreddened A0 V stars have 0.00 colors. [164]

SYSTEM ANALYSIS

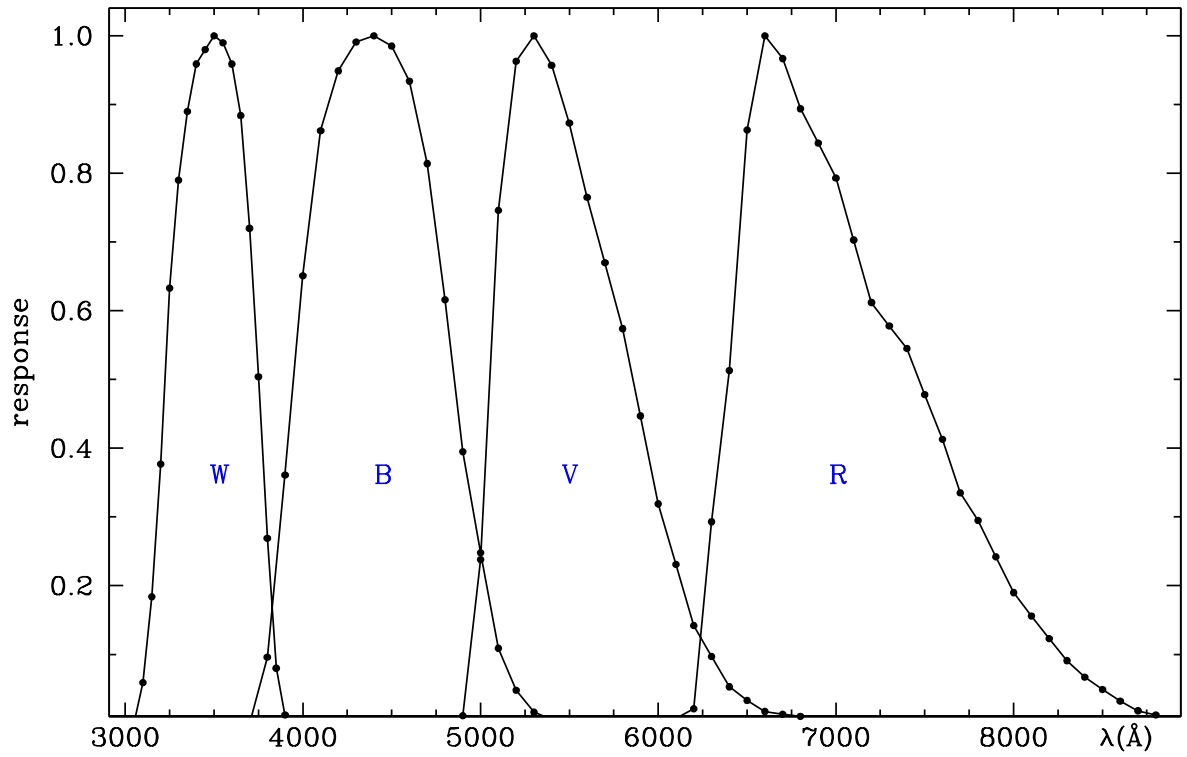
RELATIONS WITH OTHER SYSTEMS [169]

UBV - Johnson and Morgan - 1953

$$V_J - V_S = -0.0019 - 0.061\,(B-V) + 0.072\,(V-R)$$

Fig. 125. The photometric system *WBVR* – Khalliullin et al. – 1985

NORMALIZED TRASMISSION CURVES [164]



W		*B*		*V*				*R*			
λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ
3050	0.000	3700	0.000	4600	0.000	6600	0.017	5900	0.000	7900	0.242
3100	0.059	3800	0.096	4700	0.001	6700	0.013	6000	0.002	8000	0.190
3150	0.184	3900	0.361	4800	0.003	6800	0.010	6100	0.007	8100	0.156
3200	0.377	4000	0.651	4900	0.011	6900	0.007	6200	0.021	8200	0.123
3250	0.633	4100	0.862	5000	0.238	7000	0.004	6300	0.293	8300	0.091
3300	0.790	4200	0.949	5100	0.746	7100	0.003	6400	0.513	8400	0.067
3350	0.890	4300	0.991	5200	0.963	7200	0.001	6500	0.863	8500	0.049
3400	0.959	4400	1.000	5300	1.000	7300	0.000	6600	1.000	8600	0.032
3450	0.980	4500	0.985	5400	0.957			6700	0.967	8700	0.018
3500	1.000	4600	0.934	5500	0.873			6800	0.894	8800	0.012
3550	0.990	4700	0.814	5600	0.765			6900	0.844	8900	0.005
3600	0.959	4800	0.616	5700	0.670			7000	0.793	9000	0.000
3650	0.884	4900	0.395	5800	0.574			7100	0.703		
3700	0.720	5000	0.248	5900	0.447			7200	0.612		
3750	0.504	5100	0.109	6000	0.319			7300	0.578		
3800	0.269	5200	0.048	6100	0.231			7400	0.545		
3850	0.080	5300	0.016	6200	0.142			7500	0.478		
3900	0.012	5400	0.006	6300	0.097			7600	0.413		
3950	0.002	5500	0.002	6400	0.053			7700	0.335		
4000	0.000	5600	0.000	6500	0.033			7800	0.295		

Fig. 125. continued

$J_nK_nL_nM_n$ - Leggett *et al.* - 1986

Narrow band version of the common *JKLM* bands.

GENERAL INFORMATION

AUTHORS	S. K. Leggett, M. Bartholomew, C. M. Mountain and M. J. Selby
TELESCOPE	1.5m Sanchez-Magro (reflector), Teide Obs.;
	3.8m UKIRT (reflector), Mauna Kea
DETECTOR	InSb (liquid N_2 cooled)
MAIN ARTICLE	Leggett, S. K., Bartholomew, M., Mountain, C. M., Selby, M. J. 1986 MNRAS 223, 443

SYSTEM DESCRIPTION

BANDS DESCRIPTION [186]

band	λ_{eff} (μm)	FWHM (μm)
J_n	1.24	0.03
K_n	2.20	0.05
L_n	3.80	0.14
M_n	4.70	0.21

ZERO POINT: $Jn = Kn = Ln = Mn = 0.0$ for α Lyr. [186], [266]

SYSTEM ANALYSIS

RELATIONS WITH OTHER SYSTEMS [266]

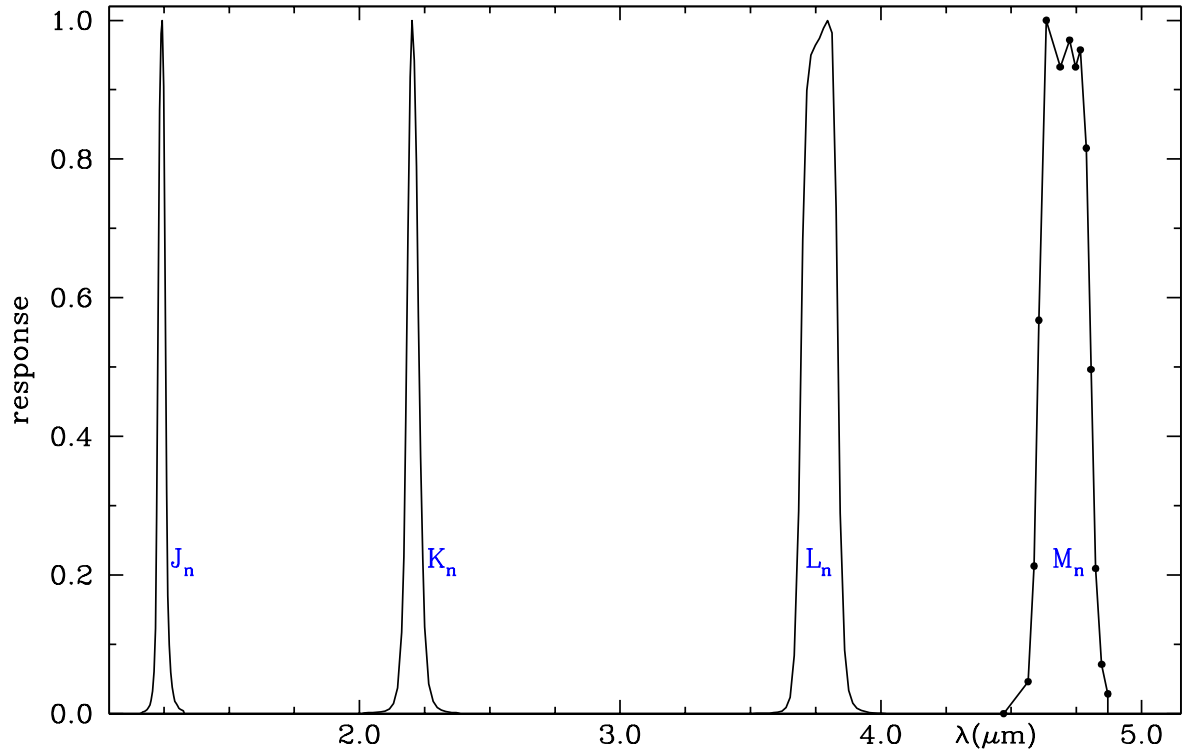
UBVRI(JKHLMN) - Johnson - 1965

$(V-J)$	=	$-0.044 + 0.988(V-Jn)$	for 103 stars in common
$(V-K)$	=	$-0.020 + 0.989(V-Kn)$	for 103 stars in common
$(V-L)$	=	$-0.038 + 0.981(V-Ln)$	for 37 stars in common

Fig. 126. The photometric system $J_nK_nL_nM_n$ – Leggett et al. – 1986

TRANSMISSION CURVES [266]

M_n band is derived from Fig 1 of [186].



J_n				K_n				L_n				M_n	
λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ
1.1587	0.000	1.2494	0.905	2.0102	0.000	2.2184	0.789	3.5081	0.000	3.7803	0.989	4.471	0.0000
1.1640	0.000909	1.2548	0.611	2.0182	0.000928	2.2264	0.574	3.5241	0.000297	3.7963	1.000	4.565	0.0461
1.1694	0.00267	1.2601	0.322	2.0343	0.00129	2.2344	0.372	3.5401	0.000374	3.8123	0.982	4.588	0.2128
1.1747	0.00304	1.2654	0.170	2.0503	0.00147	2.2424	0.223	3.5562	0.000377	3.8283	0.729	4.606	0.5673
1.1800	0.00426	1.2708	0.0986	2.0663	0.00183	2.2504	0.125	3.5722	0.000607	3.8444	0.289	4.635	1.0000
1.1854	0.00542	1.2761	0.0595	2.0823	0.00228	2.2664	0.0428	3.5882	0.00122	3.8604	0.0915	4.688	0.9327
1.1907	0.00857	1.2815	0.0383	2.0983	0.00335	2.2824	0.0179	3.6042	0.00185	3.8764	0.0332	4.724	0.9716
1.1961	0.0124	1.2868	0.0257	2.1143	0.00650	2.2984	0.00885	3.6202	0.00372	3.8924	0.0150	4.747	0.9327
1.2014	0.0192	1.2921	0.0178	2.1303	0.0147	2.3144	0.00504	3.6362	0.00860	3.9084	0.00774	4.765	0.9575
1.2067	0.0322	1.2975	0.0144	2.1463	0.0373	2.3305	0.00318	3.6522	0.0235	3.9244	0.00448	4.788	0.8156
1.2121	0.0606	1.3028	0.0109	2.1623	0.117	2.3465	0.00212	3.6682	0.0838	3.9404	0.00289	4.806	0.4964
1.2174	0.124	1.3081	0.00795	2.1703	0.2261	2.3545	0.00168	3.6842	0.292	3.9564	0.00155	4.824	0.2092
1.2227	0.286	1.3135	0.00621	2.1783	0.422	2.3625	0.00133	3.7003	0.684	3.9724	0.000826	4.847	0.0709
1.2281	0.582	1.3188	0.00532	2.1864	0.693	2.3705	0.00142	3.7163	0.899	3.9884	0.000463	4.871	0.0284
1.2334	0.871	1.3241	0.00393	2.1944	0.918	2.3785	0.00106	3.7323	0.950	4.0044	0.000134	4.941	0.0000
1.2388	0.981	1.3294	0.0000	2.2024	1.000	2.3860	0.000	3.7483	0.964	4.0200	0.000		
1.2441	1.000			2.2104	0.942			3.7643	0.974				

Fig. 126. continued

Park and Lee - 1986

Conceptual study of a broad-band system optimized for G-K dwarfs.

GENERAL INFORMATION

AUTHORS N.-K. Park and S. W. Lee
MAIN ARTICLE Park, N.-K., and Lee, S.W. 1986, Journal of the Korean Astron. Soc. 19, 1

SYSTEM DESCRIPTION

BANDS DESCRIPTION [239]

band	λ_0 (Å)	FWHM (Å)
34	3400	200
38	3850	200
42	4190	200
46	4600	200

The band profiles are gaussians truncated to 0.0 when the transmission reaches half of the peak value.

SYSTEM ANALYSIS

COLOR INDICES AND PARAMETERS [239]

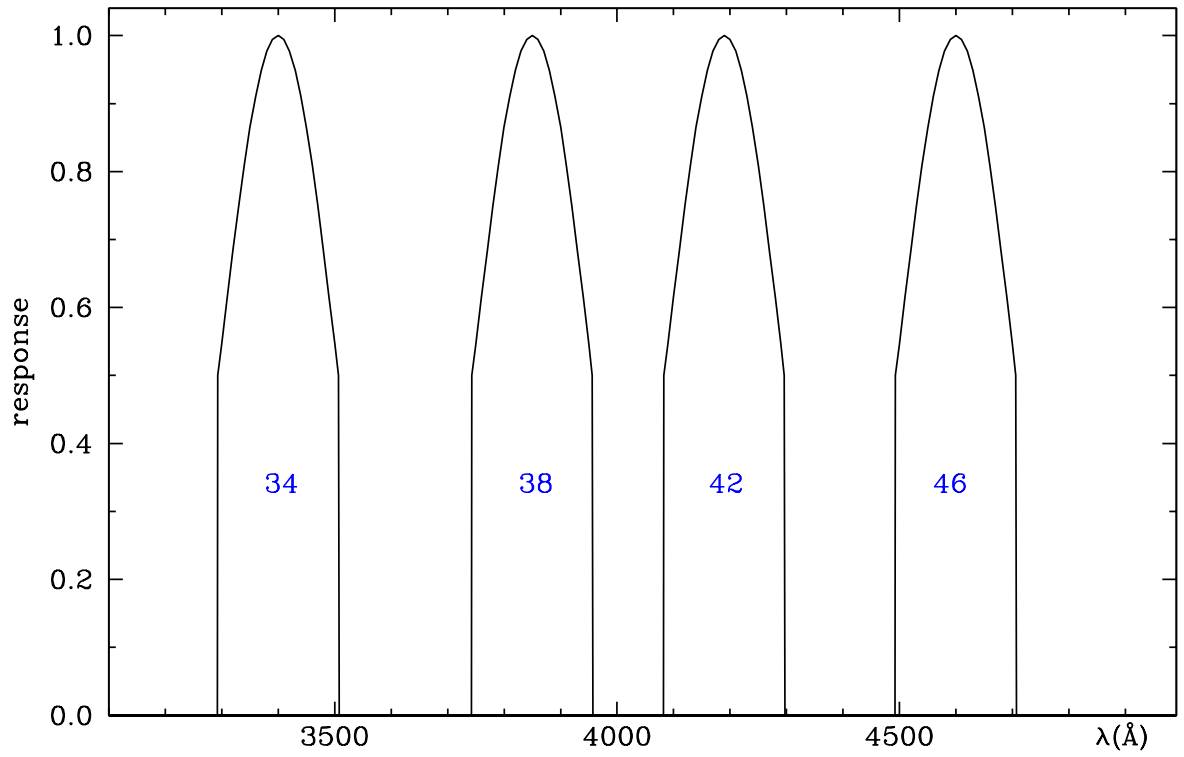
34 , *38* : bands sensitive to temperature, gravity and metallicity.

46 : band mainly sensitive to metallicity and gravity.

42 : band mainly sensitive to effective temperature.

Fig. 127. The photometric system Park and Lee – 1986

TRANSMISSION CURVES [239]



34				*38*				*42*				*46*			
λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ
3292	0.000	3410	0.994	3742	0.000	3860	0.994	4082	0.000	4200	0.994	4492	0.000	4610	0.994
3293	0.500	3420	0.977	3743	0.500	3870	0.977	4083	0.500	4210	0.977	4493	0.500	4620	0.977
3300	0.547	3430	0.949	3750	0.546	3880	0.949	4090	0.546	4220	0.949	4500	0.546	4630	0.949
3310	0.616	3440	0.911	3760	0.615	3890	0.911	4100	0.615	4230	0.911	4510	0.615	4640	0.911
3320	0.684	3450	0.865	3770	0.683	3900	0.865	4110	0.683	4240	0.865	4520	0.683	4650	0.865
3330	0.750	3460	0.810	3780	0.749	3910	0.809	4120	0.749	4250	0.809	4530	0.749	4660	0.809
3340	0.810	3470	0.750	3790	0.809	3920	0.749	4130	0.809	4260	0.749	4540	0.809	4670	0.749
3350	0.865	3480	0.684	3800	0.865	3930	0.683	4140	0.865	4270	0.683	4550	0.865	4680	0.683
3360	0.911	3490	0.616	3810	0.911	3940	0.615	4150	0.911	4280	0.615	4560	0.911	4690	0.615
3370	0.949	3500	0.547	3820	0.949	3950	0.546	4160	0.949	4290	0.546	4570	0.949	4700	0.546
3380	0.977	3507	0.500	3830	0.977	3956	0.500	4170	0.977	4296	0.500	4580	0.977	4706	0.500
3390	0.994	3508	0.000	3840	0.994	3957	0.000	4180	0.994	4297	0.000	4590	0.994	4707	0.000
3400	1.000			3850	1.000			4190	1.000			4600	1.000		

Fig. 127. continued

Kenyon and Fernandez-Castro - 1987

Classification of M stars.

GENERAL INFORMATION

AUTHORS	S. J. Kenyon and T. Fernandez-Castro
TELESCOPE	2.9m (reflector), KPNO
DETECTOR	dual-beam intensified Reticon scanner
MAIN ARTICLE	Kenyon, S. J., Fernandez-Castro, T. 1987, AJ 93, 938

SYSTEM DESCRIPTION

BANDS DESCRIPTION [163]

band	λ_{peak} (Å)	bandpass (Å)	feature (Å)
613	6125	30	continuum
618	6180	30	TiO
637	6370	30	continuum
703	7025	30	continuum
710	7100	30	TiO
740	7400	30	continuum
786	7865	30	VO
805	8050	30	continuum

Square bands obtained from direct measurement on fluxed spectra.

SYSTEM ANALYSIS

COLOR INDICES AND PARAMETERS [163]

$[TiO]_1 = -2.5\log[F_{618} / (F_{613} + 0.22\,(F_{637} - F_{613})]$: measures the strength of the TiO absorption band at 6180 Å .

$[TiO]_2 = -2.5\log(F_{710} / [F_{703} + 0.2\,(F_{740} - F_{703})]$: measures the strength of the TiO absorption band at 7100 Å .

$[VO] = -2.5\log(F_{787} / [F_{740} + 0.29\,(F_{805} - F_{740})]$: measures the strength of the VO absorption band at 7865 Å .

$[Na\,I] = -2.5\log[F_{819} / F_{805} + 0.6\,(F_{840} - F_{805})]$: measures the Na I doublet at 8181-95 Å .

If T denotes the spectral type ($T = -6$ at K0, $T = 0$ at M0, $T = +6$ at M6), than the following relations hold true for giants and supergiants:

$$T = 1.75 + 9.31\,[TiO]_1$$

$$T = 1.83 + 10.37\,[TiO]_2 - 3.28\,[TiO]_2^2$$

$$T = 0.74 + 19.3\,[VO] - 17.22[VO]_2^2$$

Fig. 128. The photometric system Kenyon and Fernandez-Castro – 1987

ψ(25) - Mendoza - 1987

Intensity of the HeI 10830 A line.

GENERAL INFORMATION

AUTHORS	E. V. Mendoza
TELESCOPE	1.5m and 0.84m (reectors), OAN San Pedro Martir, Mexico
DETECTOR	RCA 7102 (S-1 cathode)
MAIN ARTICLE	Mendoza, E.V. 1987, Rev.Mex.Astron.Astrophys. 14, 385

SYSTEM DESCRIPTION

BANDS DESCRIPTION [210]

band	λ_{peak} (A)	FWHM (A)
a	10771.5	31
b	10832.5	25
c	10893.0	28

Interference lters.

A set of 89 stars of spectral types from O to M denes the system [210].

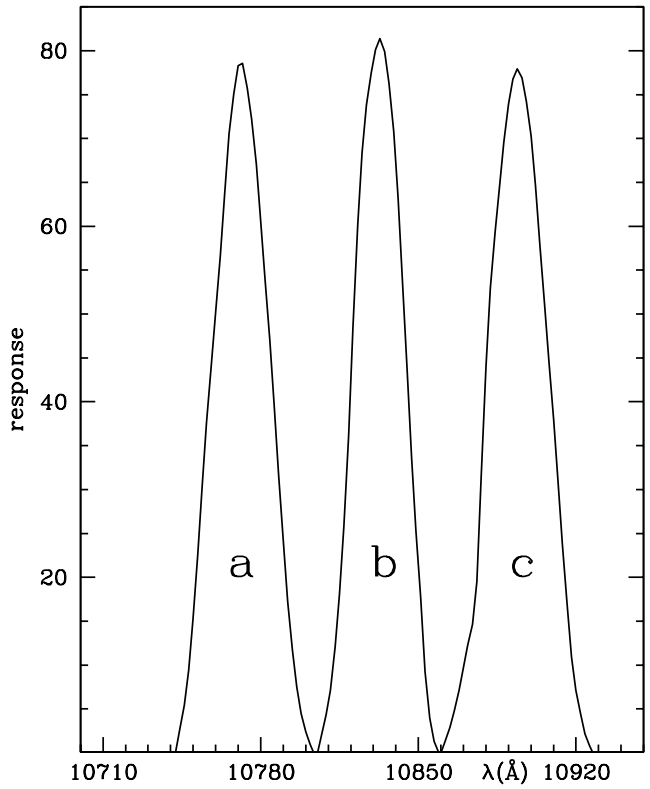
SYSTEM ANALYSIS

REDDENING-FREE PARAMETERS [210]

$\psi(25) = 0.167 + b - 0.5(a + c)$: intensity of HeI 10830 A. Stars with no HeI 10830 A absorption have ψ(25) = 0.00

TRANSMISSION CURVES

As derived from Fig 1 of [210].



a		*b*		*c*	
λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ
10742	0.0	10805	0.0	10860	0.0
10745	3.4	10808	3.4	10865	3.4
10747	6.9	10811	6.9	10868	6.9
10750	13.7	10814	13.7	10873	13.7
10753	26.8	10816	22.7	10876	20.6
10757	41.9	10820	39.8	10879	35.7
10761	52.2	10822	55.6	10882	52.9
10764	63.9	10825	67.3	10886	64.9
10767	72.1	10828	75.9	10890	73.1
10768	75.5	10830	79.0	10891	75.9
10771	79.0	10833	81.4	10894	77.9
10774	75.5	10836	79.0	10897	75.5
10777	70.7	10837	75.5	10901	69.0
10780	60.4	10841	64.5	10906	52.5
10783	49.1	10845	43.9	10909	41.5
10786	39.8	10848	28.2	10913	26.8
10789	26.8	10852	15.1	10917	12.7
10793	15.2	10854	6.9	10919	8.6
10796	6.9	10855	3.4	10921	6.2
10799	3.4	10859	0.0	10923	3.4
10804	0.0			10927	0.0

Fig. 129. The photometric system $\psi(25)$ – Mendoza – 1987

VJHKLL'M - Bessell and Brett - 1988

Homogenization of infrared systems.

GENERAL INFORMATION

AUTHORS M. S. Bessell and J. M. Brett
MAIN ARTICLE Bessell, M.S., Brett, J.M. 1988, PASP 100, 1134

SYSTEM DESCRIPTION

BANDS DESCRIPTION [34]		ABSOLUTE CALIBRATION (#) [34]	
band	λ_{eff} (μm) (#)	F_λ (W cm^{-2} μm^{-1})	F_ν (W cm^{-2} Hz^{-1})
V	0.545	3590 10^{-15}	3600 10^{-30}
J	1.22	312 10^{-15}	1570 10^{-30}
H	1.63	114 10^{-15}	1020 10^{-30}
K	2.19	39.4 10^{-15}	636 10^{-30}
L	3.45	6.99 10^{-15}	281 10^{-30}
L'	3.80	4.83 10^{-15}	235 10^{-30}
M	4.75	2.04 10^{-15}	154 10^{-30}

(#) Calculated for a 0.03 mag star from Dreiling and Bell (1980) ApJ 241, 736 model of α Lyr.

ZERO POINT: α Lyr has colors equal to 0.00 [34]

SYSTEM ANALYSIS

REDDENING RATIOS [34]

$E(V-K) = 2.78\,E(B-V)$ $E(J-H) = 0.37\,E(B-V)$ $E(H-K) = 0.19\,E(B-V)$

$E(K-L) = 0.15\,E(B-V)$ $E(K-M) = 0.24\,E(B-V)$ $A(K) = 0.34\,E(B-V)$

RELATIONS WITH OTHER SYSTEMS [34]

JHKL SAAO - Glass - 1973

$(V-K)$	=	$-0.005 + (V-K)_{SAAO}$
$(J-K)$	=	$-0.005 + (J-K)_{SAAO}$
$(H-K)$	=	$-0.021 + (H-K)_{SAAO}$
$(J-H)$	=	$0.016 + (J-H)_{SAAO}$
$(K-L)$	=	$(K-L)_{SAAO}$

UBVRI(JHKLMN) - Johnson - 1965

$(V-K)$	=	$0.01 + 0.993\,(V-K)_J$
$(J-K)$	=	$0.01 + 0.99\,(J-K)_J$
$(H-K)$	$\approx$	$0.01 + 0.91\,(H-K)_J$
$(J-H)$	=	$-0.004 + 1.01\,(J-H)_J$
$(K-L)$	=	$-0.03 + (K-L)_J$

VJHKLM ESO - Engels *et al* - 1981

$(V-K)$	=	$0.015 + (V-K)_{ESO}$
$(J-K)$	=	$-0.010 + 1.025\,(J-K)_{ESO}$
$(H-K)$	=	$0.005 + 0.87\,(H-K)_{ESO}$
$(J-H)$	=	$-0.028 + 1.105\,(J-H)_{ESO}$
$(K-L)$	=	$-0.03 + (K-L)_{ESO}$

JHKL MSO - Jones and Hyland - 1982

$(V-K)$	=	$-0.012 + 0.997\,(V-K)_{MSO}$
$(J-K)$	=	$0.010 + 1.008\,(J-K)_{MSO}$
$(H-K)$	=	$-0.007 + 0.97\,(H-K)_{MSO}$
$(J-H)$	=	$0.017 + 1.016\,(J-H)_{MSO}$
$(K-L)$	=	$-0.02 + (K-L)_{MSO}$

Fig. 130. The photometric system *VJHKLL'M* – Bessell and Brett – 1988

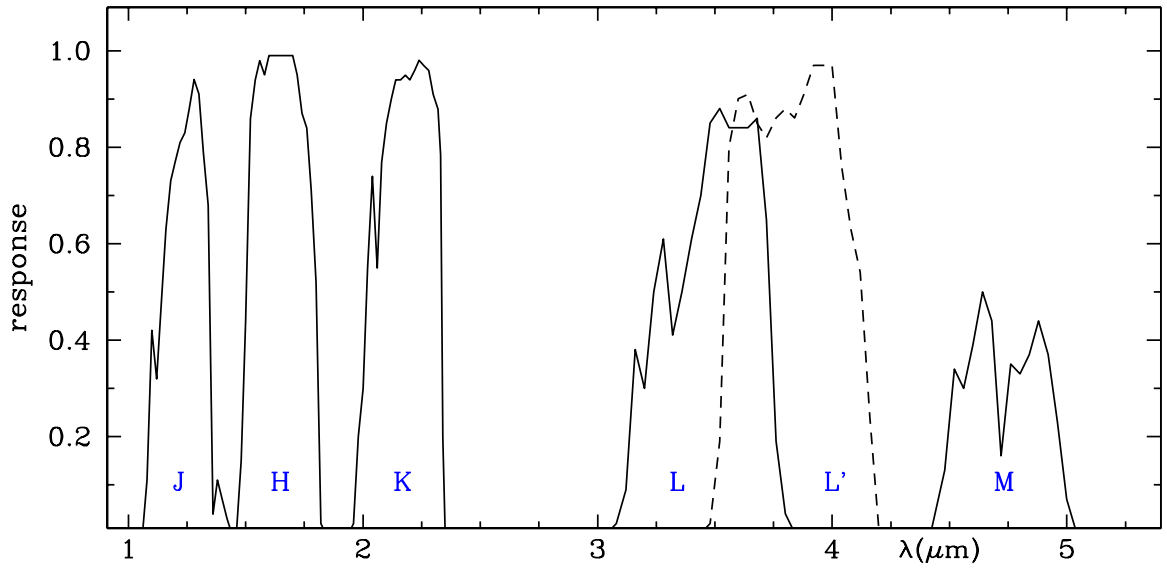
JHKL CTIO - Elias *et al* - 1982

$(V-K)$	=	$-0.02 + 1.001\,(V-K)_{CTIO}$
$(J-K)$	=	$-0.002 + 1.086\,(J-K)_{CTIO}$
$(J-H)$	=	$0.002 + 1.098\,(J-H)_{CTIO}$
$(K-L)$	=	$(K-L)_{CTIO}$
$(H-K)$	=	$1.03\,(H-K)_{CTIO}$

JHKL' AAO - Allen and Cragg - 1983

$(V-K)$	=	$1.002\,(V-K)_{AAO}$
$(J-K)$	=	$0.974\,(J-K)_{AAO}$
$(H-K)$	=	$-0.003 + 0.98\,(H-K)_{AAO}$
$(J-H)$	=	$0.005 + 0.963\,(J-H)_{AAO}$
$(K-L')$	=	$(K-L')_{AAO}$

TRANSMISSION CURVES [34]



J		*H*		*K*				*L*		*L'*		*M*	
λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ
1.040	0.00	1.460	0.00	1.940	0.00	2.380	0.75	3.040	0.00	3.440	0.00	4.440	0.00
1.060	0.02	1.480	0.15	1.960	0.12	2.400	0.64	3.080	0.02	3.480	0.02	4.480	0.13
1.080	0.11	1.500	0.44	1.980	0.20	2.440	0.10	3.120	0.09	3.520	0.19	4.520	0.34
1.100	0.42	1.520	0.86	2.000	0.30	2.480	0.00	3.160	0.38	3.560	0.80	4.560	0.30
1.120	0.32	1.540	0.94	2.020	0.55			3.200	0.30	3.600	0.90	4.600	0.39
1.140	0.47	1.560	0.98	2.040	0.74			3.240	0.50	3.640	0.91	4.640	0.50
1.160	0.63	1.580	0.95	2.060	0.55			3.280	0.61	3.680	0.85	4.680	0.44
1.180	0.73	1.600	0.99	2.080	0.77			3.320	0.41	3.720	0.82	4.720	0.16
1.200	0.77	1.620	0.99	2.100	0.85			3.360	0.50	3.760	0.86	4.760	0.35
1.220	0.81	1.640	0.99	2.120	0.90			3.400	0.61	3.800	0.88	4.800	0.33
1.240	0.83	1.660	0.99	2.140	0.94			3.440	0.70	3.840	0.86	4.840	0.37
1.260	0.88	1.680	0.99	2.160	0.94			3.480	0.85	3.880	0.91	4.880	0.44
1.280	0.94	1.700	0.99	2.180	0.95			3.520	0.88	3.920	0.97	4.920	0.37
1.300	0.91	1.720	0.95	2.200	0.94			3.560	0.84	3.960	0.97	4.960	0.23
1.320	0.79	1.740	0.87	2.220	0.96			3.600	0.84	4.000	0.97	5.000	0.07
1.340	0.68	1.760	0.84	2.240	0.98			3.640	0.84	4.040	0.76	5.040	0.03
1.360	0.04	1.780	0.71	2.260	0.97			3.680	0.86	4.080	0.63	5.080	0.00
1.380	0.11	1.800	0.52	2.280	0.96			3.720	0.65	4.120	0.54		
1.400	0.07	1.820	0.02	2.300	0.91			3.760	0.19	4.160	0.24		
1.420	0.03	1.840	0.00	2.320	0.88			3.800	0.04	4.200	0.00		
1.440	0.00			2.340	0.84			3.840	0.00				

The original table in [34] appears wrongly formatted.

Fig. 130. continued

77 81 - Cook and Aaronson - 1989

Intermediate-band photometry of M stars.

GENERAL INFORMATION

AUTHORS	K. H. Cook and M. Aaronson
TELESCOPE	0.4m (reflector), KPNO
DETECTOR	RCA 31034A (refrigerated)
MAIN ARTICLE	Cook, K.H., Aaronson, M. 1989, AJ 97, 923

SYSTEM DESCRIPTION

BANDS DESCRIPTION [73]

band	λ_c (Å)	FWHM (Å)
77	7752	284
81	8104	365

Interference filters by Spectro-Optics.

ZERO POINT: *(77–81)* = 0.00 for unreddened A0 stars. [73]

SYSTEM ANALYSIS

COLOR INDICES AND PARAMETERS [73]

77 : measures the TiO band at 7750 Å .

81 : measures CN bands around 8100 Å .

If M indicates the spectal type ($M = 0$ at M0, $M = 5$ at M5 ,etc..) then the following relations hold for stars later than M0.5:

(77–81) = 0.099 + 0.053 M : for giants.

(77–81) = 0.180 + 0.043 M : for dwarfs.

RELATIONS WITH OTHER SYSTEMS [73]

UBVRI(JHKLMN) - Johnson - 1965

$(V-I)$	=	1.180 + 3.796 *(77–81)*	for field giants with $(V-I) > 1.6$
$(V-I)$	=	1.196 + 3.761 *(77–81)*	for sample stars with $(V-I) > 1.6$

Fig. 131. The photometric system 77 81 – Cook and Aaronson – 1989

$g_4r_4i_4z_4$ - Schneider *et al.* - 1989

Photometry of quasars.

GENERAL INFORMATION

AUTHORS	D. P. Schneider, M. Schmidt J. E. Gunn,
TELESCOPE	5m Hale (reector), Palomar Obs.
DETECTOR	800 X 800 UV-ooded CCDs (Texas Instruments)
MAIN ARTICLE	Schneider, D. P., Schmidt, M., Gunn, J. E. 1989, AJ 98, 1507

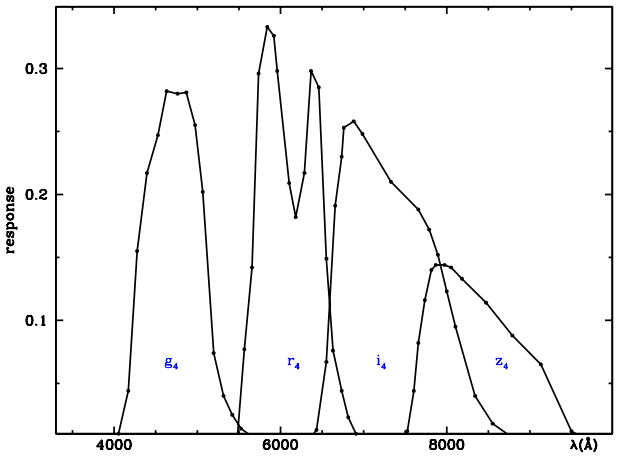
SYSTEM DESCRIPTION

BANDS DESCRIPTION [262]				
band	lter	λ_{eff} (A)	*WHM* (A)	λ_c (A)
g_4	Corion interference	5090	877	4690
r_4	3mm Schott BG610 + Balzer B1 short-pass	6610	870	6105
i_4			1375	7290
z_4			1385	8335

ZERO POINT: BD +17°4708 (F8 IV) is taken to have to have $g_4 = r_4 = i_4 = z_4 = 9.50$ mag. [262]

TRANSMISSION CURVES

As derived from Fig 3 of [262].



g4		*r4*		*i4*		*z4*	
λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ
3474	0.000	5474	0.000	6237	0.000	7421	0.000
3605	0.002	5566	0.077	6316	0.003	7526	0.012
3974	0.007	5658	0.142	6434	0.013	7605	0.044
4053	0.010	5737	0.296	6553	0.067	7658	0.082
4171	0.044	5842	0.333	6658	0.191	7737	0.116
4276	0.155	5921	0.326	6737	0.230	7816	0.140
4395	0.217	5961	0.298	6763	0.253	7868	0.144
4526	0.247	6105	0.209	6882	0.258	7974	0.144
4632	0.282	6184	0.182	6987	0.248	8053	0.142
4763	0.280	6289	0.217	7329	0.210	8184	0.133
4868	0.281	6368	0.298	7658	0.188	8474	0.114
4974	0.255	6461	0.285	7789	0.172	8789	0.088
5066	0.202	6553	0.149	7895	0.152	9132	0.065
5197	0.074	6632	0.076	8000	0.123	9500	0.012
5316	0.040	6737	0.044	8105	0.095	9842	0.000
5421	0.025	6816	0.023	8342	0.040		
5526	0.014	6908	0.010	8553	0.018		
5763	0.003	7000	0.007	8789	0.007		
5868	0.002	7079	0.004	9000	0.002		
6316	0.000	7263	0.007	9342	0.000		
		7368	0.000				

Fig. 132. The photometric system $g_4r_4i_4z_4$ – Schneider et al. – 1989

FOC HST - 1989

Photometric bands of the FOC camera on board HST.

GENERAL INFORMATIONS

TELESCOPE 2.4m Hubble Space Telescope
MAIN ARTICLE Nota, A., *et al* 1996, FOC Intrument Handbook, Version 7.0 (Baltimore, STScI)

SYSTEM DESCRIPTION

BANDS DESCRIPTION [235], pg. 25									
band	λ_0 (A)	FWHM (A)	ϒ	Notes	band	λ_0 (A)	FWHM (A)	ϒ	Notes
F/96					F/96				
F120M	1230	82	0.10		*F372M*	3710	406	0.73	
F130M	1280	88	0.10		*F430W*	3940	832	0.74	*B*
F140W	1370	298	0.21		*F410M*	4100	194	0.58	*b*
F140M	1400	178	0.08		*F437M*	4290	438	0.71	
F152M	1500	184	0.08		*F470M*	4710	212	0.79	*v*
F165W	1700	910	0.28		*F486N*	4870	34	0.63	*H*β
F170M	1760	184	0.18		*F502M*	4940	530	0.82	
F175W	1730	716	0.24		*F501N*	5010	74	0.68	[OIII]
F190M	2000	276	0.15		*F550M*	5460	188	0.77	*y*
F195W	2110	946	0.42		*F600M*	5800	410	0.80	
F210M	2156	214	0.18		*F630M*	6382	208	0.67	
F220W	2280	480	0.39		F/48				
F231M	2330	228	0.18		*F140W*	1320	300	0.20	
F253M	2550	236	0.18		*F150W*	1400	628	0.23	
F275W	2770	594	0.40		*F175W*	1730	678	0.18	
F278M	2800	316	0.26		*F195W*	2110	1076	0.36	
F307M	3080	328	0.26		*F220W*	2250	480	0.36	
F320W	3360	844	0.89		*F275W*	2750	656	0.29	
F342W	3410	702	0.81	*U*	*F342W*	3400	706	0.83	*U*
F346M	3480	434	0.58	*u*	*F430W*	3950	938	0.75	*B*

The long-pass lters (*F130LP, F370LP, F480LP* for the f/96 mode and *F130LP, F180LP, F305LP* for the f/48 mode) are not listed.

TRANSMISSION CURVES [235]

To save space the transmission proles of the bands are plotted but not tabulated. The proles can be obtained in tabular form via STSDAS (inside Iraf) or from the ADPS *www* site.

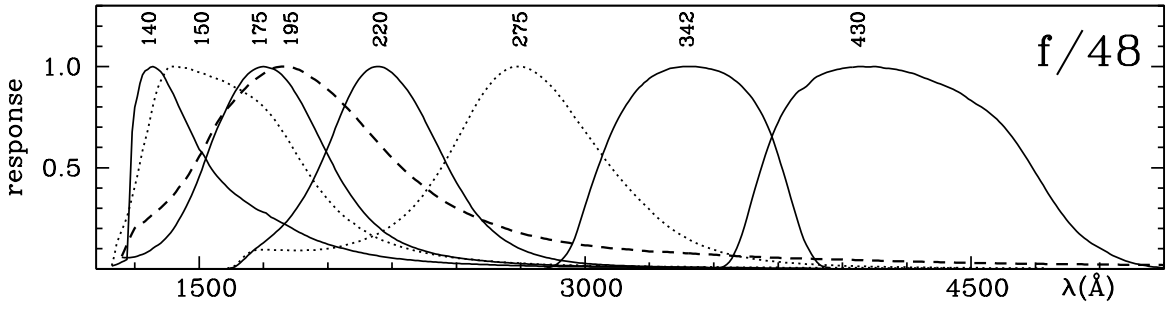


Fig. 133. The photometric system FOC HST – 1990

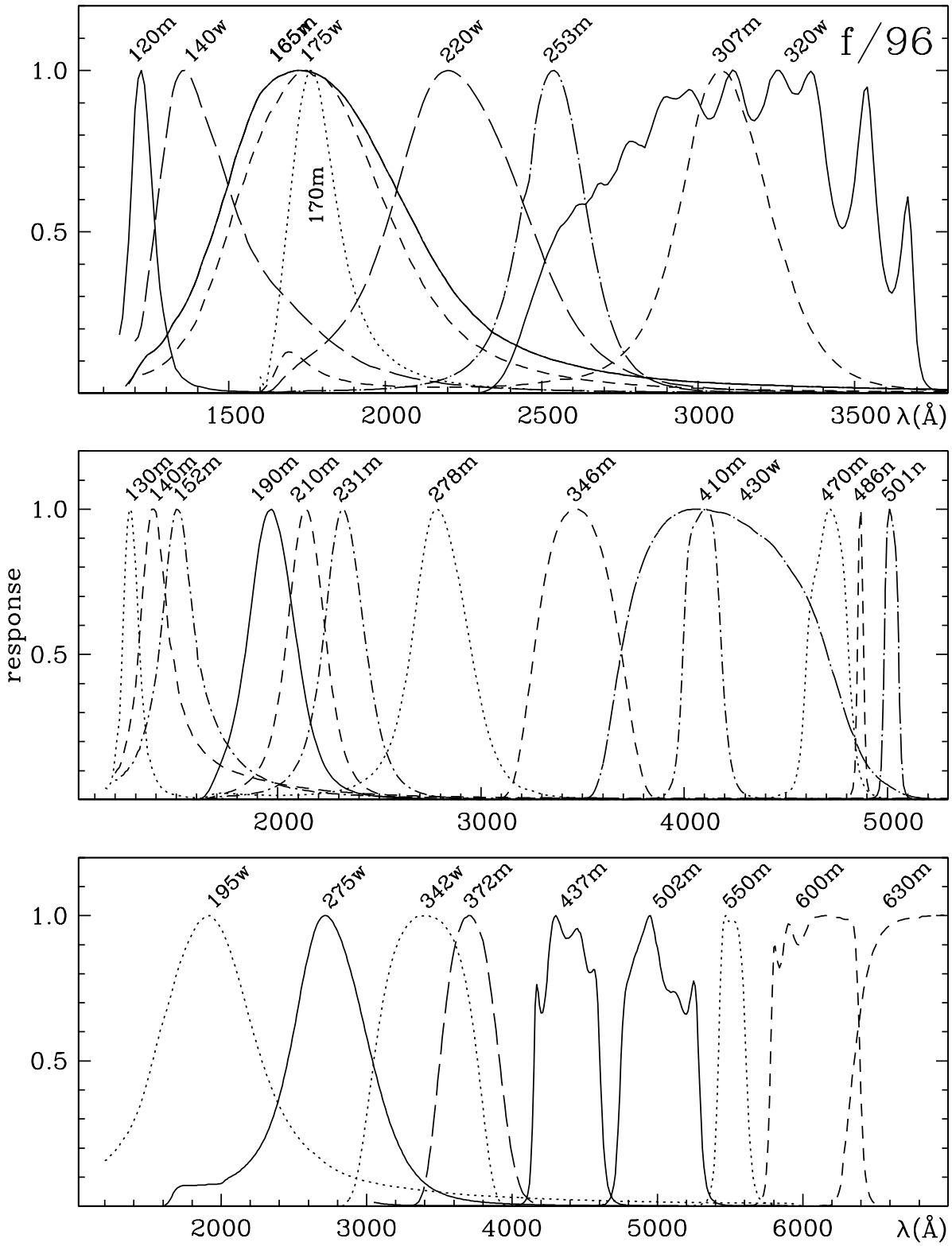


Fig. 133. continued

WFPC1 HST - 1989

Photometric bands of the Wide Field and Planetary Camera 1 on the Hubble Space Telescope.

GENERAL INFORMATION

TELESCOPE	2.4m Hubble Space Telescope
DETECTOR	Texas Intrument CCD
MAIN ARTICLE	HST Manuals

SYSTEM DESCRIPTION

BANDS DESCRIPTION [90]

band	λ_0 (A)	FWHM (A)	band	λ_0 (A)	FWHM (A)	band	λ_0 (A)	FWHM (A)
122M	1185	160	*492M*	4913	505	*658N*	6576	15
157W	1445	270	*502N*	5015	25	*664N*	6630	165
194W	1880	430	*517N*	5180	110	*673N*	6718	40
230W	2300	400	*547M*	5459	630	*675W*	6721	1300
284W	2795	450	*555W*	5471	1500	*702W*	6989	2000
336W	3374	480	*569W*	5631	1120	*718M*	7173	760
368M	3690	280	*588N*	5877	40	*791W*	7953	1865
375N	3740	100	*606W*	5937	2275	*814W*	8221	2400
413M	4131	300	*622W*	6180	1340	*875M*	8769	755
437N	4366	20	*631N*	6305	25	*889N*	8885	45
439W	4375	635	*648M*	6476	495	*1042M*	10172	275
469N	4688	25	*656N*	6559	15	*1083N*	10840	100
487N	4868	30						

The long-pass lters (*F725LP, F785LP, F850LP*) are not listed.

SYSTEM ANALYSIS

RELATIONS WITH OTHER SYSTEMS [90]

UBVRI(JHKLMN) - Johnson - 1965, *RI* - Cousins - 1976

$(B-V)_{Johnson}$	=	0.995 ($\pm$0.025) ($439W-555W$)
$(V-I)_{Cousins}$	=	0.89 ($\pm$0.01) ($555W-785LP$)

TRANSMISSION CURVES

To save space the transmission proles of the bands are plotted but not tabulated. The proles can be obtained in tabular form via STSDAS (inside Iraf) or from the ADPS *www* site.

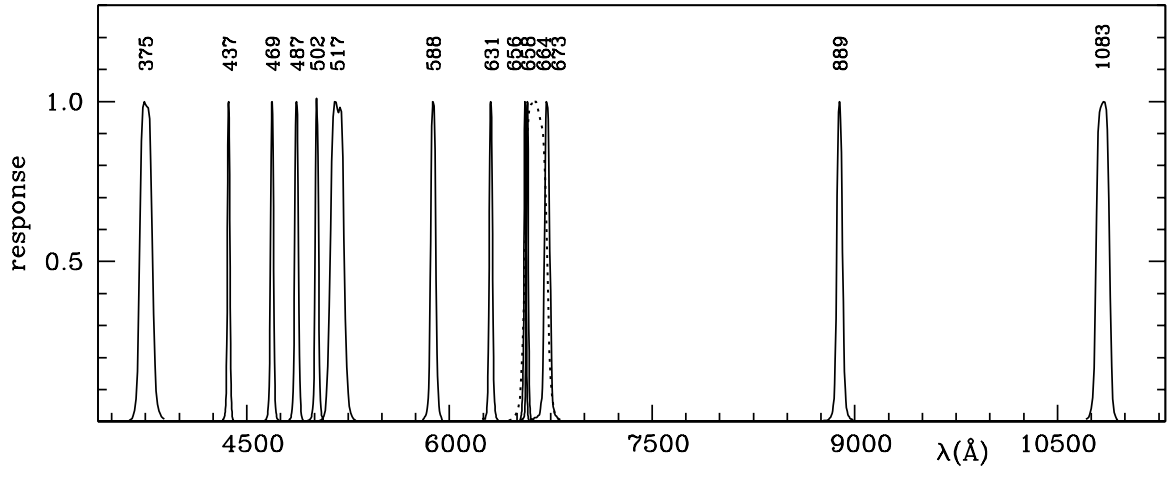


Fig. 134. The photometric system WFPC1 HST – 1989

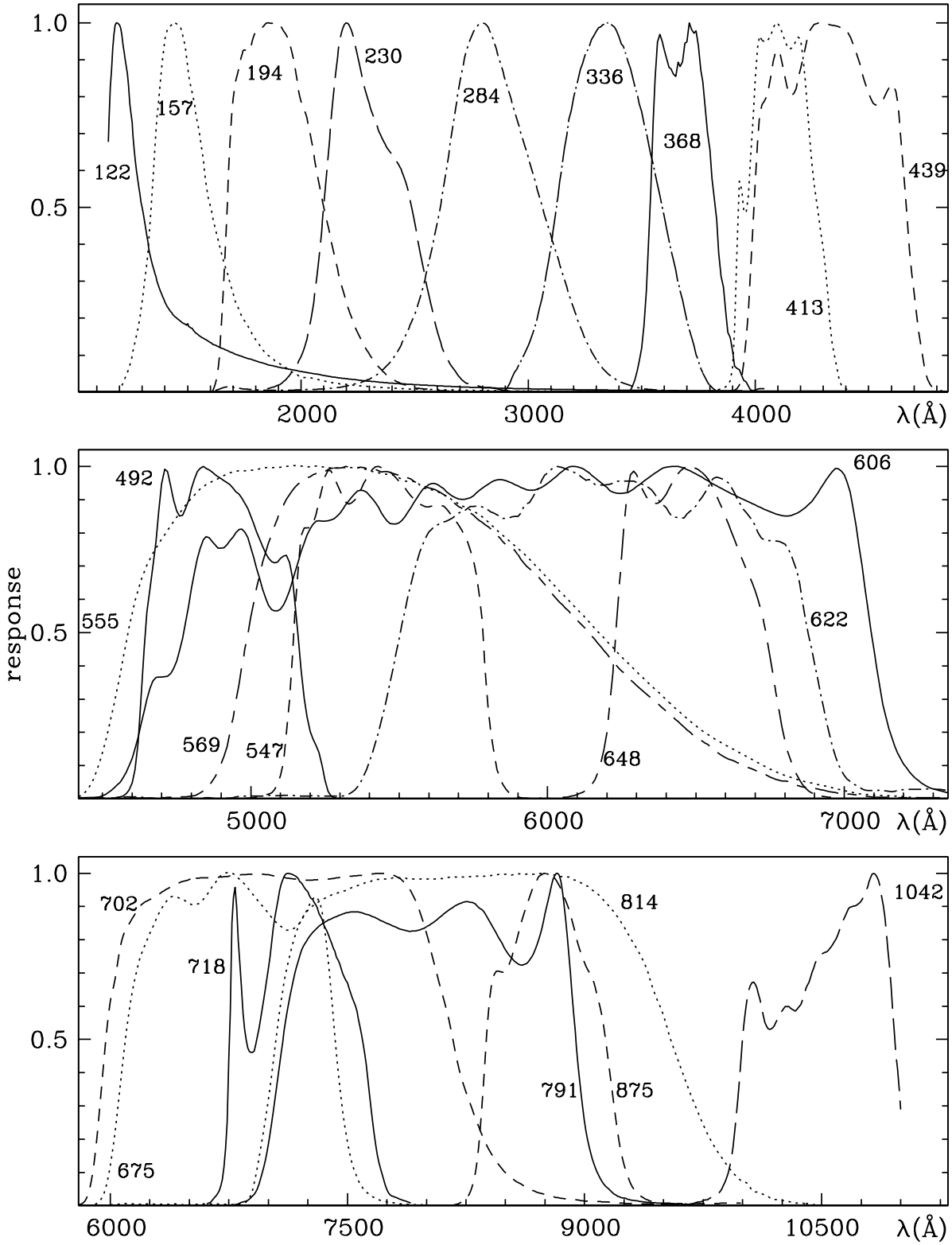


Fig. 134. continued

Hipparcos - 1989

Photometric bands of the Hipparcos-Tycho mission.

GENERAL INFORMATION

TELESCOPE	0.29m (reector)
DETECTOR	Hipparcos: image dissector tube, (S-20 cathode)
	Tycho: photomultiplier (Bi−alkali cathode)
MAIN ARTICLE	Hipparcos and Tycho catalogues 1997, ESA pub SP-1200, Volume 1, pg. 39

SYSTEM DESCRIPTION

BANDS DESCRIPTION [141], pg. 42

band	λ_{peak} (A)	*WHM (A)*	λ_c (A)
B_T	4350	710	4190
H_p	4525	2220	5045
V_T	5050	950	5230

ZERO POINT: $H_p = B_T = V_T = 0.00$ for stars with $V_{Johnson} = 0$ and $(B-V) = 0$. [141], pg. 58

SYSTEM ANALYSIS

RELATIONS WITH OTHER SYSTEMS [141], pg. 57

UBV - Johnson and Morgan - 1953

$$V_{Johnson} = V_{Tycho} - 0.090\,(B-V)_{Tycho} \quad \text{for } -0.2 < (B-V)_{Tycho} < 1.8$$

$$(B-V)_{Johnson} = 0.850\,(B-V)_{Tycho} \quad \text{for } -0.2 < (B-V)_{Tycho} < 1.8$$

TRANSMISSION CURVES [141], pg. 42

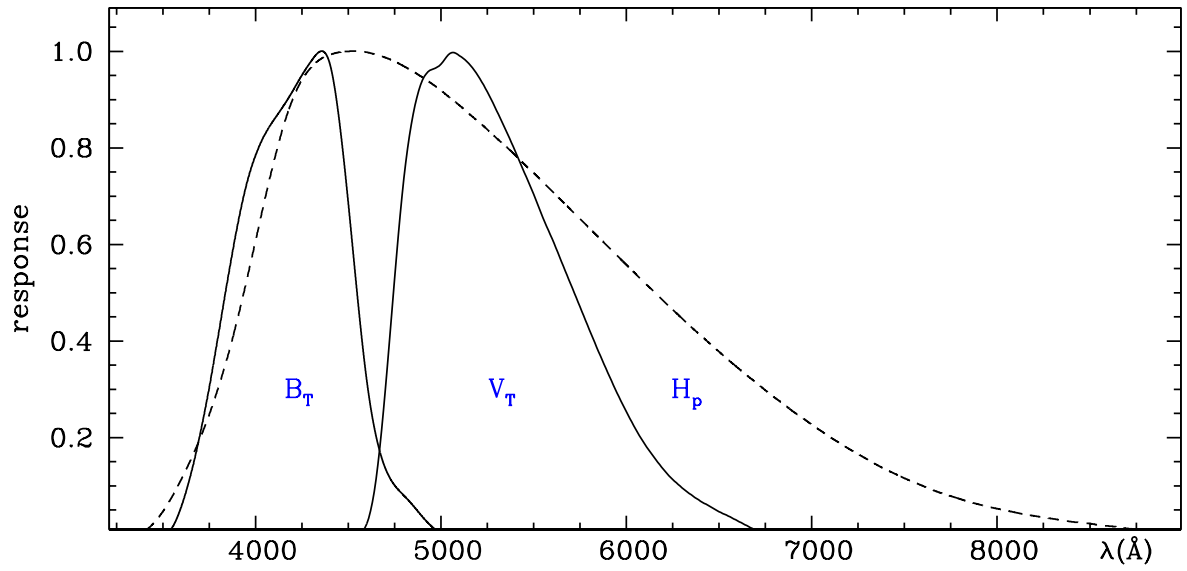


Fig. 135. The photometric system Hipparcos – 1989

H_p						B_T		V_T	
λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ
3350	0.000	5600	0.710	7850	0.067	3500	0.000	4550	0.000
3400	0.006	5650	0.691	7900	0.062	3550	0.014	4600	0.022
3450	0.023	5700	0.672	7950	0.057	3600	0.058	4650	0.115
3500	0.047	5750	0.653	8000	0.053	3650	0.123	4700	0.301
3550	0.078	5800	0.634	8050	0.049	3700	0.206	4750	0.530
3600	0.114	5850	0.615	8100	0.045	3750	0.305	4800	0.737
3650	0.154	5900	0.596	8150	0.041	3800	0.416	4850	0.870
3700	0.198	5950	0.577	8200	0.038	3850	0.530	4900	0.940
3750	0.248	6000	0.558	8250	0.035	3900	0.636	4950	0.973
3800	0.305	6050	0.539	8300	0.032	3950	0.724	5000	0.990
3850	0.369	6100	0.520	8350	0.029	4000	0.787	5050	0.996
3900	0.442	6150	0.502	8400	0.026	4050	0.830	5100	0.991
3950	0.523	6200	0.483	8450	0.024	4100	0.861	5150	0.975
4000	0.608	6250	0.465	8500	0.022	4150	0.889	5200	0.949
4050	0.694	6300	0.447	8550	0.019	4200	0.920	5250	0.916
4100	0.774	6350	0.429	8600	0.017	4250	0.953	5300	0.878
4150	0.845	6400	0.412	8650	0.015	4300	0.982	5350	0.837
4200	0.901	6450	0.395	8700	0.012	4350	1.002	5400	0.794
4250	0.941	6500	0.378	8750	0.010	4400	0.976	5450	0.749
4300	0.967	6550	0.361	8800	0.007	4450	0.861	5500	0.704
4350	0.984	6600	0.345	8850	0.005	4500	0.685	5550	0.658
4400	0.993	6650	0.329	8900	0.002	4550	0.489	5600	0.612
4450	0.998	6700	0.314	8950	0.000	4600	0.317	5650	0.565
4500	1.000	6750	0.298			4650	0.202	5700	0.518
4550	1.000	6800	0.283			4700	0.136	5750	0.471
4600	0.998	6850	0.269			4750	0.101	5800	0.424
4650	0.993	6900	0.254			4800	0.080	5850	0.379
4700	0.987	6950	0.241			4850	0.059	5900	0.335
4750	0.979	7000	0.227			4900	0.036	5950	0.293
4800	0.969	7050	0.214			4950	0.016	6000	0.254
4850	0.958	7100	0.201			5000	0.003	6050	0.218
4900	0.946	7150	0.189			5050	0.000	6100	0.186
4950	0.933	7200	0.177					6150	0.159
5000	0.919	7250	0.166					6200	0.135
5050	0.903	7300	0.155					6250	0.114
5100	0.888	7350	0.144					6300	0.097
5150	0.871	7400	0.134					6350	0.082
5200	0.855	7450	0.125					6400	0.069
5250	0.838	7500	0.116					6450	0.058
5300	0.820	7550	0.108					6500	0.047
5350	0.803	7600	0.100					6550	0.038
5400	0.785	7650	0.092					6600	0.028
5450	0.766	7700	0.085					6650	0.018
5500	0.748	7750	0.079					6700	0.008
5550	0.729	7800	0.073					6750	0.000

Fig. 135. continued

UBVRI - Bessell - 1990

Standarization of the optical band profiles of the *UBVRI(JHKLMN) - Johnson - 1965* and *RI - Cousins - 1976* systems.

GENERAL INFORMATION

AUTHORS	M. B. Bessell
MAIN ARTICLE	Bessell, M. S. 1990, PASP 102, 1181

SYSTEM DESCRIPTION

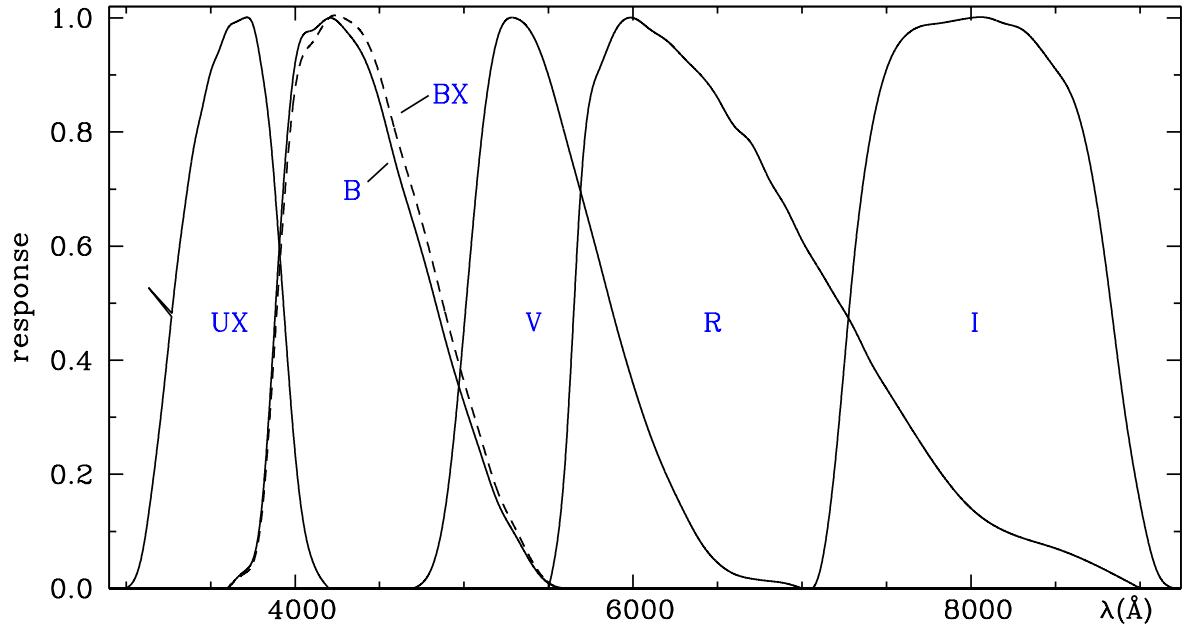
Recommended filters to match the standard system with various photomultipliers and CCDs.

BANDS DESCRIPTION [32]	
band	filters
glass filters for S-11 / S-4 phototubes	
U	1mm UG1 + (2mm WG320 with UV tubes)
B	2mm GG395 + 1mm BG12
V	3mm GG515
glass filters for GaAs / S-20R phototubes	
U	1mm UG1 + 1mm BG39
B	2mm GG385 + 1mm BG12 + 1mm BG 18
V	2mm GG495 + 1mm BG18 + (1mm BG 38 GaAs)
R	2mm OG570 + 2mm KG3
I	3mm RG9
glass filters for UV coated CCD	
U	1mm UG1 + 1mm BG39 + (3mm WG305 fill)
B	2mm GG385 + 1mm BG12 + 2mm BG39
V	2mm GG495 + 3mm BG39
R	2mm OG570 + 3mm KG3
I	3mm RG9 + (2mm WG305 fill)
BJ	2mm BG28 + 3mm BG39
Z	3mm RG1000

Fig. 136. The photometric system *UBVRI* – Bessell – 1990

TRANSMISSION CURVES [32]

UX and *BX* should be used for computing standard *(U-B)* color.
B, V, R, I should be used for the other colors and magnitudes. [32]



UX		*BX*		*B*		*V*		*R*		*I*	
λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ
3000	0.000	3600	0.000	3600	0.000	4700	0.000	5500	0.00	7000	0.000
3050	0.016	3700	0.026	3700	0.030	4800	0.030	5600	0.23	7100	0.024
3100	0.068	3800	0.120	3800	0.134	4900	0.163	5700	0.74	7200	0.232
3150	0.167	3900	0.523	3900	0.567	5000	0.458	5800	0.91	7300	0.555
3200	0.287	4000	0.875	4000	0.920	5100	0.780	5900	0.98	7400	0.785
3250	0.423	4100	0.956	4100	0.978	5200	0.967	6000	1.00	7500	0.910
3300	0.560	4200	1.000	4200	1.000	5300	1.000	6100	0.98	7600	0.965
3350	0.673	4300	0.998	4300	0.978	5400	0.973	6200	0.96	7700	0.985
3400	0.772	4400	0.972	4400	0.935	5500	0.898	6300	0.93	7800	0.990
3450	0.841	4500	0.901	4500	0.853	5600	0.792	6400	0.90	7900	0.995
3500	0.905	4600	0.793	4600	0.740	5700	0.684	6500	0.86	8000	1.000
3550	0.943	4700	0.694	4700	0.640	5800	0.574	6600	0.81	8100	1.000
3600	0.981	4800	0.587	4800	0.536	5900	0.461	6700	0.78	8200	0.990
3650	0.993	4900	0.470	4900	0.424	6000	0.359	6800	0.72	8300	0.980
3700	1.000	5000	0.362	5000	0.325	6100	0.270	6900	0.67	8400	0.950
3750	0.989	5100	0.263	5100	0.235	6200	0.197	7000	0.61	8500	0.910
3800	0.916	5200	0.169	5200	0.150	6300	0.135	7100	0.56	8600	0.860
3850	0.804	5300	0.107	5300	0.095	6400	0.081	7200	0.51	8700	0.750
3900	0.625	5400	0.049	5400	0.043	6500	0.045	7300	0.46	8800	0.560
3950	0.423	5500	0.010	5500	0.009	6600	0.025	7400	0.40	8900	0.330
4000	0.238	5600	0.000	5600	0.000	6700	0.017	7500	0.35	9000	0.150
4050	0.114					6800	0.013	8000	0.14	9100	0.030
4100	0.051					6900	0.009	8500	0.03	9200	0.000
4150	0.019					7000	0.000	9000	0.00		
4200	0.000										

Fig. 136. continued

JHKL SAAO - Carter - 1990

Definition of the SAAO infrared photometry by fixing the standard stars.

GENERAL INFORMATION

AUTHORS	B. S. Carter
TELESCOPE	0.75m (reflector), Sutherland
DETECTOR	InSb
MAIN ARTICLE	Carter, B. S. 1990, MNRAS 242, 1

SYSTEM DESCRIPTION

ZERO POINT: The basis of the South African Astronomical Observatory infrared photometric system are defined through colors and magnitudes of 230 standard stars.
The zero-points are set by 25 standards in the B1-A7 spectral-type range. [62]

SYSTEM ANALYSIS

RELATIONS WITH OTHER SYSTEMS [62]

VJHKLM ESO - Engels *et al* - 1981

$$J_{ESO} = J - 0.062\,(J-K) + 0.053$$
$$H_{ESO} = H + 0.059\,(J-K) + 0.034$$
$$K_{ESO} = K + 0.031$$
$$L_{ESO} = L + 0.013\,(J-K) - 0.019$$

JHKL MSO - Jones and Hyland - 1982

$$J_{MSSO} = J - 0.055\,(J-K) + 0.005$$
$$H_{MSSO} = H + 0.001\,(J-K) + 0.024$$
$$K_{MSSO} = K - 0.014\,(J-K) + 0.009$$

JHKL CTIO - Elias *et al* - 1982

$$J_{CTIO} = J - 0.134\,(J-K) - 0.001$$
$$H_{CTIO} = H - 0.022\,(J-K) + 0.004$$
$$K_{CTIO} = K - 0.027\,(J-K) - 0.003$$
$$L_{CTIO} = L - 0.023\,(J-K) - 0.002$$

JHKL' AAO - Allen and Cragg - 1983

$$J_{AAO} = J + 0.005\,(J-K) + 0.013$$
$$H_{AAO} = H + 0.015\,(J-K) + 0.024$$
$$K_{AAO} = K + 0.006\,(J-K) + 0.012$$
$$L_{AAO} = L - 0.051\,(J-K) + 0.018$$

Fig. 137. The photometric system *JHKL* SAAO – Carter – 1990

Guide Star Catalogue - Lasker *et al.* - 1990

Input catalogue for HST pointing and guiding.

GENERAL INFORMATION

AUTHORS	B. M. Lasker, C. R. Sturch, B. J. McClean, J. L. Russell, H. Jenkner and M. M. Shara
TELESCOPE	1.2m UK Schmidt, Siding Spring Obs. ; 1.2m Oschin Schmidt, Palomar Obs.
DETECTOR	Kodak IIIa-J, IIa-D photographic plates
MAIN ARTICLE	Lasker, B. M., Sturch, C.R., McClean, B. J., Russell, J. L., Jenkner, H., and Shara, M. M. 1990, AJ 99, 2019

SYSTEM DESCRIPTION

BANDS DESCRIPTION [184]

band	plate	filter	λ_0 (Å)	FWHM (Å)
J (#)	IIIaJ	GG395	4500	1500
D	IIaD	none	5610	3200
V495	IIaD	GG495	5650	1400
V12	IIaD	W12	5760	1140

(#) For UK Schmidt plates (southern emisphere).

Fig. 138. The photometric system Guide Star Catalogue – Lasker et al. – 1990

UIT - 1990

Photometric bands of the Ultraviolet Imaging Telescope o w on Astro-1 (1990) and Astro-2 (1995) missions (Shuttle).

GENERAL INFORMATION

TELESCOPE	0.38m (reector)
DETECTOR	Cs_2Te cathode (Near-UV camera), CsI cathode (Far-UV camera) + Kodak IIa-O lms.
MAIN ARTICLE	Stecher *et al.* 1992, ApJ 395, L1

SYSTEM DESCRIPTION

BANDS DESCRIPTION [281]					
band	λ_{eff} (A)	λ_{peak} (A)	$\Delta\lambda$(#)	*WHM (A)*	λ_c (A)
Near UV camera					
A1	2488	2763	1147	1015	2175
A2	1892	1853	412	295	1685
A3(##)	1964	1899	173		
A4	2205	2184	244	165	1955
A5	2558	2508	456	335	2265
Far UV camera					
B1	1521	1443	354	383	1510
B2	1359	1266	160		
B3	1445	1385	256		
B4(##)	1585	1523, 1676	129		
B5	1615	1518	225	245	1600
B6	1496	1477	404	413	1505

(#) Equivalent width. (##) Saddle-shaped bands.

TRANSMISSION CURVES

As derived from Fig 1 of [281]

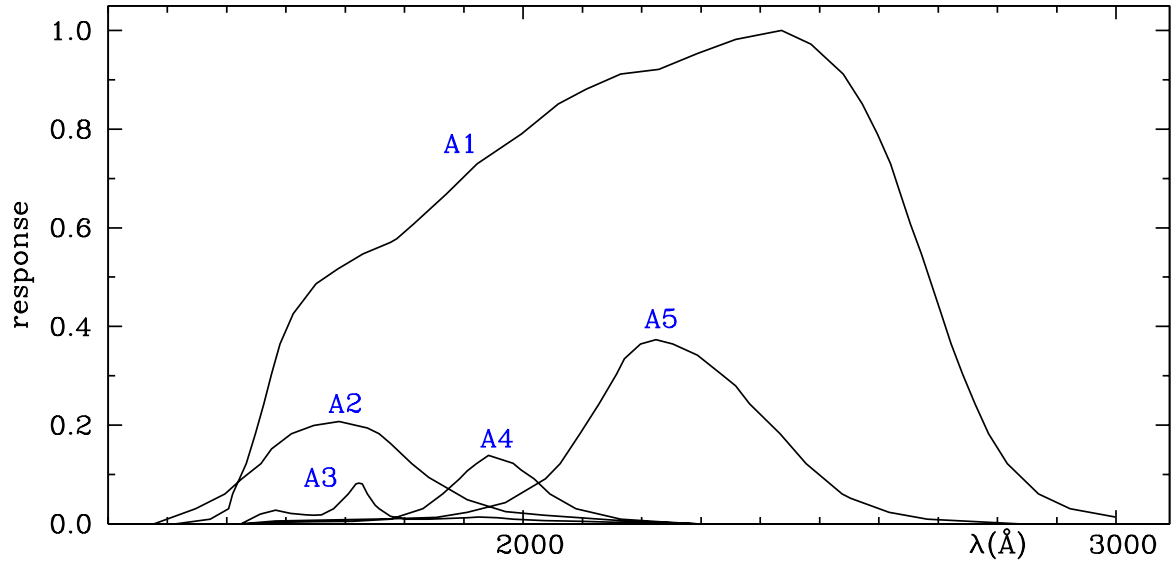
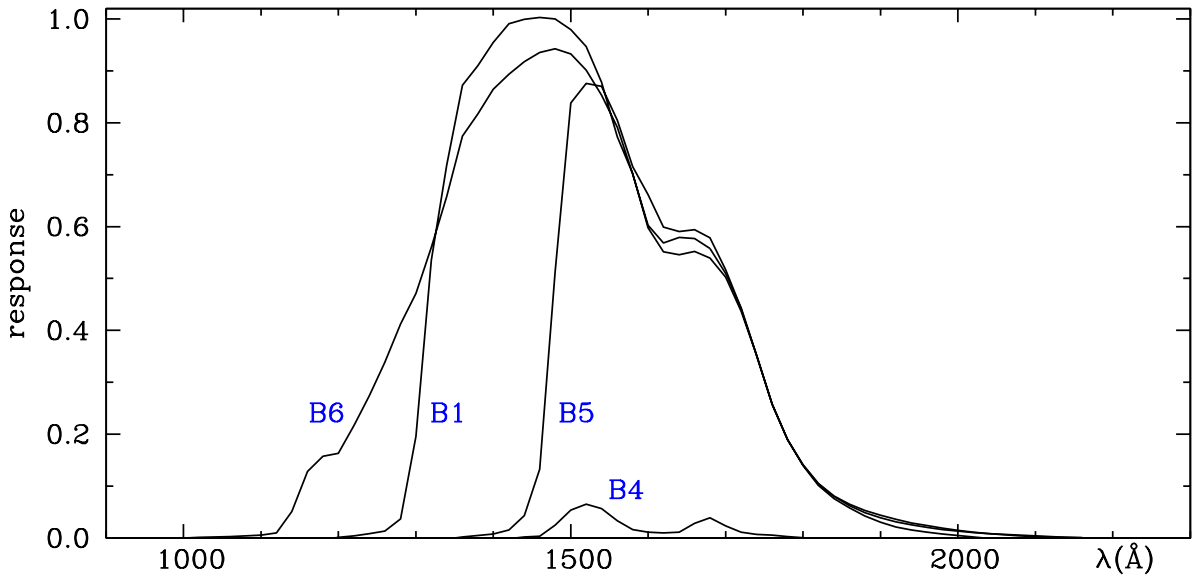


Fig. 139. The photometric system UIT – 1990



A1		*A2*		*A3*		*A4*		*A5*		*B1*		*B4*		*B5*		*B6*	
λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ
1414	0.000	1378	0.000	1524	0.000	1530	0.000	1524	0.000	1194	0.000	1427	0.000	1349	0.000	1000	0.000
1472	0.009	1448	0.030	1556	0.019	1582	0.003	1582	0.005	1265	0.015	1453	0.003	1388	0.006	1065	0.003
1503	0.030	1497	0.061	1582	0.027	1647	0.004	1647	0.007	1278	0.030	1479	0.021	1414	0.012	1116	0.009
1510	0.061	1525	0.091	1608	0.021	1712	0.005	1712	0.009	1285	0.061	1483	0.030	1433	0.030	1135	0.030
1533	0.122	1558	0.122	1634	0.018	1776	0.009	1776	0.010	1291	0.122	1492	0.046	1449	0.061	1142	0.061
1549	0.182	1576	0.152	1647	0.017	1831	0.030	1854	0.013	1298	0.182	1511	0.061	1459	0.122	1158	0.122
1563	0.243	1609	0.182	1660	0.018	1864	0.061	1906	0.023	1304	0.243	1524	0.066	1466	0.243	1175	0.155
1576	0.304	1647	0.199	1680	0.030	1893	0.091	1970	0.043	1307	0.304	1536	0.061	1472	0.365	1194	0.158
1590	0.365	1690	0.207	1705	0.061	1906	0.108	2038	0.091	1310	0.365	1550	0.046	1479	0.486	1210	0.182
1612	0.426	1737	0.195	1718	0.081	1921	0.122	2062	0.122	1313	0.426	1563	0.030	1485	0.608	1228	0.243
1651	0.486	1757	0.182	1723	0.082	1942	0.139	2096	0.182	1317	0.486	1582	0.015	1492	0.729	1251	0.304
1687	0.517	1776	0.163	1728	0.081	1983	0.123	2128	0.243	1321	0.547	1614	0.010	1498	0.821	1266	0.365
1730	0.547	1812	0.122	1737	0.061	1996	0.109	2158	0.304	1329	0.608	1647	0.015	1502	0.851	1285	0.426
1776	0.570	1841	0.094	1750	0.038	2018	0.091	2171	0.334	1334	0.669	1662	0.030	1523	0.874	1304	0.486
1787	0.578	1906	0.049	1757	0.030	2045	0.061	2198	0.365	1342	0.729	1677	0.040	1550	0.851	1317	0.547
1815	0.608	1970	0.024	1776	0.015	2089	0.030	2224	0.373	1348	0.790	1692	0.030	1563	0.790	1342	0.669
1871	0.669	2035	0.017	1802	0.009	2164	0.009	2252	0.365	1356	0.851	1712	0.015	1576	0.729	1349	0.729
1922	0.729	2164	0.006	1841	0.009	2229	0.004	2294	0.342	1382	0.912	1750	0.006	1598	0.669	1369	0.790
1997	0.790	2294	0.000	1873	0.011	2294	0.000	2334	0.304	1408	0.973	1802	0.000	1616	0.608	1393	0.851
2060	0.851			1906	0.012			2358	0.280	1445	1.000			1640	0.591	1411	0.881
2106	0.881			1925	0.013			2382	0.243	1485	0.997			1660	0.594	1435	0.912
2164	0.912			1957	0.012			2433	0.182	1505	0.973			1680	0.578	1479	0.942
2229	0.921			1983	0.009			2477	0.122	1524	0.942			1692	0.547	1515	0.912
2294	0.953			2035	0.006			2538	0.061	1536	0.912			1708	0.486	1541	0.851
2358	0.982			2100	0.005			2552	0.052	1543	0.851			1724	0.426	1560	0.790
2436	1.000			2164	0.003			2617	0.023	1556	0.790			1737	0.365	1572	0.729
2485	0.973			2294	0.000			2682	0.009	1569	0.729			1750	0.304	1589	0.669
2539	0.912							2830	0.000	1589	0.669			1763	0.243	1599	0.608
2572	0.851									1598	0.608			1783	0.182	1631	0.576
2598	0.790									1608	0.578			1810	0.122	1655	0.579
2620	0.729									1621	0.550			1867	0.061	1673	0.568
2636	0.669									1656	0.553			1906	0.041	1686	0.547
2653	0.608									1669	0.547			1970	0.021	1708	0.486
2671	0.547									1695	0.517			2035	0.009	1724	0.426
2688	0.486									1705	0.486			2164	0.000	1737	0.365
2705	0.426									1723	0.426					1750	0.304
2722	0.365									1737	0.365					1763	0.243
2741	0.304									1750	0.304					1783	0.182
2762	0.243									1763	0.243					1810	0.122
2785	0.182									1783	0.182					1841	0.079
2816	0.122									1809	0.122					1906	0.036
2869	0.061									1856	0.061					1970	0.018
2922	0.030									1906	0.027					2035	0.009
2999	0.013									1970	0.009					2164	0.000
										2035	0.000						

Fig. 139. continued

JHKL'M ESO - Bouchet *et al.* - 1991

Infrared photometry at ESO.

GENERAL INFORMATION

AUTHORS	P. Bouchet, J. Manfroid and F.X. Schmider
TELESCOPE	1m, 2.2m and 3.6m (reflectors), ESO (La Silla)
DETECTOR	InSb
MAIN ARTICLE	Bouchet, P., Manfroid, J., Schmider, F.X. 1991, A&AS 91, 409

SYSTEM DESCRIPTION

BANDS DESCRIPTION [38]				ABSOLUTE CALIBRATION (#) [38]	
band	λ_0 (μm)	λ_{eff} (μm)(##)	FWHM (μm)	$F_{\lambda,0}$ (W m^{-2} nm^{-1})	$F_{\nu,0}$ (Jy)
J	1.228	1.210	0.190	3.44 10^{-12}	1680
H	1.651	1.635	0.269	1.21 10^{-12}	1070
K	2.216	2.197	0.360	4.12 10^{-13}	664
L'	3.771	3.740	0.580	5.58 10^{-14}	260
M	4.772	4.759	0.381	2.21 10^{-14}	167

(#) Fluxes for a 0.00 mag star.

(##) For a 11400 K blackbody.

ZERO POINT: HR 3314 (A0 V) is taken to have:
$V = 3.89$, $(V-K) = -0.05$, $(J-K) = -0.01$, $(H-K) = -0.01$, $(H-L') = 0.00$, $(K-M) = 0.00$ [38]

SYSTEM ANALYSIS

RELATIONS WITH OTHER SYSTEMS [48]

MSSO - Thomas *et al* - 1973

for 15 stars in common:

$$J_{ESO} - J_{MSSO} = 0.007\ (\pm 0.006) + 0.003\ (\pm 0.027)\ (J-K)_{MSSO}$$
$$H_{ESO} - H_{MSSO} = 0.008\ (\pm 0.005) - 0.013\ (\pm 0.024)\ (J-K)_{MSSO}$$
$$K_{ESO} - K_{MSSO} = -0.002\ (\pm 0.005) - 0.021\ (\pm 0.024)\ (J-K)_{MSSO}$$

JHKL CTIO - Elias *et al*- 1982

for 15 stars in common:

$$J_{ESO} - J_{CTIO} = 0.006\ (\pm 0.008) + 0.134\ (\pm 0.033)\ (J-K)_{CTIO}$$
$$H_{ESO} - H_{CTIO} = 0.028\ (\pm 0.007) + 0.025\ (\pm 0.027)\ (J-K)_{CTIO}$$
$$K_{ESO} - K_{CTIO} = 0.019\ (\pm 0.005) - 0.010\ (\pm 0.018)\ (J-K)_{CTIO}$$
$$L_{ESO} - L_{CTIO} = 0.015\ (\pm 0.007) + 0.011\ (\pm 0.025)\ (J-K)_{CTIO}$$

Fig. 140. The photometric system *JHKL'M* ESO – Bouchet et al. – 1991

JHKL' AAO - Allen and Cragg - 1983

for 22 stars in common:

$$
\begin{aligned}
J_{ESO} - J_{AAO} &= -0.003\ (\pm 0.006) - 0.017\ (\pm 0.018)\ (J-K)_{AAO} \\
H_{ESO} - H_{AAO} &= 0.009\ (\pm 0.005) + 0.006\ (\pm 0.018)\ (J-K)_{AAO} \\
K_{ESO} - K_{AAO} &= 0.001\ (\pm 0.005) - 0.002\ (\pm 0.017)\ (J-K)_{AAO} \\
L_{ESO} - L_{AAO} &= -0.014\ (\pm 0.007) - 0.042\ (\pm 0.023)\ (J-K)_{AAO}
\end{aligned}
$$

JHKL SAAO - Carter - 1990

for 119 stars in common:

$$
\begin{aligned}
J_{ESO} - J_{SAAO} &= 0.014\ (\pm 0.006) - 0.024\ (\pm 0.011)\ (J-K)_{SAAO} \\
H_{ESO} - H_{SAAO} &= 0.034\ (\pm 0.005) + 0.013\ (\pm 0.009)\ (J-K)_{SAAO} \\
K_{ESO} - K_{SAAO} &= 0.019\ (\pm 0.005) - 0.015\ (\pm 0.009)\ (J-K)_{SAAO} \\
L_{ESO} - L_{SAAO} &= -0.002\ (\pm 0.004) - 0.002\ (\pm 0.008)\ (J-K)_{SAAO}
\end{aligned}
$$

Fig. 140. continued

POSS II - Reid *et al.* - 1991

Second photographic Palomar Observatory Sky Survey.

GENERAL INFORMATION

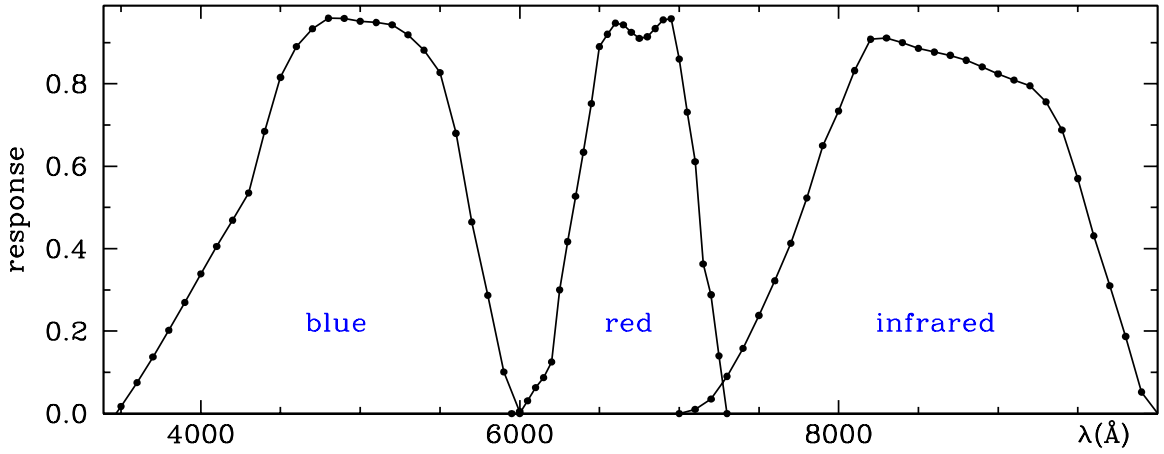
AUTHORS	I. N. Reid, C. Brewer, R. J. Brucato, W. R. McKinley, A. Maury, D. Mendenhall, J. R. Mould, J. Mueller, G. Neugebauer, J. Phinney, W. L. W. Sargent, J. Schombert and R. Thicksten
TELESCOPE	1.2m Oschin Schmidt, Palomar Obs.; 1.2m UK Schmidt; 1.0m Schmidt, ESO
DETECTOR	Kodak IIIa-J, IIIa-F, and IV-N photographic plates (hypersensitized)
MAIN ARTICLE	Reid, I. N., *et al.* 1991, PASP 103, 661

SYSTEM DESCRIPTION

BANDS DESCRIPTION [250]					
plate	emulsion	lter	λ_{eff} (A)	*WHM* (A)	λ_c (A)
blue	IIIaJ	GG 395	4800	1430	4970
red	IIIaF	RG 610	6500	770	6720
infrared	IV-N	RG 9	8500	1760	8660

TRANSMISSION CURVES

As derived from Fig 1 of [250].



blue				*red*				*infrared*					
λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ
3400	0.000	4800	0.959	5950	0.000	6650	0.943	7000	0.000	8400	0.900	9800	0.187
3500	0.017	4900	0.959	6000	0.000	6700	0.925	7100	0.010	8500	0.886	9900	0.052
3600	0.075	5000	0.952	6050	0.031	6750	0.910	7200	0.035	8600	0.877	10000	0.000
3700	0.137	5100	0.949	6100	0.063	6800	0.914	7300	0.090	8700	0.869		
3800	0.202	5200	0.943	6150	0.087	6850	0.934	7400	0.158	8800	0.857		
3900	0.269	5300	0.919	6200	0.125	6900	0.955	7500	0.238	8900	0.841		
4000	0.339	5400	0.881	6250	0.300	6950	0.958	7600	0.322	9000	0.824		
4100	0.405	5500	0.827	6300	0.417	7000	0.860	7700	0.413	9100	0.809		
4200	0.469	5600	0.680	6350	0.527	7050	0.731	7800	0.523	9200	0.795		
4300	0.535	5700	0.465	6400	0.634	7100	0.611	7900	0.650	9300	0.756		
4400	0.684	5800	0.287	6450	0.752	7150	0.363	8000	0.734	9400	0.688		
4500	0.815	5900	0.101	6500	0.890	7200	0.288	8100	0.832	9500	0.570		
4600	0.890	6000	0.005	6550	0.920	7250	0.140	8200	0.908	9600	0.431		
4700	0.933			6600	0.947	7300	0.000	8300	0.911	9700	0.310		

Fig. 141. The photometric system POSS II – Reid et al. – 1991

CaII - Twarog *et al.* - 1991

A CaII-based metallicity index is added to the *uvbyH*β - *Strömgren and Crawford - 1956* system.

GENERAL INFORMATION

AUTHORS	B. J. Anthony-Twarog, J. Laird, D. Payne and B. A. Twarog
TELESCOPE	0.9m (reector), KPNO; 0.6m and 1.0m (reectors), CTIO
DETECTOR	1P21 (S-20 cathode, refrigerated)
MAIN ARTICLE	Anthony-Twarog, B.J., Laird, J.B., Payne, D., Twarog, B.A. 1991, AJ 101, 1902

SYSTEM DESCRIPTION

BANDS DESCRIPTION [10]				
band	λ_{eff} (A)	FWHM (A)	*WHM* (A)	λ_c (A)
Ca old	3959	≈ 90	79	3953
Ca new	3945	≈ 90	90	3949

Filters are appropriately blocked against red leaks.

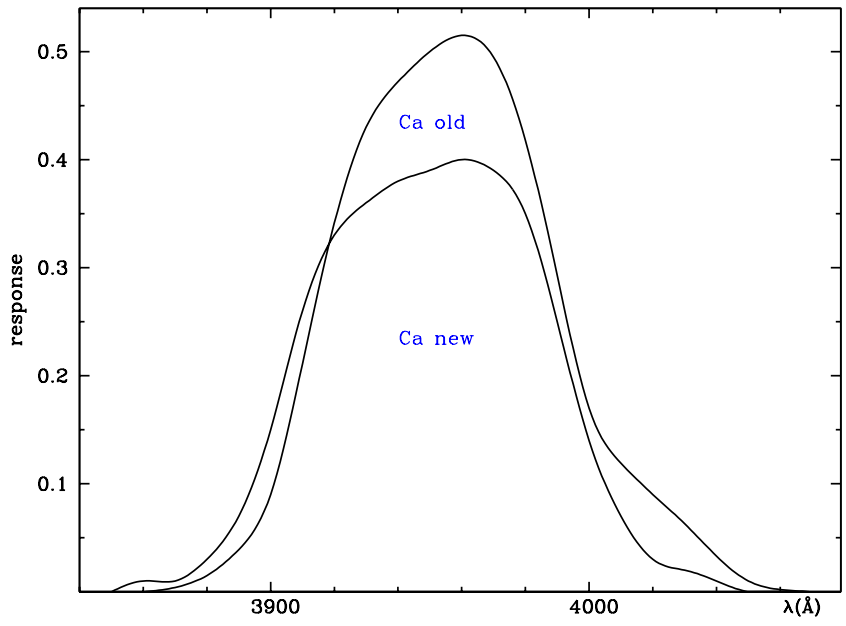
SYSTEM ANALYSIS

COLOR INDICES [10]

If *CaII* is the magnitude in the present system and *b, y* are from *uvbyH*β - *Strömgren and Crawford - 1956*:

$hk = (CaII - b) - (b - y)$

TRASMISSION CURVES [10]



Ca old		*Ca new*	
λ (A)	ϒ	λ (A)	ϒ
3850	0.000	3850	0.000
3860	0.000	3860	0.010
3870	0.004	3870	0.010
3880	0.015	3880	0.030
3890	0.039	3890	0.070
3900	0.090	3900	0.150
3910	0.211	3910	0.260
3920	0.341	3920	0.330
3930	0.430	3930	0.360
3940	0.472	3940	0.380
3950	0.500	3950	0.390
3960	0.515	3960	0.400
3970	0.495	3970	0.390
3980	0.418	3980	0.350
3990	0.293	3990	0.250
4000	0.170	4000	0.140
4010	0.119	4010	0.070
4020	0.090	4020	0.030
4030	0.063	4030	0.020
4040	0.033	4040	0.010
4050	0.010	4050	0.000
4060	0.002	4060	0.000
4070	0.000	4070	0.000

Fig. 142. The photometric system CaII – Twarog et al. – 1991

20 colors - Bastiaansen - 1992

Narrow band photometric system. Used to derive the interstellar extinction toward hot stars.

GENERAL INFORMATION

AUTHORS	P. A. Bastiaansen
TELESCOPE	0.50m (reflector), ESO (La Silla)
DETECTOR	340-520 nm range: EMI 6256B, (S-11 cathode, thermo-electrically cooled) 541-787 nm range: EMI 9558B, (S-20 cathode, refrigerated)
MAIN ARTICLE	Bastiaansen, P. A. 1992, A&AS 93, 449

SYSTEM DESCRIPTION

BANDS DESCRIPTION [23]

band	λ_0 (Å)	band-width (Å)	feature	band	λ_0 (Å)	band-width (Å)	feature
340	3402	42		*523*	5205	94	
350	3493	40		*543*	5407	100	HeII 5415
360	3600	52		*560*	5601	104	
378	3785	48		*582*	5821	98	HeI 5876
405	4038	46	Hδ, Hε, HeI 4026	*609*	6107	84	
418	4192	104	Hδ, HeII 4200	*637*	6400	114	Hα
438	4395	44	Hγ	*666*	6681	86	Hα, HeI 6687
451	4496	84	HeI 4471, HeII 4541	*710*	7102	92	HeI 7065
468	4708	96	Hβ, HeII 4686	*749*	7505	78	
502	4999	82	Hβ, HeI 4922, HeI 5015	*790*	7873	80	

TRANSMISSION CURVES

As derived from Fig 1 of [23].

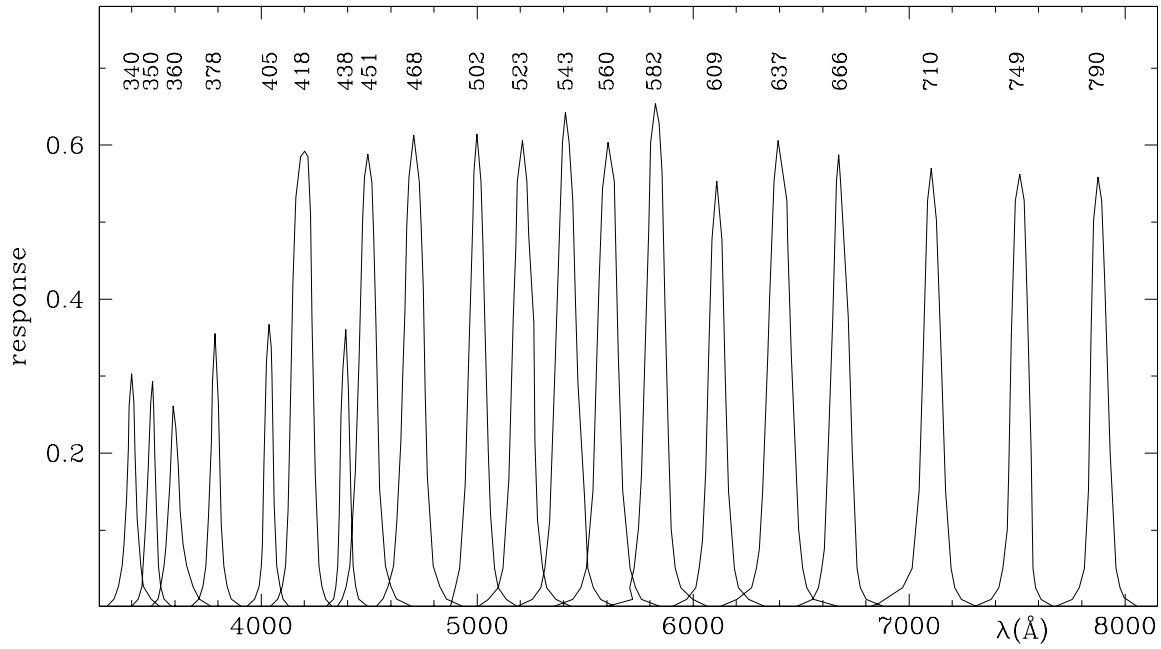


Fig. 143. The photometric system 20 colors – Bastiaansen – 1992

340		*350*		*360*		*378*		*405*		*418*		*438*	
λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ
3282	0.000	3396	0.000	3487	0.000	3672	0.000	3931	0.000	4039	0.000	4298	0.000
3318	0.005	3430	0.011	3522	0.011	3711	0.011	3969	0.011	4077	0.011	4336	0.011
3339	0.011	3447	0.027	3535	0.027	3730	0.027	3989	0.027	4097	0.027	4345	0.027
3356	0.027	3453	0.053	3550	0.053	3744	0.053	4000	0.053	4112	0.053	4354	0.053
3364	0.053	3465	0.136	3558	0.081	3755	0.106	4004	0.133	4124	0.170	4362	0.144
3376	0.114	3477	0.197	3577	0.125	3770	0.165	4011	0.245	4131	0.372	4370	0.285
3384	0.202	3488	0.258	3585	0.184	3774	0.266	4024	0.301	4146	0.511	4378	0.361
3389	0.266	3496	0.294	3593	0.234	3787	0.355	4037	0.338	4161	0.585	4392	0.309
3399	0.303	3502	0.266	3605	0.261	3801	0.293	4046	0.367	4183	0.592	4403	0.250
3410	0.261	3508	0.180	3616	0.219	3809	0.213	4049	0.319	4201	0.585	4415	0.117
3416	0.205	3513	0.106	3624	0.160	3816	0.116	4053	0.184	4217	0.532	4426	0.053
3426	0.139	3523	0.053	3638	0.077	3827	0.053	4060	0.082	4228	0.420	4438	0.027
3442	0.081	3535	0.027	3655	0.053	3841	0.027	4073	0.053	4236	0.213	4451	0.011
3454	0.053	3549	0.011	3683	0.027	3861	0.011	4087	0.027	4251	0.128	4495	0.000
3489	0.027	3588	0.000	3713	0.011	3911	0.000	4101	0.011	4266	0.053		
3510	0.011			3773	0.000			4131	0.000	4281	0.027		
3534	0.000									4298	0.011		

451		*468*		*502*		*523*		*543*		*560*		*582*	
λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ
4350	0.000	4530	0.000	4823	0.000	5000	0.000	5179	0.000	5347	0.000	5590	0.000
4374	0.011	4563	0.011	4876	0.010	5051	0.010	5256	0.010	5442	0.010	5702	0.010
4393	0.027	4588	0.027	4898	0.025	5098	0.025	5294	0.025	5481	0.025	5707	0.025
4411	0.053	4612	0.053	4918	0.050	5119	0.050	5313	0.050	5505	0.050	5727	0.050
4436	0.154	4628	0.170	4945	0.121	5146	0.113	5336	0.143	5536	0.151	5747	0.101
4453	0.261	4647	0.282	4959	0.201	5168	0.214	5359	0.292	5552	0.327	5760	0.226
4470	0.370	4656	0.415	4980	0.362	5179	0.370	5382	0.402	5565	0.468	5774	0.392
4478	0.481	4665	0.497	4985	0.478	5186	0.483	5394	0.528	5580	0.553	5794	0.566
4493	0.552	4674	0.553	4999	0.553	5209	0.553	5408	0.604	5605	0.604	5803	0.629
4513	0.588	4684	0.613	5018	0.615	5229	0.606	5426	0.642	5635	0.543	5825	0.654
4521	0.559	4706	0.559	5025	0.566	5239	0.553	5442	0.604	5641	0.427	5842	0.604
4530	0.505	4731	0.495	5036	0.503	5262	0.468	5454	0.503	5654	0.302	5856	0.493
4539	0.319	4740	0.383	5051	0.312	5267	0.377	5466	0.302	5674	0.151	5870	0.302
4548	0.176	4750	0.301	5061	0.158	5278	0.166	5496	0.111	5708	0.050	5884	0.171
4576	0.053	4760	0.215	5080	0.050	5303	0.050	5512	0.050	5733	0.025	5898	0.103
4600	0.027	4769	0.112	5098	0.025	5322	0.025	5537	0.025	5760	0.010	5918	0.050
4626	0.011	4797	0.053	5135	0.001	5365	0.010	5571	0.010	5856	0.000	5942	0.025
4702	0.000	4826	0.027	5189	0.000	5442	0.000	5641	0.000			5999	0.010
		4858	0.011									6073	0.000

609		*637*		*666*		*710*		*749*		*790*	
λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ
5898	0.000	6118	0.000	6472	0.000	6812	0.000	7296	0.000	7671	0.000
5970	0.010	6203	0.010	6553	0.010	6859	0.010	7379	0.010	7756	0.013
6013	0.025	6271	0.025	6581	0.025	6970	0.025	7415	0.025	7788	0.025
6028	0.050	6293	0.050	6596	0.050	7014	0.050	7435	0.050	7812	0.050
6043	0.151	6306	0.101	6607	0.201	7046	0.151	7455	0.201	7830	0.201
6058	0.302	6322	0.327	6628	0.377	7066	0.327	7462	0.402	7842	0.427
6073	0.478	6346	0.478	6646	0.553	7086	0.503	7473	0.528	7855	0.528
6088	0.553	6355	0.528	6664	0.587	7103	0.570	7492	0.562	7880	0.558
6109	0.478	6374	0.606	6673	0.553	7127	0.528	7512	0.528	7893	0.503
6133	0.327	6393	0.553	6682	0.377	7148	0.327	7533	0.352	7905	0.352
6148	0.176	6434	0.402	6719	0.226	7169	0.151	7547	0.176	7931	0.151
6164	0.085	6438	0.327	6737	0.075	7194	0.050	7565	0.101	7959	0.050
6192	0.050	6455	0.151	6759	0.050	7211	0.025	7575	0.050	7977	0.025
6210	0.025	6489	0.075	6774	0.025	7243	0.005	7586	0.025	7995	0.010
6258	0.010	6508	0.050	6802	0.010	7318	0.000	7612	0.010	8061	0.000
6338	0.000	6526	0.025	6888	0.000			7671	0.000		
		6558	0.010								

Fig. 143. continued

MACHO - 1992

MACHO Project photometric system.

GENERAL INFORMATION

TELESCOPE	1.27m (reector), Mt. Stromlo Obs.
DETECTOR	2048 X 2048 CCDs
MAIN ARTICLE	Bessell, M. S., Germany, L. M. 1999, PASP 111, 1421

SYSTEM DESCRIPTION

BANDS DESCRIPTION		
band	*WHM (A)*	λ_c (A)
B_{ma}	1350	5225
R_{ma}	1600	6950

SYSTEM ANALYSIS

REDDENING RATIOS [35]

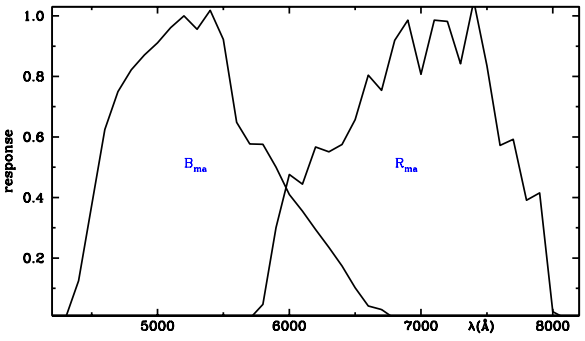
$E(B_{ma}-R_{ma}) \,/\, E(B-R)_{Cousins} = 1.01$ derived from Landolt's F stars.

RELATIONS WITH OTHER SYSTEMS

RI - Cousins - 1976 [35]

V	=	$B_{ma} - 0.18\,(B_{ma}-R_{ma})$	for $(B_{ma}-R_{ma}) < 1.0$
V	=	$B_{ma} - 0.07 - 0.10\,(B_{ma}-R_{ma})$	for $(B_{ma}-R_{ma}) > 1.0$
R	=	$R_{ma} + 0.19\,(B_{ma}-R_{ma})$	for $(B_{ma}-R_{ma}) < 1.0$
R	=	$R_{ma} - 0.07 + 0.26\,(B_{ma}-R_{ma})$	for $(B_{ma}-R_{ma}) > 1.0$

TRANSMISSION CURVES [35]



B_{ma}				R_{ma}			
λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ
4300	0.000	5600	0.648	5700	0.000	7000	0.807
4400	0.125	5700	0.577	5800	0.047	7100	0.986
4500	0.375	5800	0.576	5900	0.301	7200	0.982
4600	0.625	5900	0.500	6000	0.476	7300	0.842
4700	0.750	6000	0.410	6100	0.444	7400	1.049
4800	0.822	6100	0.355	6200	0.567	7500	0.835
4900	0.871	6200	0.294	6300	0.551	7600	0.572
5000	0.911	6300	0.235	6400	0.575	7700	0.592
5100	0.961	6400	0.174	6500	0.657	7800	0.391
5200	1.000	6500	0.102	6600	0.804	7900	0.415
5300	0.956	6600	0.042	6700	0.754	8000	0.023
5400	1.018	6700	0.030	6800	0.919	8100	0.000
5500	0.922	6800	0.000	6900	0.986		

Fig. 144. The photometric system MACHO – 1992

SCAS - Clark *et al.* - 1993

Taxonomy of asteroids.

GENERAL INFORMATION

AUTHORS	B. E. Clark, J. F. Bell, P. Fanale, and P. G. Lucey
TELESCOPE	2.3m IRTF, Mauna Kea Obs.
MAIN ARTICLE	Clark, B. E., Bell, J. F., Fanale, F. P., Lucey, P. G. Lun. Plan. Inst. 24, 299

SYSTEM DESCRIPTION

BANDS DESCRIPTION

band	*WHM* (μm)	λ_c (μm)
A	0.085	0.913
B	0.086	1.052
C	0.105	1.300
D	0.137	1.545
E	0.141	1.648
F	0.172	2.157
G	0.204	2.281

TRANSMISSION CURVES

As derived from Fig 1 of [68].

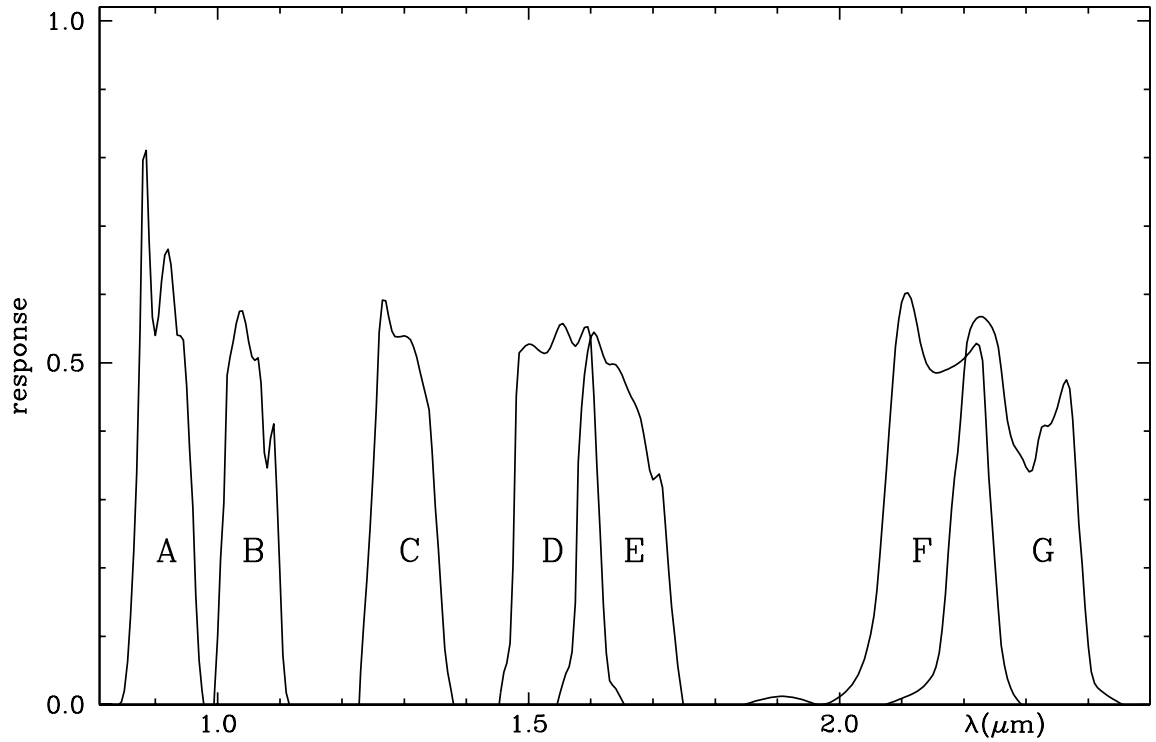


Fig. 145. The photometric system SCAS – Clark et al. – 1993

A		*B*		*C*		*D*		*E*		*F*		*G*	
λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ
0.791	0.000	0.994	0.000	1.227	0.000	1.453	0.000	1.546	0.000	1.846	0.000	2.074	0.000
0.842	0.000	1.000	0.101	1.233	0.101	1.461	0.050	1.562	0.050	1.887	0.010	2.110	0.013
0.854	0.050	1.004	0.201	1.242	0.201	1.471	0.101	1.572	0.101	1.907	0.012	2.147	0.039
0.858	0.101	1.010	0.302	1.248	0.302	1.475	0.201	1.576	0.201	1.928	0.010	2.165	0.111
0.864	0.201	1.012	0.402	1.254	0.402	1.477	0.302	1.578	0.302	1.948	0.005	2.173	0.201
0.868	0.302	1.018	0.503	1.258	0.503	1.479	0.402	1.583	0.402	1.968	0.000	2.181	0.302
0.872	0.402	1.039	0.578	1.278	0.553	1.481	0.492	1.593	0.503	1.988	0.005	2.194	0.402
0.874	0.503	1.059	0.503	1.288	0.538	1.483	0.513	1.605	0.545	2.009	0.018	2.202	0.503
0.876	0.603	1.071	0.452	1.315	0.525	1.501	0.528	1.623	0.503	2.033	0.050	2.212	0.553
0.878	0.724	1.075	0.367	1.335	0.452	1.534	0.520	1.639	0.497	2.049	0.101	2.228	0.568
0.892	0.613	1.085	0.392	1.343	0.402	1.554	0.558	1.664	0.452	2.064	0.201	2.244	0.553
0.913	0.643	1.093	0.362	1.349	0.302	1.576	0.525	1.684	0.402	2.072	0.302	2.258	0.503
0.929	0.603	1.095	0.302	1.357	0.201	1.599	0.543	1.700	0.329	2.080	0.402	2.265	0.452
0.933	0.553	1.099	0.201	1.363	0.101	1.603	0.503	1.714	0.322	2.088	0.503	2.273	0.402
0.947	0.513	1.104	0.101	1.369	0.050	1.607	0.402	1.725	0.201	2.120	0.575	2.293	0.362
0.953	0.402	1.116	0.000	1.380	0.000	1.613	0.302	1.735	0.101	2.131	0.528	2.313	0.352
0.959	0.302					1.617	0.201	1.741	0.050	2.165	0.487	2.323	0.402
0.963	0.201					1.623	0.101	1.749	0.000	2.202	0.508	2.334	0.407
0.968	0.101					1.627	0.050			2.216	0.524	2.354	0.447
0.972	0.050					1.633	0.030			2.230	0.503	2.376	0.402
0.978	0.000					1.654	0.000			2.232	0.482	2.382	0.302
										2.236	0.402	2.390	0.201
										2.242	0.302	2.399	0.101
										2.250	0.201	2.405	0.050
										2.258	0.101	2.415	0.025
										2.267	0.050	2.455	0.000
										2.293	0.000		

Fig. 145. continued

WFPC2 HST - 1993

Photometric bands of the Wide Field and Planetary Camera 2 on board HST.

GENERAL INFORMATION

TELESCOPE 2.4m Hubble Space Telescope
MAIN ARTICLE Biretta, J. A. *et al.* 1996, WFPC2 Instrument Handbook, Version 4.0 (Baltimore, STScI)

SYSTEM DESCRIPTION

BANDS DESCRIPTION [36], pg 37

band	λ_0 (Å)	λ_{peak} (Å)	FWHM (Å)	Υ_{peak} (%)	Notes	In WF/PC-1 (#)
F122M	1292	1240	263.5	18.9	Lyα	Y
F160AW	1471	1403	457.2	10.1	Woods A	
F160BW	1471	1403	457.2	10.1	Woods B	
F170W	1689	1667	434.9	30.3		
F185W	1907	1849	302.9	23.7		
F218W	2136	2091	355.9	21.3	Interstellar Feature	
F255W	2557	2483	408.2	15.5		
F300W	2924	2760	727.9	51.8	Wide U	
F336W	3327	3447	370.7	80.3	WFPC2 U, Strömgren *u*	Y
F343N	3430	3433	24.3	19.7	Ne V	
F375N	3736	3736	26.2	17.2	[OII] 3727 RS	Y
F380W	3934	3981	694.7	65.6		
F390N	3889	3886	45.3	37.8	CN	
F410M	4088	4098	146.9	70.1	Strömgren *v*	
F437N	4369	4368	25.2	52.0	[OIII]	Y
F439W	4292	4176	464.4	67.3	WFPC2 B	Y
F450W	4445	5061	925.0	92.4	Wide B	
F467M	4682	4728	171.5	75.3	Strömgren *b*	
F469N	4695	4699	24.9	52.4	He II	Y
F487N	4865	4863	25.8	58.6	H β	Y
F502N	5012	5009	26.8	63.8	[OIII]	Y
F547M	5454	5361	486.6	91.3	Strömgren *y*, but wider	Y
F555W	5252	5151	1222.5	94.8	WFPC2 V	Y
F569W	5554	5309	965.8	94.2		Y
F588N	5892	5895	49.1	91.5	He I & Na I (NaD)	Y

continues

Fig. 146. The photometric system WFPC2 HST – 1993

BANDS DESCRIPTION [36], pg 37						
band	λ_0 (A)	λ_{peak} (A)	FWHM (A)	Υ_{peak} (%)	Notes	In WF/PC-1 (#)
F606W	5843	6183	1578.7	98.3	Wide V	Y
F622W	6157	6034	935.4	95.6		Y
F631N	6306	6302	30.8	85.7	[OI]	Y
F656N	6562	6561	22.0	77.9	Hα	Y
F658N	6590	6592	28.5	79.7	[NII]	Y
F673N	6733	6733	47.2	87.0	[SII]	Y
F675W	6735	6796	889.4	97.9	WFPC2 R	Y
F702W	6997	6539	1480.7	98.5	Wide R	Y
F791W	8006	8081	1304.2	99.7		Y
F814W	8269	8386	1758.0	98.4	WFPC2 I	Y
F953N	9546	9528	52.5	95.6	[SiIII]	
F1042M	10443	10139	610.9	95.2		Y

(#) It is indicated if an equivalent lter was available in the Wide Field and Planetary Camera 1.

The long-pass lters (*F130LP, F165LP, F785LP, F850LP*), the Quad and the Ramp lters are not listed.

TRANSMISSION CURVES [36]

To save space the transmission proles of the bands are plotted but not tabulated. The proles can be obtained in tabular form via STSDAS (inside Iraf) or from the ADPS *www* site.

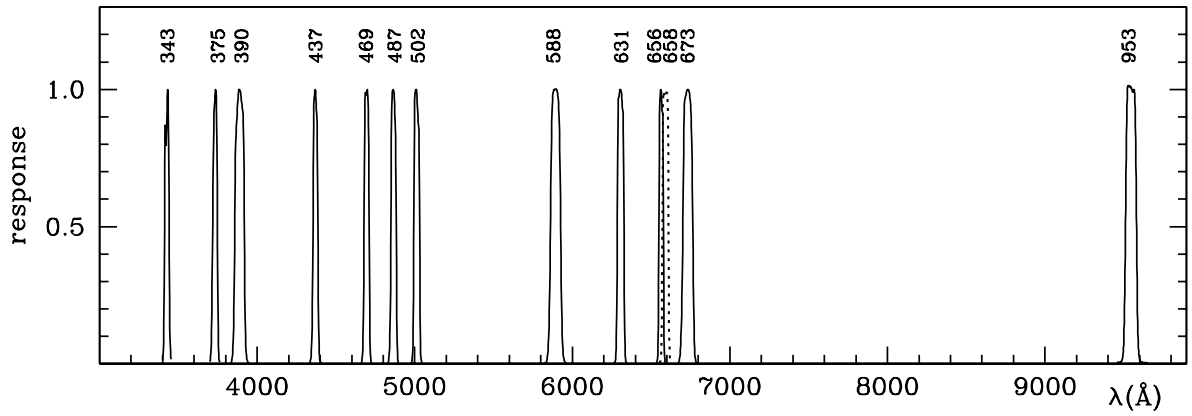


Fig. 146. continued

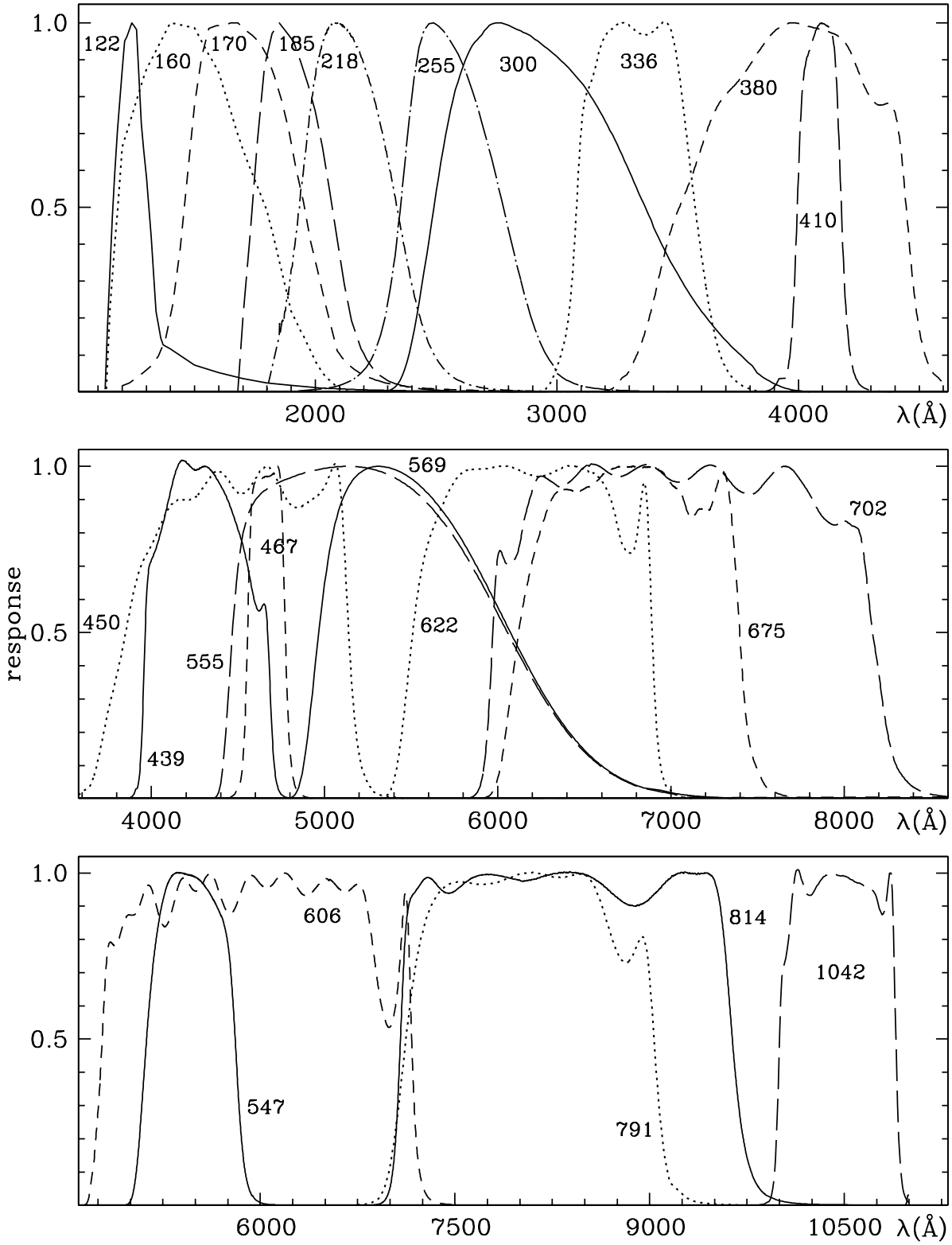


Fig. 146. continued

JHKL' CST - Alonso *et al.* - 1994

Infrared photometry at Teide Observatory.

GENERAL INFORMATION

AUTHORS	A. Alonso, S. Arribas, C. Martinez-Roger
TELESCOPE	1.54m (reflector) Carlos Sánchez Telescope, Teide Obs.
DETECTOR	InSb
MAIN ARTICLE	Alonso, A., Arribas, S., Martinez-Roger, C. 1994, A&AS 107, 365

SYSTEM DESCRIPTION

BANDS DESCRIPTION [7]				FLUX CALIBRATION [7]
band	λ_{eff} (μm) (#)	*WHM* (μm)	λ_c (μm)	F(λ) (erg cm^{-2} s^{-1} nm^{-1}) (#)
J	1.2790	0.128	1.310	29.12 10^{-10}
H	1.6483	0.274	1.661	10.92 10^{-10}
K	2.1869	0.399	2.166	4.26 10^{-10}
L'		0.614	3.678	

(#) Calculated for α Lyr.

SYSTEM ANALYSIS

REDDENING RATIOS [8]

$E_J = 1.172E_H + 0.045$ $E_J = 1.350E_K - 0.003$ $E_{L'} = 0.55E_J + 0.04$

RELATIONS WITH OTHER SYSTEMS [8]

UBVRI(JHKLMN) - Johnson - 1965

J_{CST}	=	$J_J - 0.040 - 0.064(J-K)_J$	
H_{CST}	=	$H_J - 0.020 - 0.034(J-K)_J$	
K_{CST}	=	$K_J - 0.042 + 0.019(J-K)_J$	
L'_{CST}	=	$L_J + 0.04 - 0.016(J-K)_J$	
$(J-K)_{CST}$	=	$0.008 + 0.910(J-K)_J$	for $-0.20 < (J-K)_{CST} < 1.20$
$(J-H)_{CST}$	=	$-0.010 + 0.942(J-H)_J$	for $-0.10 < (J-H)_{CST} < 0.90$
$(J-L')_{CST}$	=	$-0.080 + 0.955(J-L)_J$	for $-0.25 < (J-L)_{CST} < 1.30$
$(V-K)_{CST}$	=	$0.050 + 0.993(V-K)_J$	for $-0.60 < (V-K)_{CST} < 5.50$

JHKL CTIO - Elias *et al.* - 1982

J_{CST}	=	$J_{CTIO} - 0.035 + 0.019(J-K)_{CTIO}$	
H_{CST}	=	$H_{CTIO} - 0.025 + 0.030(J-K)_{CTIO}$	
K_{CST}	=	$K_{CTIO} - 0.022 + 0.006(J-K)_{CTIO}$	
$(J-K)_{CST}$	=	$-0.015 + 1.014(J-K)_{CTIO}$	for $-0.15 < (J-K)_{CST} < 1.10$
$(J-H)_{CST}$	=	$-0.008 + 0.980(J-H)_{CTIO}$	for $-0.08 < (J-H)_{CST} < 0.85$
$(V-K)_{CST}$	=	$0.022 + 0.998(V-K)_{CTIO}$	for $-1.50 < (V-K)_{CST} < 6.00$

Fig. 147. The photometric system *JHKL'* CST – Alonso et al. – 1994

$J_nK_nL_nM_n$ - Leggett *et al.* 1986

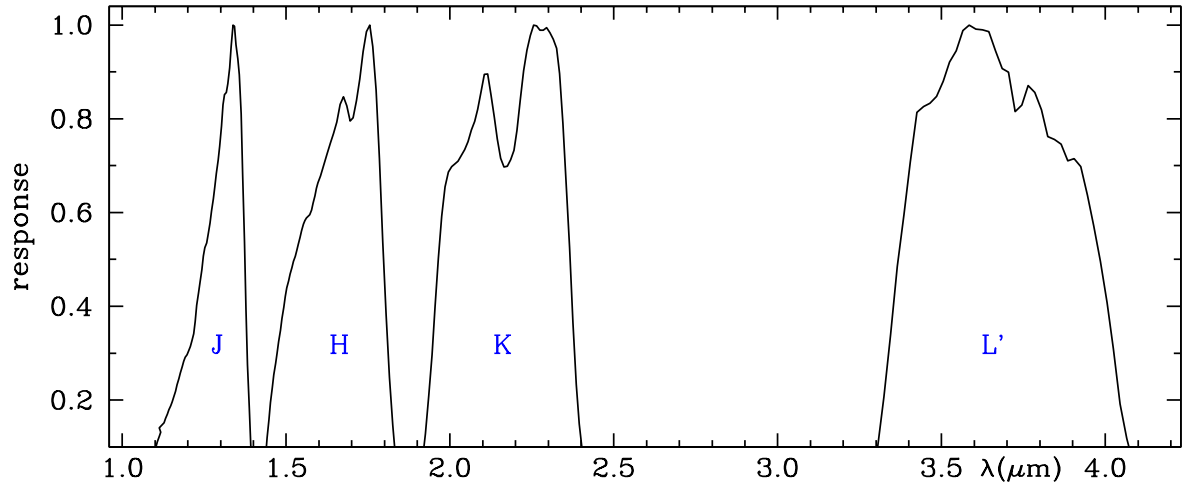
J_{CST}	=	$J_n - 0.035 + 0.009(J-K)_n$	for $-0.2 < (J-K)_{CST} < 1.1$
K_{CST}	=	$K_n - 0.035 + 0.075(J-K)_n$	for $-0.2 < (J-K)_{CST} < 1.3$
L'_{CST}	=	$L'_n + 0.04 + 0.015(J-K)_n$	
$(V-K)_{CST}$	=	$0.043 + 0.978(V-K)_n$	for $-0.5 < (V-K)_{CST} < 4.8$

JHKL'M ESO - Bouchet *et al* - 1991

J_{CST}	=	$J_{ESO} - 0.047 - 0.102(J-K)_{ESO}$	
H_{CST}	=	$H_{ESO} - 0.068 + 0.016(J-K)_{ESO}$	
K_{CST}	=	$K_{ESO} - 0.042 + 0.006(J-K)_{ESO}$	
L'_{CST}	=	$L'_{ESO} + 0.037 - 0.057(J-K)_{ESO}$	
$(J-K)_{CST}$	=	$-0.012 + 0.910(J-K)_{ESO}$	for $-0.15 < (J-K)_{CST} < 0.90$
$(J-H)_{CST}$	=	$0.010 + 0.883(J-H)_{ESO}$	for $-0.10 < (J-H)_{CST} < 0.70$
$(J-L')_{CST}$	=	$-0.073 + 0.946(J-L')_{ESO}$	for $-0.2 < (J-H)_{CST} < 1.0$
$(V-K)_{CST}$	=	$0.039 + (V-K)_{ESO}$	for $-0.9 < (V-K)_{CST} < 3.5$

TRANSMISSION CURVES

J,H and K bands are from [7]. *L'* band is from [8].



J

λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ
0.98500	0.0000	1.04750	0.0186	1.13250	0.1611	1.21750	0.3411	1.30250	0.7840	1.38750	0.1827
0.98700	0.0001	1.05250	0.0252	1.13750	0.1703	1.22250	0.3679	1.30750	0.8299	1.39250	0.1010
0.98900	0.0002	1.05750	0.0315	1.14250	0.1793	1.22750	0.4021	1.31250	0.8513	1.39750	0.0375
0.99100	0.0003	1.06250	0.0375	1.14750	0.1880	1.23250	0.4287	1.31750	0.8559	1.40250	0.0054
0.99300	0.0004	1.06750	0.0434	1.15250	0.1966	1.23750	0.4507	1.32250	0.8750	1.40750	0.0033
0.99500	0.0005	1.07250	0.0511	1.15750	0.2060	1.24250	0.4782	1.32750	0.9084	1.41250	0.0018
0.99700	0.0007	1.07750	0.0598	1.16250	0.2185	1.24750	0.5074	1.33250	0.9542	1.41750	0.0010
0.99900	0.0009	1.08250	0.0674	1.16750	0.2328	1.25250	0.5249	1.33750	1.0000	1.42250	0.0007
1.00250	0.0010	1.08750	0.0741	1.17250	0.2460	1.25750	0.5353	1.34250	0.9970	1.42750	0.0003
1.00750	0.0013	1.09250	0.0804	1.17750	0.2583	1.26250	0.5534	1.34750	0.9580	1.42350	0.0000
1.01250	0.0014	1.09750	0.0875	1.18250	0.2712	1.26750	0.5778	1.35250	0.9282		
1.01750	0.0015	1.10250	0.0984	1.18750	0.2831	1.27250	0.6030	1.35750	0.8940		
1.02250	0.0021	1.10750	0.1114	1.19250	0.2909	1.27750	0.6289	1.36250	0.8104		
1.02750	0.0031	1.11250	0.1221	1.19750	0.2963	1.28250	0.6558	1.36750	0.6811		
1.03250	0.0045	1.11750	0.1311	1.20250	0.3044	1.28750	0.6836	1.37250	0.5375		
1.03750	0.0068	1.11250	0.1410	1.20750	0.3146	1.29250	0.7115	1.37750	0.3920		
1.04250	0.0118	1.12750	0.1514	1.21250	0.3259	1.29750	0.7412	1.38250	0.2754		

Fig. 147. continued

H				*K*				*L'*			
λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ
1.3425	0.0000	1.5625	0.5879	1.8550	0.0000	2.2950	0.9939	3.160	0.000	3.925	0.698
1.3475	0.0004	1.5675	0.5918	1.8650	0.0020	2.3050	0.9834	3.170	0.001	3.945	0.637
1.3525	0.0005	1.5725	0.5952	1.8750	0.0054	2.3150	0.9692	3.180	0.002	3.965	0.571
1.3575	0.0007	1.5775	0.6053	1.8850	0.0105	2.3250	0.9505	3.190	0.002	3.985	0.496
1.3625	0.0008	1.5825	0.6198	1.8950	0.0150	2.3350	0.8961	3.200	0.003	4.005	0.408
1.3675	0.0011	1.5875	0.6353	1.9050	0.0306	2.3450	0.7898	3.210	0.002	4.025	0.309
1.3725	0.0014	1.5925	0.6514	1.9150	0.0678	2.3550	0.6575	3.220	0.003	4.045	0.192
1.3775	0.0018	1.5975	0.6635	1.9250	0.1278	2.3650	0.5251	3.230	0.002	4.065	0.118
1.3825	0.0026	1.6050	0.6776	1.9350	0.2086	2.3750	0.3653	3.240	0.004	4.085	0.064
1.3875	0.0036	1.6150	0.7015	1.9450	0.2969	2.3850	0.2336	3.250	0.004	4.105	0.033
1.3925	0.0046	1.6250	0.7259	1.9550	0.3987	2.3950	0.1495	3.260	0.009	4.125	0.014
1.3975	0.0057	1.6350	0.7489	1.9650	0.5027	2.4050	0.0834	3.270	0.016	4.145	0.006
1.4025	0.0075	1.6450	0.7680	1.9750	0.5921	2.4150	0.0464	3.285	0.034	4.165	0.001
1.4075	0.0100	1.6550	0.7925	1.9850	0.6548	2.4250	0.0256	3.305	0.097	4.185	0.000
1.4125	0.0130	1.6650	0.8305	1.9950	0.6863	2.4350	0.0120	3.325	0.207	4.205	0.000
1.4175	0.0175	1.6750	0.8466	2.0050	0.6981			3.345	0.340		
1.4225	0.0275	1.6850	0.8275	2.0150	0.7029			3.365	0.485		
1.4275	0.0429	1.6950	0.7951	2.0250	0.7093			3.385	0.595		
1.4325	0.0627	1.7050	0.8020	2.0350	0.7218			3.405	0.707		
1.4375	0.0875	1.7150	0.8387	2.0450	0.7341			3.425	0.814		
1.4425	0.1199	1.7250	0.8846	2.0550	0.7512			3.445	0.826		
1.4475	0.1583	1.7350	0.9433	2.0650	0.7755			3.465	0.833		
1.4525	0.1951	1.7450	0.9854	2.0750	0.7946			3.485	0.848		
1.4575	0.2261	1.7550	1.0000	2.0850	0.8199			3.505	0.880		
1.4625	0.2539	1.7650	0.9543	2.0950	0.8571			3.525	0.921		
1.4675	0.2777	1.7750	0.8618	2.1050	0.8947			3.545	0.945		
1.4725	0.3003	1.7850	0.7145	2.1150	0.8955			3.565	0.988		
1.4775	0.3241	1.7950	0.5363	2.1250	0.8507			3.585	1.000		
1.4825	0.3486	1.8050	0.3825	2.1350	0.8030			3.605	0.991		
1.4875	0.3737	1.8150	0.2487	2.1450	0.7562			3.625	0.990		
1.4925	0.3980	1.8250	0.1458	2.1550	0.7160			3.645	0.986		
1.4975	0.4208	1.8350	0.0771	2.1650	0.6972			3.665	0.945		
1.5025	0.4393	1.8450	0.0324	2.1750	0.6990			3.685	0.907		
1.5075	0.4537	1.8550	0.0151	2.1850	0.7126			3.705	0.899		
1.5125	0.4684	1.8650	0.0061	2.1950	0.7327			3.725	0.815		
1.5175	0.4828	1.8750	0.0043	2.2050	0.7753			3.745	0.829		
1.5225	0.4955	1.8850	0.0033	2.2150	0.8404			3.765	0.871		
1.5275	0.5067	1.8950	0.0030	2.2250	0.9025			3.785	0.856		
1.5325	0.5187	1.9050	0.0024	2.2350	0.9460			3.805	0.819		
1.5375	0.5317	1.9150	0.0014	2.2450	0.9770			3.825	0.762		
1.5425	0.5473	1.9250	0.0012	2.2550	1.0000			3.845	0.756		
1.5475	0.5616	1.9350	0.0005	2.2650	0.9980			3.865	0.746		
1.5525	0.5750	1.9450	0.0000	2.2750	0.9890			3.885	0.710		
1.5575	0.5831			2.2850	0.9891			3.905	0.715		

Fig. 147. continued

DENIS - Epchtein *et al.* - 1994

Photometric system for the Deep Infrared Southern Sky Survey.

GENERAL INFORMATION

AUTHORS	N. Epchtein, B. de Batz, E. Copet, *et al.*
TELESCOPE	1.0m (reflector), ESO (La Silla)
DETECTOR	Tektronix 1K CCD (*i* band), (cooled at 180 K); NICMOS-3 CCD (cooled at 80K)
MAIN ARTICLE	Epchtein, N., de Batz, B., Copet, E., *et al.* 1994, Ap&SS 217, 3

SYSTEM DESCRIPTION

BANDS DESCRIPTION [107]					FLUX CALIBRATION [107](##)	
band	λ_0 (μm)	λ_{eff} (μm)(#)	*WHM* (μm)	λ_c (μm)	F_λ (W m^{-2} μm^{-1})	F_ν (Jy)
I	0.795	0.788	0.1312	0.925	$1.20 \cdot 10^{-8}$	2499
J	1.235	1.221	0.199	1.249	$3.17 \cdot 10^{-9}$	1595
K_S	2.160	2.144	0.330	2.151	$4.34 \cdot 10^{-10}$	665

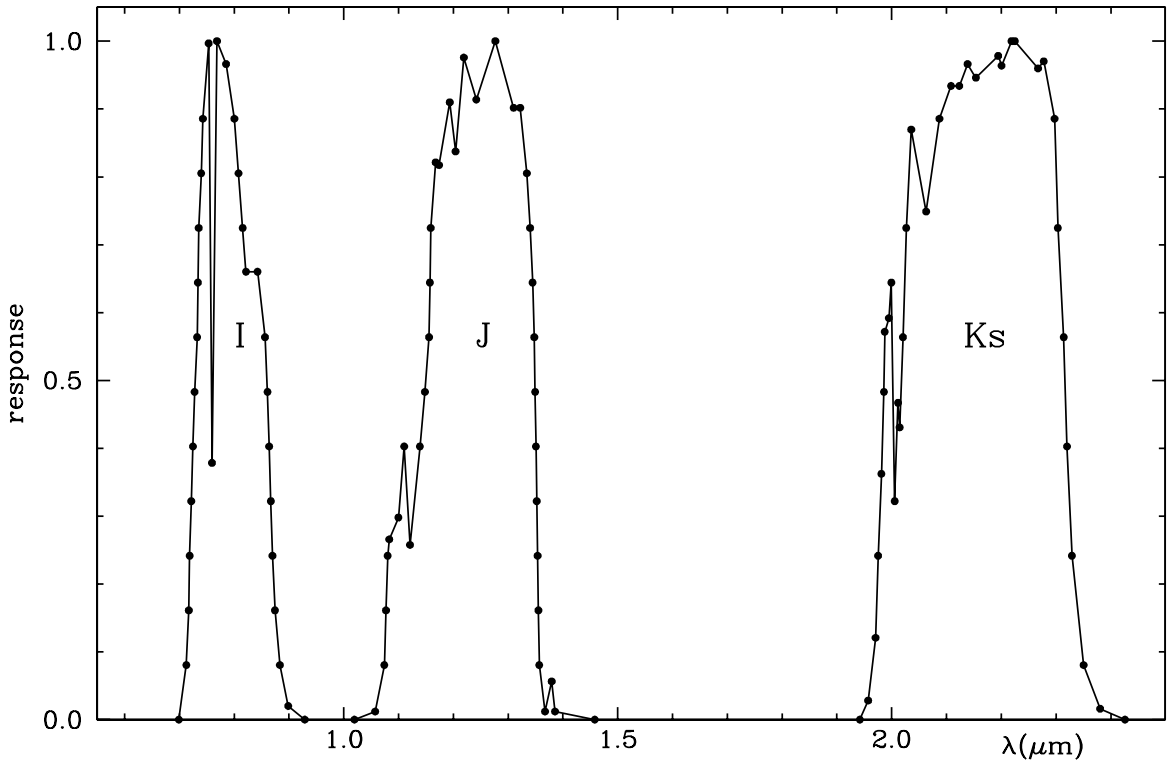
(#) For α Lyr.

(##) For a 0.0mag star.

Fig. 148. The photometric system DENIS – Epchtein et al. – 1994

TRANSMISSION CURVES

As derived from Fig 3 of [107]



I				*J*				*Ks*			
λ (μ m)	ϒ	λ (μ m)	ϒ	λ (μ m)	ϒ	λ (μ m)	ϒ	λ (μ m)	ϒ	λ (μ m)	ϒ
0.699	0.000	0.822	0.660	1.020	0.000	1.242	0.914	1.942	0.000	2.139	0.966
0.713	0.081	0.843	0.660	1.057	0.012	1.277	1.000	1.957	0.028	2.154	0.946
0.717	0.161	0.856	0.564	1.074	0.081	1.310	0.902	1.971	0.121	2.195	0.978
0.719	0.242	0.861	0.483	1.077	0.161	1.322	0.902	1.975	0.242	2.201	0.964
0.722	0.322	0.864	0.403	1.080	0.242	1.334	0.805	1.981	0.362	2.219	1.000
0.725	0.403	0.867	0.322	1.083	0.266	1.340	0.725	1.986	0.483	2.225	1.000
0.728	0.483	0.870	0.242	1.100	0.298	1.345	0.644	1.987	0.572	2.267	0.960
0.732	0.564	0.875	0.161	1.110	0.403	1.348	0.564	1.995	0.592	2.278	0.970
0.734	0.644	0.884	0.081	1.121	0.258	1.349	0.483	1.999	0.644	2.297	0.886
0.735	0.725	0.899	0.020	1.139	0.403	1.351	0.403	2.006	0.322	2.303	0.725
0.740	0.805	0.929	0.000	1.148	0.483	1.352	0.322	2.012	0.467	2.314	0.564
0.743	0.886			1.156	0.564	1.354	0.242	2.015	0.431	2.320	0.403
0.754	0.997			1.157	0.644	1.355	0.161	2.021	0.564	2.329	0.242
0.760	0.378			1.159	0.725	1.357	0.081	2.027	0.725	2.350	0.081
0.769	1.000			1.168	0.821	1.367	0.012	2.036	0.870	2.381	0.016
0.785	0.966			1.174	0.817	1.380	0.056	2.063	0.749	2.426	0.000
0.800	0.886			1.194	0.910	1.386	0.012	2.087	0.886		
0.808	0.805			1.204	0.837	1.458	0.000	2.108	0.934		
0.816	0.725			1.219	0.976			2.123	0.934		

Fig. 148. continued

JHKL MSSSO - McGregor - 1994

Infrared photometry at Mount Stromlo and Siding Spring Observatories.

GENERAL INFORMATION

AUTHORS	P. J. McGregor
TELESCOPE	ANU 2.3m (reflector), Siding Spring Obs.
DETECTOR	InSb (cooled)
MAIN ARTICLE	Mc Gregor, P. J. 1994, PASP 106, 508

SYSTEM ANALYSIS

RELATIONS WITH OTHER SYSTEMS [204]

JHKL CTIO - Elias *et al* - 1982

K_{CTIO}	=	$K_{MSSSO} + 0.004\ (\pm 0.006)\ (J-K)_{MSSSO} - 0.015\ (\pm 0.007)$	for $(J-K) < 3.0$
$(J-K)_{CTIO}$	=	$0.947\ (\pm 0.004)\ (J-K)_{MSSSO} + 0.006\ (\pm 0.004)$	for $(J-K) < 3.0$
$(H-K)_{CTIO}$	=	$0.966\ (\pm 0.009)\ (H-K)_{MSSSO} + 0.010\ (\pm 0.003)$	for $(H-K) < 0.9$
$(J-H)_{CTIO}$	=	$0.937\ (\pm 0.005)\ (J-H)_{MSSSO} - 0.003\ (\pm 0.004)$	for $(J-H) < 2.1$
$(K-L)_{CTIO}$	=	$0.751\ (\pm 0.10)\ (K-L)_{MSSSO} + 0.02\ (\pm 0.01)$	for $(K-L) < 0.2$

JHKL MSO - Jones and Hyland - 1982

K_{MSO}	=	$K_{MSSSO} - 0.010\ (\pm 0.008)\ (J-K)_{MSSSO} + 0.000(\pm 0.004)$	for $(J-K) < 0.9$
$(J-K)_{MSO}$	=	$0.997\ (\pm 0.006)\ (J-K)_{MSSSO} + 0.009\ (\pm 0.003)$	for $(J-K) < 0.9$
$(H-K)_{MSO}$	=	$0.971\ (\pm 0.023)\ (H-K)_{MSSSO} + 0.014\ (\pm 0.003)$	for $(H-K) < 0.3$
$(J-H)_{MSO}$	=	$1.002\ (\pm 0.007)\ (J-H)_{MSSSO} - 0.004\ (\pm 0.003)$	for $(J-H) < 0.6$

JHKL' AAO - Allen and Cragg - 1983

K_{AAO}	=	$K_{MSSSO} + 0.003\ (\pm 0.004)\ (J-K)_{MSSSO} + 0.005\ (\pm 0.005)$	for $(J-K) < 4.0$
$(J-K)_{AAO}$	=	$1.051\ (\pm 0.004)\ (J-K)_{MSSSO} + 0.006\ (\pm 0.004)$	for $(J-K) < 4.0$
$(H-K)_{AAO}$	=	$1.018\ (\pm 0.007)\ (H-K)_{MSSSO} + 0.009\ (\pm 0.003)$	for $(H-K) < 1.2$
$(J-H)_{AAO}$	=	$1.065\ (\pm 0.004)\ (J-H)_{MSSSO} - 0.005\ (\pm 0.004)$	for $(J-H) < 2.8$
$(K-L')_{AAO}$	=	$1.496\ (\pm 0.037)\ (K-L)_{MSSSO} + 0.010\ (\pm 0.004)$	for $(K-L) < 0.27$

JHKLM - Bessell and Brett - 1988

$(J-K)$	=	$1.026\ (J-K)_{MSSSO} + 0.005$
$(H-K)$	=	$0.997\ (H-K)_{MSSSO} + 0.007$
$(J-H)$	=	$1.028\ (J-H)_{MSSSO}$

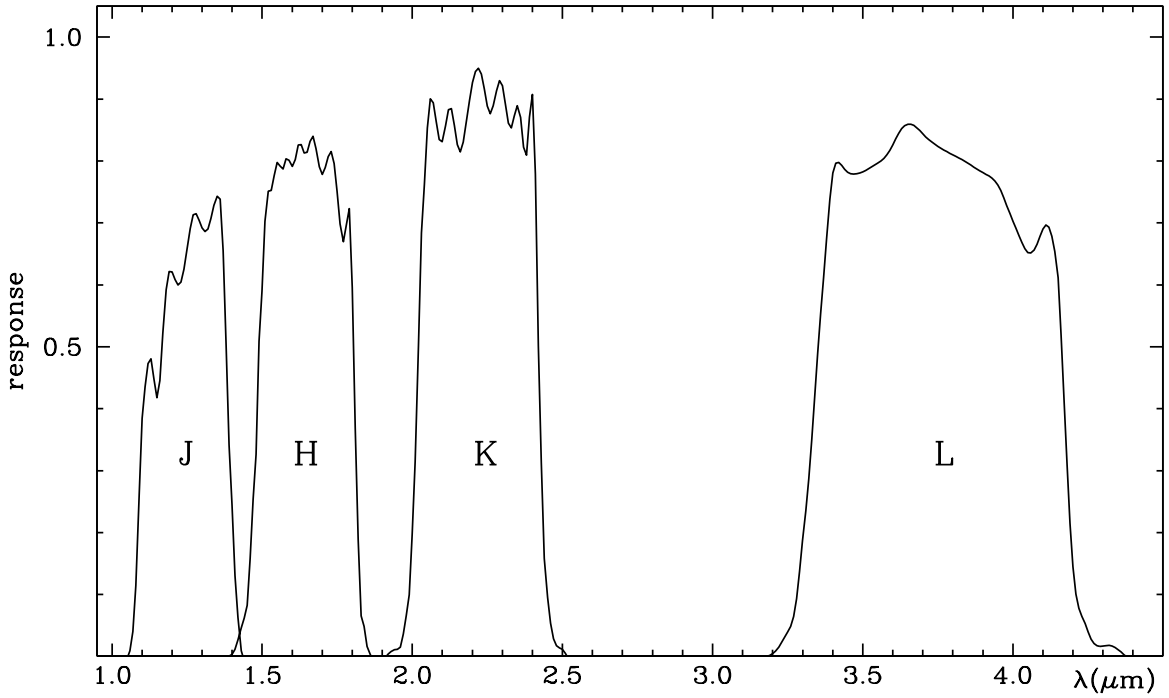
Fig. 149. The photometric system *JHKL* MSSSO – McGregor – 1994

JHKL SAAO - Carter - 1990

K_{SAAO}	=	$K_{MSSSO} + 0.012\ (\pm 0.004)\ (J-K)_{MSSSO} - 0.015\ (\pm 0.003)$	for $(J-K) < 3.0$
$(J-K)_{SAAO}$	=	$1.063\ (\pm 0.003)\ (J-K)_{MSSSO} + 0.011\ (\pm 0.002)$	for $(J-K) < 3.0$
$(H-K)_{SAAO}$	=	$0.979\ (\pm 0.011)\ (H-K)_{MSSSO} - 0.001\ (\pm 0.002)$	for $(H-K) < 0.9$
$(J-H)_{SAAO}$	=	$1.096\ (\pm 0.005)\ (J-K)_{MSSSO} + 0.009\ (\pm 0.003)$	for $(J-H) < 2.1$
$(K-L)_{SAAO}$	=	$0.863\ (\pm 0.098)\ (K-L)_{MSSSO} + 0.020\ (\pm 0.005)$	for $(K-L) < 0.2$

TRANSMISSION CURVES

As derived from Fig 2 of [204]



J				*H*				*K*				*L*			
λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ
1.053	0.000	1.373	0.600	1.379	0.000	1.752	0.738	1.912	0.000	2.294	0.930	3.180	0.000	3.844	0.798
1.073	0.060	1.382	0.480	1.415	0.018	1.776	0.678	1.948	0.012	2.309	0.894	3.216	0.012	3.903	0.780
1.081	0.120	1.389	0.360	1.438	0.060	1.794	0.696	1.966	0.024	2.327	0.852	3.245	0.036	3.962	0.750
1.085	0.180	1.400	0.240	1.456	0.120	1.800	0.600	1.977	0.060	2.357	0.882	3.281	0.096	3.986	0.720
1.089	0.240	1.411	0.120	1.468	0.240	1.806	0.480	1.993	0.120	2.380	0.810	3.299	0.180	4.021	0.678
1.092	0.300	1.421	0.060	1.482	0.360	1.810	0.360	2.004	0.240	2.403	0.894	3.322	0.300	4.051	0.652
1.097	0.360	1.427	0.024	1.488	0.480	1.818	0.240	2.013	0.360	2.410	0.780	3.340	0.420	4.081	0.666
1.107	0.420	1.450	0.000	1.501	0.600	1.823	0.120	2.019	0.480	2.416	0.600	3.358	0.540	4.116	0.696
1.130	0.480			1.512	0.720	1.835	0.060	2.025	0.600	2.428	0.360	3.378	0.660	4.140	0.654
1.154	0.420			1.527	0.750	1.847	0.024	2.033	0.720	2.434	0.240	3.393	0.756	4.152	0.600
1.178	0.580			1.551	0.798	1.865	0.000	2.043	0.780	2.445	0.120	3.417	0.798	4.163	0.480
1.207	0.612			1.569	0.786			2.049	0.840	2.469	0.030	3.441	0.786	4.175	0.360
1.225	0.600			1.581	0.804			2.066	0.900	2.499	0.012	3.488	0.780	4.187	0.240
1.251	0.660			1.604	0.792			2.096	0.828	2.517	0.000	3.536	0.792	4.205	0.120
1.267	0.708			1.622	0.828			2.126	0.888			3.589	0.816	4.235	0.060
1.296	0.696			1.646	0.810			2.155	0.816			3.630	0.852	4.258	0.030
1.320	0.690			1.669	0.840			2.191	0.900			3.666	0.858	4.318	0.018
1.355	0.744			1.695	0.780			2.232	0.936			3.707	0.840	4.377	0.000
1.370	0.660			1.735	0.810			2.259	0.876			3.784	0.814		

Fig. 149. continued

IRTF NSFCAM - Shure *et al.* - 1994

Photometry with the NSFCAM infrared array camera at the NASA Infrared Telescope Facility

GENERAL INFORMATION

AUTHORS	M. A. Shure, D. W. Toomey, J. T. Rayner, P. M. Onaka, A. J. Denault
TELESCOPE	3.0m (reflector) NASA Infrared Telescope Facility, Mauna Kea
DETECTOR	256×256 InSb infrared array
MAIN ARTICLE	Shure, M. A., Toomey, D. W., Rayner, J. T., Onaka, P. M., Denault, A. J., 1994, Proc. SPIE Vol. 2198, p. 614
	NSFCAM User's Guide 1999

SYSTEM DESCRIPTION

BANDS DESCRIPTION [269][144]

band	λ_c (μm)	band width (μm)
broad bands		
J	1.26	0.31
H	1.62	0.28
K'	2.12	0.34
K_s	2.15	0.32
K	2.21	0.39
L	3.50	0.61
L'	3.78	0.59
M'	4.78	0.22
M	4.85	0.62
narrow bands		
HeI	1.08	0.01
Paschen γ	1.09	0.01
Paschen β	1.28	0.01
FeII	1.64	0.02
H_2	2.12	0.02
Brackett γ	2.16	0.02
H_2	2.25	0.02
CO_{cont}	2.26	0.05
CO	2.30	0.03

SYSTEM ANALYSIS

RELATIONS WITH OTHER SYSTEMS [144]

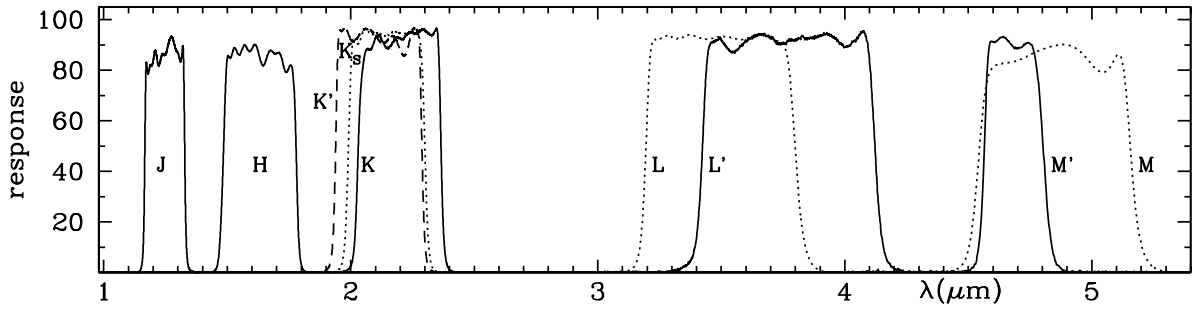
J_{UKIRT}	=	J_{IRTF}
K_{UKIRT}	=	K_{IRTF}
L'_{UKIRT}	=	L'_{IRTF}
$(H-K)_{UKIRT}$	=	$0.82\ (\pm\ 0.02) \times (H-K)_{IRTF}$

JHKL CTIO - Elias - 1982

K_{CTIO}	=	$K_{IRTF} - 0.018 \times (J-K)_{IRTF}$
$(J-K)_{CTIO}$	=	$0.936 \times (J-K)_{IRTF}$
$(H-K)_{CTIO}$	=	$0.790 \times (H-K)_{IRTF}$
$(K-L)_{CTIO}$	=	$0.820 \times (K-L)_{IRTF}$

Fig. 150. The photometric system IRTF NSFCAM – Shure et al. – 1994

TRANSMISSION CURVES [144]



J		*H*		*K*		*K'*		K_S		*L*		*L'*		*M*		*M'*	
λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ	λ (μm)	ϒ
1.140	0.3	1.479	0.6	1.900	1.3	1.950	0.9	2.040	0.5	3.121	0.7	3.300	1.4	4.444	0.9	4.430	0.9
1.150	1.0	1.488	1.7	1.910	3.8	1.960	2.5	2.050	1.2	3.142	1.7	3.322	5.2	4.466	2.1	4.440	1.7
1.155	2.0	1.497	6.1	1.920	12.2	1.970	8.0	2.060	3.3	3.163	6.0	3.344	28.0	4.488	5.3	4.450	2.9
1.160	4.5	1.506	21.8	1.930	39.4	1.980	27.4	2.070	10.3	3.184	25.4	3.366	80.9	4.510	13.9	4.460	4.5
1.165	12.3	1.515	54.6	1.940	82.2	1.990	70.7	2.080	30.5	3.205	73.4	3.388	94.9	4.532	33.1	4.470	10.0
1.170	36.9	1.524	75.6	1.950	96.4	2.000	94.2	2.090	64.5	3.226	91.9	3.410	91.7	4.554	59.1	4.480	17.9
1.175	78.7	1.533	82.0	1.960	95.1	2.010	96.3	2.100	86.8	3.247	91.9	3.432	89.5	4.576	75.6	4.490	31.5
1.180	88.8	1.542	80.9	1.970	93.5	2.020	96.4	2.110	93.7	3.268	93.4	3.454	90.2	4.598	80.9	4.500	48.0
1.185	84.4	1.551	79.1	1.980	94.3	2.030	94.4	2.120	94.8	3.289	93.5	3.476	93.5	4.620	82.3	4.510	64.0
1.190	83.8	1.560	80.3	1.990	95.2	2.040	89.7	2.130	94.6	3.310	92.8	3.498	94.1	4.642	82.7	4.520	77.4
1.195	85.9	1.569	83.7	2.000	96.1	2.050	86.3	2.140	94.4	3.331	92.8	3.520	93.2	4.664	83.0	4.530	85.1
1.200	87.0	1.578	86.3	2.010	96.0	2.060	85.9	2.150	94.5	3.352	93.4	3.542	92.3	4.686	83.4	4.540	89.4
1.205	87.7	1.587	86.9	2.020	95.1	2.070	86.7	2.160	94.6	3.373	94.0	3.564	92.6	4.708	84.1	4.550	90.5
1.210	88.8	1.596	86.3	2.030	95.1	2.080	89.5	2.170	94.4	3.394	93.5	3.586	92.7	4.730	85.1	4.560	90.8
1.215	91.1	1.605	86.9	2.040	94.7	2.090	92.1	2.180	94.4	3.415	92.8	3.608	91.9	4.752	86.1	4.570	90.0
1.220	92.6	1.614	87.7	2.050	94.9	2.100	93.3	2.190	94.6	3.436	92.2	3.630	91.8	4.774	87.2	4.580	89.1
1.225	93.2	1.623	87.2	2.060	94.8	2.110	93.5	2.200	95.2	3.457	92.4	3.652	90.6	4.796	88.1	4.590	88.8
1.230	92.8	1.632	85.0	2.070	94.2	2.120	92.0	2.210	95.0	3.478	92.8	3.674	90.8	4.818	88.9	4.600	88.6
1.235	91.3	1.641	82.4	2.080	93.2	2.130	91.2	2.220	94.9	3.499	93.3	3.696	92.6	4.840	89.4	4.610	88.9
1.240	89.3	1.650	82.0	2.090	92.2	2.140	90.6	2.230	94.1	3.520	93.3	3.718	93.9	4.862	89.9	4.620	90.1
1.245	87.3	1.659	84.3	2.100	92.8	2.150	90.8	2.240	93.6	3.541	92.9	3.740	94.1	4.884	90.2	4.630	91.5
1.250	86.1	1.668	87.8	2.110	92.5	2.160	91.8	2.250	93.5	3.562	92.4	3.762	93.0	4.906	89.9	4.640	92.2
1.255	86.1	1.677	90.0	2.120	92.0	2.170	93.5	2.260	94.1	3.583	92.1	3.784	92.6	4.928	89.1	4.650	93.0
1.260	86.2	1.686	89.6	2.130	90.7	2.180	94.5	2.270	94.7	3.604	92.4	3.806	91.2	4.950	87.6	4.660	93.0
1.265	85.7	1.695	87.9	2.140	89.5	2.190	95.3	2.280	94.8	3.625	93.3	3.828	89.3	4.972	85.5	4.670	92.4
1.270	83.6	1.704	87.7	2.150	88.8	2.200	95.9	2.290	94.3	3.646	93.9	3.850	87.8	4.994	83.0	4.680	91.5
1.275	82.0	1.713	88.9	2.160	89.7	2.210	96.4	2.300	94.1	3.667	93.9	3.872	87.4	5.016	80.7	4.690	91.2
1.280	82.3	1.722	90.1	2.170	91.3	2.220	96.0	2.310	94.7	3.688	93.3	3.894	89.6	5.038	79.2	4.700	91.4
1.285	85.4	1.731	88.4	2.180	93.6	2.230	95.2	2.320	96.1	3.709	92.2	3.916	91.3	5.060	79.7	4.710	89.9
1.290	87.9	1.740	86.4	2.190	93.8	2.240	94.2	2.330	96.3	3.730	91.4	3.938	92.1	5.082	82.5	4.720	79.0
1.295	86.4	1.749	86.4	2.200	92.4	2.250	92.6	2.340	94.2	3.751	90.3	3.960	91.3	5.104	86.0	4.730	56.9
1.300	83.3	1.758	88.4	2.210	89.6	2.260	91.5	2.350	91.1	3.772	82.2	3.982	89.7	5.126	82.0	4.740	32.2
1.305	81.8	1.767	88.1	2.220	88.0	2.270	91.4	2.360	90.7	3.793	58.3	4.004	73.3	5.148	60.2	4.750	16.3
1.310	82.0	1.776	85.3	2.230	88.3	2.280	93.5	2.370	92.9	3.814	30.0	4.026	39.9	5.170	32.4	4.760	8.2
1.315	80.2	1.785	85.2	2.240	86.8	2.290	95.8	2.380	89.1	3.835	12.9	4.048	17.2	5.192	15.0	4.770	3.8
1.320	78.5	1.794	83.1	2.250	80.5	2.300	96.6	2.390	66.2	3.856	5.4	4.070	7.7	5.214	6.9	4.780	2.1
1.325	82.5	1.803	61.4	2.260	68.2	2.310	95.5	2.400	33.0	3.877	2.3	4.092	4.2	5.236	3.3	4.790	1.5
1.330	71.9	1.812	33.5	2.270	41.5	2.320	94.8	2.410	12.1	3.898	0.9	4.114	2.4	5.258	1.7	4.800	0.7
1.335	29.4	1.821	13.6	2.280	15.6	2.330	74.2	2.420	4.2			4.136	2.0	5.280	0.8		
1.340	8.9	1.830	4.0	2.290	5.3	2.340	28.2	2.430	1.6			4.158	1.1				
1.345	3.1	1.839	1.2	2.300	2.1	2.350	8.2	2.440	0.7			4.180	0.6				
1.350	1.1	1.848	0.4	2.310	1.2	2.360	2.8										
1.355	0.3			2.320	0.6												

Fig. 150. continued

FPBS - Brewer *et al.* - 1995

Absorption bands in late type stars.

GENERAL INFORMATION

AUTHORS	J. P. Brewer, H. B. Richer and D. R. Crabtree
TELESCOPE	3.6m Canada French Hawaii Telescope (reflector), Mauna Kea
DETECTOR	Loral3 2048X2048 CCD
MAIN ARTICLE	Brewer, J., Richer, H. B., Crabtree, D.R. 1995, AJ 109, 2480

SYSTEM DESCRIPTION

BANDS DESCRIPTION [53]

band	λ_c (Å)	bandpass (Å)
TiO	7800	140
CN	8100	140

In addition to the *TiO* and the *CN* bands the system includes the *V* and the *I* bands from *RI - Cousins - 1976*.

Fig. 151. The photometric system FPBS – Brewer et al. – 1995

ISOCAM ISO - 1995

Infrared photometric system of the ISO satellite.

GENERAL INFORMATION

TELESCOPE	0.60cm (reflector)
DETECTOR	InSb 32X32 pixels Charge Injection Device (Short-Wavelength range); 32X32 Gallium doped Silicon photo-conductor array hybridized by Indium bumps (Long-Wavelength range)
MAIN ARTICLE	ISOCAM Observer's Manual V1.0

SYSTEM DESCRIPTION

BANDS DESCRIPTION [145]		
band	λ_c (μm)	bandpass (μm)
Short-Wavelength channel		
SW1	3.57	3.05 – 4.10
SW2	3.30	3.20 – 3.40
SW3	4.50	4.00 – 5.00
SW4	2.77	2.50 – 3.05
SW5		3.00 – 5.5
SW6	3.72	3.45 – 4.00
SW7	3.05	2.90 – 3.20
SW8	4.06	
SW9	3.88	3.76 – 4.00
SW10	4.70	4.53 – 4.88
SW11	4.26	4.16 – 4.37
Long-Wavelength channel		
LW1	4.50	4.00 – 5.00
LW2	6.75	5.00 – 8.50
LW3	15.00	12.0 – 18
LW4	6.00	5.50 – 6.50
LW5	6.75	6.50 – 7.00
LW6	7.75	7.00 – 8.50
LW7	9.62	8.50 – 10.7
LW8	11.40	10.7 – 12.0
LW9	15.00	14.0 – 16.0
LW10	11.50	8.00 – 15.0

Fig. 152. The photometric system ISOCAM ISO – 1995

TRANSMISSION CURVES [145]

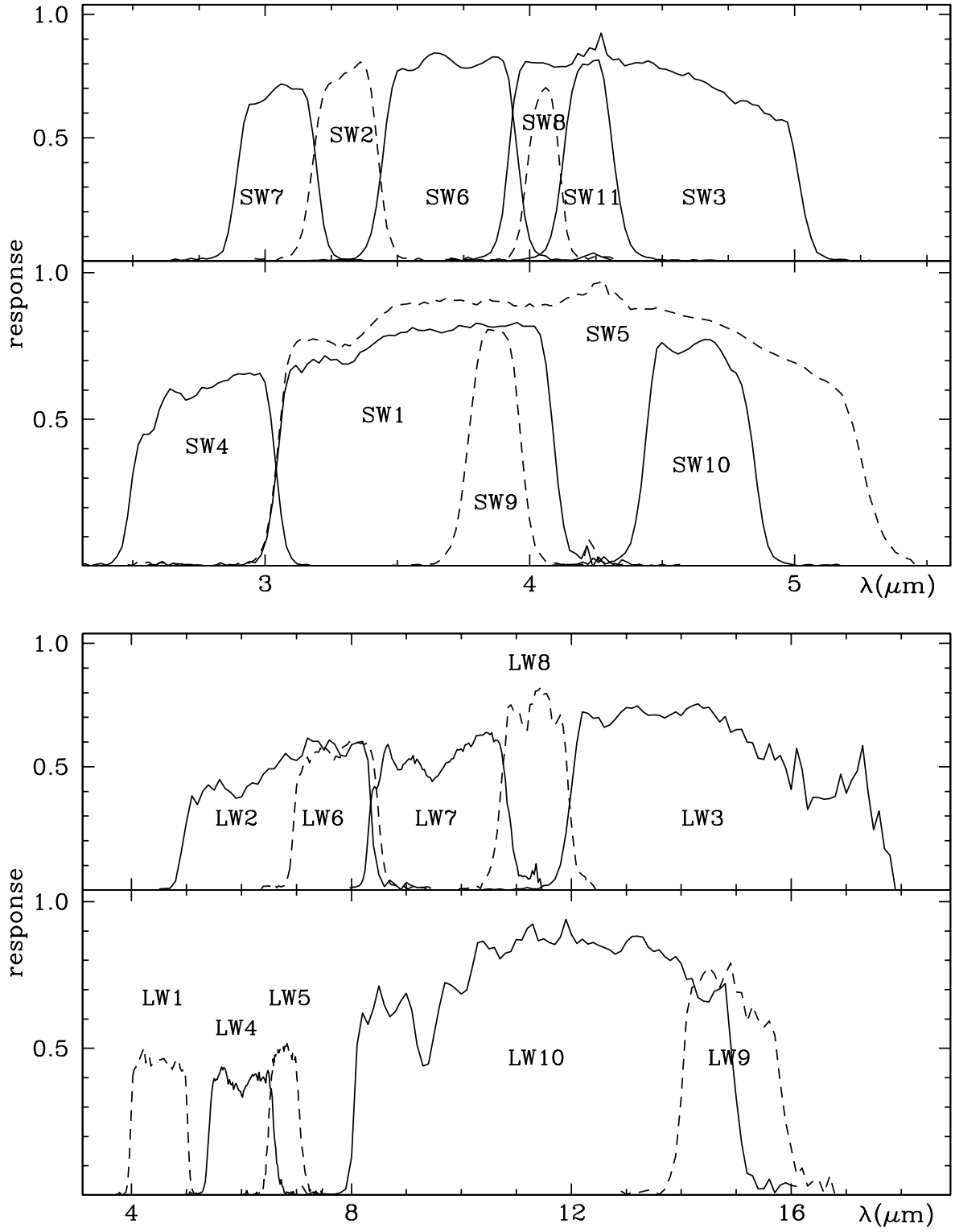


Fig. 152. continued

SW1		SW2		SW3		SW4		SW5		SW6		SW7		SW8		SW10		SW11	
λ (μm)	Υ	λ (μm)	Υ	λ (μm)	Υ	λ (μm)	Υ	λ (μm)	Υ	λ (μm)	Υ	λ (μm)	Υ	λ (μm)	Υ	λ (μm)	Υ	λ (μm)	Υ
2.90	0.00	3.06	0.01	3.80	0.01	2.40	0.00	2.90	0.01	3.30	0.00	2.70	0.00	3.85	0.00	4.25	0.02	3.95	0.01
2.95	0.01	3.09	0.02	3.85	0.03	2.43	0.02	2.99	0.06	3.33	0.01	2.73	0.01	3.89	0.01	4.29	0.03	3.97	0.01
3.00	0.07	3.12	0.05	3.90	0.22	2.46	0.07	3.08	0.67	3.36	0.03	2.76	0.01	3.93	0.03	4.33	0.02	3.99	0.01
3.05	0.40	3.15	0.17	3.95	0.72	2.49	0.24	3.17	0.77	3.39	0.08	2.79	0.01	3.97	0.20	4.37	0.06	4.01	0.01
3.10	0.68	3.18	0.40	4.00	0.81	2.52	0.41	3.26	0.76	3.42	0.22	2.82	0.02	4.01	0.55	4.41	0.20	4.03	0.02
3.15	0.67	3.21	0.64	4.05	0.80	2.55	0.45	3.35	0.78	3.45	0.48	2.85	0.07	4.05	0.70	4.45	0.54	4.05	0.04
3.20	0.69	3.24	0.72	4.10	0.79	2.58	0.47	3.44	0.86	3.48	0.71	2.88	0.24	4.09	0.62	4.49	0.76	4.07	0.07
3.25	0.70	3.27	0.73	4.15	0.79	2.61	0.56	3.53	0.89	3.51	0.78	2.91	0.49	4.13	0.20	4.53	0.74	4.09	0.14
3.30	0.69	3.30	0.76	4.20	0.83	2.64	0.60	3.62	0.89	3.54	0.77	2.94	0.64	4.17	0.03	4.57	0.73	4.11	0.27
3.35	0.72	3.33	0.78	4.25	0.86	2.67	0.59	3.71	0.91	3.57	0.78	2.97	0.64	4.21	0.01	4.61	0.75	4.13	0.45
3.40	0.75	3.36	0.81	4.30	0.82	2.70	0.57	3.80	0.89	3.60	0.82	3.00	0.66	4.25	0.02	4.65	0.77	4.15	0.63
3.45	0.78	3.39	0.75	4.35	0.80	2.73	0.58	3.89	0.90	3.63	0.84	3.03	0.69			4.69	0.77	4.17	0.73
3.50	0.79	3.42	0.51	4.40	0.81	2.76	0.61	3.98	0.88	3.66	0.84	3.06	0.72			4.73	0.72	4.19	0.79
3.55	0.81	3.45	0.20	4.45	0.81	2.79	0.61	4.07	0.89	3.69	0.83	3.09	0.70			4.77	0.66	4.21	0.80
3.60	0.80	3.48	0.07	4.50	0.78	2.82	0.62	4.16	0.92	3.72	0.80	3.12	0.70			4.81	0.58	4.23	0.80
3.65	0.80	3.51	0.01	4.55	0.76	2.85	0.63	4.25	0.96	3.75	0.78	3.15	0.69			4.85	0.35	4.25	0.82
3.70	0.80	3.54	0.00	4.60	0.76	2.88	0.65	4.34	0.91	3.78	0.78	3.18	0.51			4.89	0.10	4.27	0.79
3.75	0.82			4.65	0.73	2.91	0.65	4.43	0.87	3.81	0.80	3.21	0.23			4.93	0.03	4.29	0.66
3.80	0.83			4.70	0.70	2.94	0.66	4.52	0.87	3.84	0.82	3.24	0.06			4.97	0.01	4.31	0.48
3.85	0.81			4.75	0.67	2.97	0.65	4.61	0.85	3.87	0.83	3.27	0.02	SW9				4.33	0.31
3.90	0.82			4.80	0.65	3.00	0.63	4.70	0.83	3.90	0.81	3.30	0.00	λ (μm)	Υ			4.35	0.18
3.95	0.83			4.85	0.63	3.03	0.44	4.79	0.79	3.93	0.66			3.65	0.01			4.37	0.09
4.00	0.82			4.90	0.60	3.06	0.17	4.88	0.74	3.96	0.37			3.69	0.05			4.39	0.05
4.05	0.75			4.95	0.57	3.09	0.04	4.97	0.70	3.99	0.13			3.73	0.16			4.41	0.03
4.10	0.33			5.00	0.44	3.12	0.01	5.06	0.66	4.02	0.04			3.77	0.45			4.43	0.02
4.15	0.05			5.05	0.14	3.15	0.00	5.15	0.61	4.05	0.02			3.81	0.74			4.45	0.01
4.20	0.04			5.10	0.02			5.24	0.42	4.08	0.01			3.85	0.81			4.47	0.01
4.25	0.01			5.15	0.01			5.33	0.11	4.11	0.00			3.89	0.80			4.49	0.01
4.30	0.00			5.20	0.00			5.42	0.03					3.93	0.73				
														3.97	0.39				
														4.01	0.10				
														4.05	0.03				
														4.09	0.00				

LW1		LW2		LW3		LW4		LW5		LW6		LW7		LW8		LW9		LW10	
λ (μm)	Υ	λ (μm)	Υ	λ (μm)	Υ	λ (μm)	Υ	λ (μm)	Υ	λ (μm)	Υ	λ (μm)	Υ	λ (μm)	Υ	λ (μm)	Υ	λ (μm)	Υ
3.85	0.00	4.70	0.01	11.50	0.02	5.20	0.00	6.30	0.00	6.70	0.00	8.20	0.04	10.30	0.00	13.65	0.01	7.70	0.00
3.90	0.01	4.85	0.09	11.70	0.04	5.25	0.01	6.35	0.02	6.77	0.02	8.30	0.22	10.37	0.02	13.75	0.04	8.00	0.13
3.95	0.09	5.00	0.28	11.90	0.23	5.30	0.02	6.40	0.04	6.84	0.05	8.40	0.41	10.44	0.05	13.85	0.09	8.30	0.58
4.00	0.32	5.15	0.37	12.10	0.60	5.35	0.06	6.45	0.12	6.91	0.16	8.50	0.43	10.51	0.08	13.95	0.21	8.60	0.65
4.05	0.43	5.30	0.40	12.30	0.72	5.40	0.19	6.50	0.27	6.98	0.37	8.60	0.56	10.58	0.14	14.05	0.48	8.90	0.66
4.10	0.45	5.45	0.41	12.50	0.70	5.45	0.33	6.55	0.41	7.05	0.46	8.70	0.57	10.65	0.23	14.15	0.68	9.20	0.51
4.15	0.46	5.60	0.45	12.70	0.67	5.50	0.40	6.60	0.46	7.12	0.50	8.80	0.51	10.72	0.42	14.25	0.71	9.50	0.55
4.20	0.49	5.75	0.40	12.90	0.72	5.55	0.39	6.65	0.47	7.19	0.54	8.90	0.49	10.79	0.57	14.35	0.73	9.80	0.72
4.25	0.47	5.90	0.37	13.10	0.74	5.60	0.41	6.70	0.50	7.26	0.53	9.00	0.52	10.86	0.76	14.45	0.77	10.10	0.70
4.30	0.47	6.05	0.40	13.30	0.72	5.65	0.43	6.75	0.52	7.33	0.56	9.10	0.54	10.93	0.73	14.55	0.77	10.40	0.87
4.35	0.44	6.20	0.44	13.50	0.71	5.70	0.43	6.80	0.52	7.40	0.56	9.20	0.53	11.00	0.73	14.65	0.73	10.70	0.81
4.40	0.45	6.35	0.45	13.70	0.70	5.75	0.39	6.85	0.50	7.47	0.56	9.30	0.49	11.07	0.71	14.75	0.72	11.00	0.87
4.45	0.46	6.50	0.49	13.90	0.72	5.80	0.38	6.90	0.48	7.54	0.58	9.40	0.46	11.14	0.66	14.85	0.79	11.30	0.92
4.50	0.46	6.65	0.50	14.10	0.73	5.85	0.37	6.95	0.48	7.61	0.56	9.50	0.45	11.21	0.67	14.95	0.74	11.60	0.86
4.55	0.46	6.80	0.55	14.30	0.76	5.90	0.38	7.00	0.43	7.68	0.53	9.60	0.47	11.28	0.76	15.05	0.69	11.90	0.94
4.60	0.46	6.95	0.53	14.50	0.74	5.95	0.36	7.05	0.29	7.75	0.54	9.70	0.51	11.35	0.81	15.15	0.64	12.20	0.87
4.65	0.45	7.10	0.54	14.70	0.68	6.00	0.34	7.10	0.16	7.82	0.56	9.80	0.53	11.42	0.82	15.25	0.61	12.50	0.85
4.70	0.44	7.25	0.62	14.90	0.64	6.05	0.36	7.15	0.09	7.89	0.58	9.90	0.56	11.49	0.80	15.35	0.63	12.80	0.82
4.75	0.43	7.40	0.60	15.10	0.65	6.10	0.37	7.20	0.05	7.96	0.60	10.00	0.57	11.56	0.80	15.45	0.58	13.10	0.88
4.80	0.46	7.55	0.59	15.30	0.60	6.15	0.39	7.25	0.01	8.03	0.61	10.10	0.59	11.63	0.72	15.55	0.58	13.40	0.84
4.85	0.46	7.70	0.59	15.50	0.53	6.20	0.41	7.30	0.02	8.10	0.60	10.20	0.59	11.70	0.67	15.65	0.58	13.70	0.81
4.90	0.43	7.85	0.54	15.70	0.53	6.25	0.41			8.17	0.60	10.30	0.63	11.77	0.70	15.75	0.47	14.00	0.79
4.95	0.43	8.00	0.59	15.90	0.49	6.30	0.39			8.24	0.59	10.40	0.63	11.84	0.68	15.85	0.31	14.30	0.67
5.00	0.33	8.15	0.60	16.10	0.57	6.35	0.39			8.31	0.59	10.50	0.63	11.91	0.53	15.95	0.20	14.60	0.69
5.05	0.11	8.30	0.53	16.30	0.33	6.40	0.40			8.38	0.55	10.60	0.60	11.98	0.31	16.05	0.10	14.90	0.51
5.10	0.02	8.45	0.09	16.50	0.37	6.45	0.40			8.45	0.42	10.70	0.59	12.05	0.17	16.15	0.08	15.20	0.07
5.15	0.01	8.60	0.01	16.70	0.37	6.50	0.42			8.52	0.24	10.80	0.45	12.12	0.07	16.25	0.07	15.50	0.02
5.20	0.00			16.90	0.47	6.55	0.36			8.59	0.11	10.90	0.26	12.19	0.06	16.35	0.03	15.80	0.03
				17.10	0.45	6.60	0.20			8.66	0.05	11.00	0.11	12.26	0.05	16.45	0.06	16.10	0.02
				17.30	0.58	6.65	0.10			8.73	0.02	11.10	0.06	12.33	0.02	16.55	0.02	16.40	0.01
				17.50	0.24	6.70	0.04			8.80	0.00	11.20	0.05	12.40	0.00			16.70	0.00
				17.70	0.17	6.75	0.03					11.30	0.07						
				17.90	0.00	6.80	0.00					11.40	0.03						

Fig. 152. continued

BATC - Fan *et al.* - 1996

General purpose system.

GENERAL INFORMATION

AUTHORS	X. Fan *et al.*
TELESCOPE	0.6/0.9m Schmidt, Beijing Astron. Obs.
DETECTOR	2048X2048, UV-coated CCD
MAIN ARTICLE	Fan, X. *et al.* 1996, AJ 112, 628

SYSTEM DESCRIPTION

BANDS DESCRIPTION [102]

band	λ_c (Å)	FWHM (Å)
1	3360	360
2	3890	340
3	4210	320
4	4550	340
5	4925	390
6	5270	340
7	5795	310
8	6075	310
9	6660	480
10a	7050	300
10	7215	550
10b	7490	330
11	8020	260
12	8480	180
13	9190	260
14	9745	270

SYSTEM ANALYSIS

RELATIONS WITH OTHER SYSTEMS [102]

UBV - Johnson and Morgan - 1953

$$(B-V)_J = 0.127 + 0.489\,(m_{3890} - m_{5795}) - 0.033(m_{3890} - m_{5795})^2$$

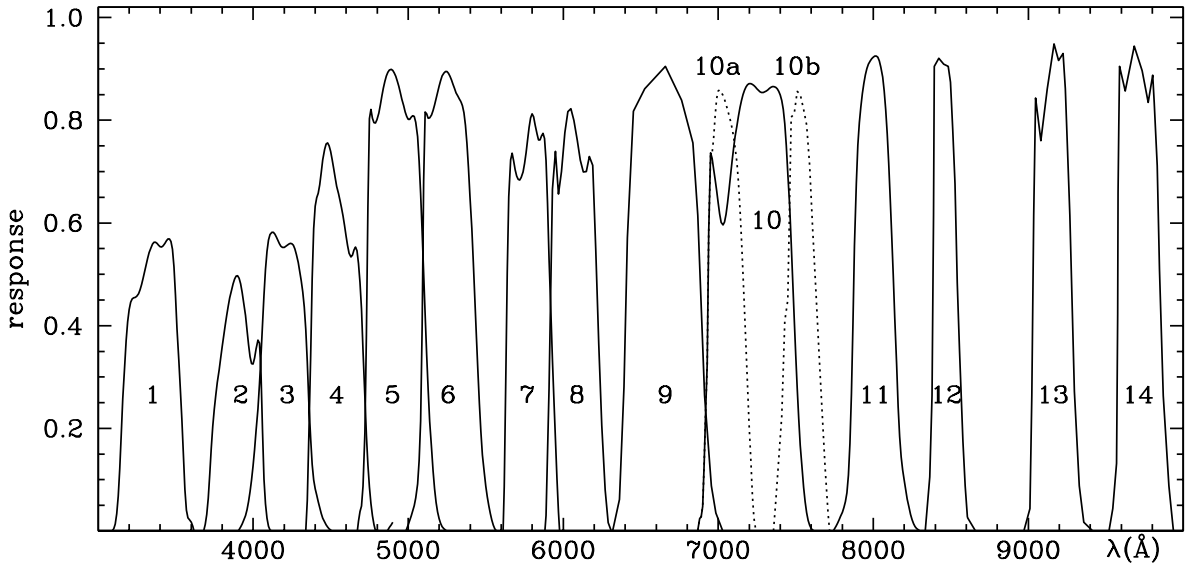
RI - Cousins - 1976

$$(V-I)_C = +0.343(\pm 0.015) + 1.090(\pm 0.072)(m_{5795} - m_{8020}) + 0.196(\pm 0.083)(m_{5795} - m_{8020})^2$$

$$(V-R)_C = +0.002(\pm 0.012) + 1.299(\pm 0.04)(m_{5795} - m_{6660})$$

Fig. 153. The photometric system BATC – Fan et al. – 1996

TRANSMISSION CURVES [102]



1		*2*		*3*		*4*		*5*		*6*		*7*		*8*	
λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ
3087	0.000	3680	0.000	3902	0.000	4317	0.000	4673	0.000	4984	0.000	5577	0.000	5844	0.000
3134	0.088	3709	0.062	3961	0.044	4353	0.088	4688	0.035	5035	0.044	5622	0.119	5892	0.044
3161	0.264	3733	0.176	4006	0.145	4385	0.554	4718	0.158	5073	0.158	5637	0.439	5904	0.176
3182	0.378	3760	0.264	4050	0.343	4391	0.598	4732	0.439	5088	0.351	5652	0.668	5918	0.439
3250	0.457	3813	0.387	4080	0.510	4421	0.659	4747	0.773	5103	0.747	5681	0.719	5933	0.710
3360	0.562	3858	0.466	4119	0.582	4460	0.743	4762	0.817	5118	0.815	5732	0.690	5963	0.672
3413	0.554	3902	0.496	4184	0.554	4540	0.672	4792	0.795	5147	0.808	5764	0.747	6001	0.747
3466	0.567	3953	0.413	4279	0.540	4584	0.606	4836	0.857	5192	0.857	5800	0.813	6052	0.822
3487	0.527	3991	0.325	4302	0.501	4635	0.534	4881	0.898	5236	0.895	5844	0.760	6111	0.721
3517	0.351	4021	0.356	4347	0.351	4667	0.550	4955	0.848	5325	0.844	5874	0.773	6165	0.719
3546	0.176	4050	0.308	4371	0.176	4688	0.492	5005	0.801	5370	0.791	5889	0.729	6185	0.731
3561	0.075	4065	0.141	4406	0.075	4703	0.413	5038	0.808	5429	0.457	5918	0.439	6215	0.501
3591	0.022	4080	0.053	4451	0.025	4718	0.281	5059	0.773	5474	0.176	5948	0.193	6245	0.246
3620	0.000	4125	0.000	4510	0.000	4747	0.097	5118	0.360	5518	0.053	5969	0.044	6274	0.062
						4777	0.018	5168	0.088	5548	0.013	6046	0.000	6319	0.000
						4866	0.000	5207	0.018	5607	0.000				
								5251	0.000						

9		*10a*		*10*		*10b*		*11*		*12*		*13*		*14*	
λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ
6319	0.000	6867	0.000	6867	0.000	7357	0.000	7742	0.000	8335	0.000	8973	0.000	9521	0.000
6363	0.062	6882	0.026	6882	0.026	7401	0.185	7816	0.053	8365	0.105	9011	0.044	9545	0.044
6393	0.281	6906	0.088	6906	0.088	7416	0.264	7846	0.141	8380	0.264	9023	0.264	9569	0.132
6414	0.571	6918	0.220	6918	0.220	7445	0.475	7867	0.351	8388	0.615	9035	0.615	9577	0.422
6452	0.817	6935	0.439	6935	0.439	7460	0.606	7884	0.615	8394	0.905	9047	0.844	9580	0.659
6526	0.861	6941	0.624	6941	0.624	7463	0.747	7914	0.808	8424	0.921	9082	0.760	9583	0.791
6660	0.905	6956	0.734	6956	0.734	7469	0.808	7944	0.879	8454	0.909	9124	0.861	9589	0.905
6764	0.839	6986	0.830	6992	0.659	7511	0.857	8000	0.923	8483	0.905	9165	0.949	9625	0.857
6838	0.756	7016	0.857	7024	0.598	7546	0.826	8062	0.879	8498	0.874	9195	0.917	9684	0.945
6867	0.615	7075	0.804	7084	0.703	7579	0.764	8098	0.729	8513	0.782	9225	0.930	9735	0.896
6912	0.264	7134	0.659	7134	0.815	7609	0.598	8113	0.628	8528	0.677	9239	0.861	9773	0.835
6956	0.088	7164	0.475	7193	0.870	7638	0.413	8127	0.518	8543	0.483	9269	0.615	9803	0.888
6986	0.035	7208	0.149	7282	0.854	7668	0.246	8142	0.395	8557	0.351	9299	0.272	9812	0.835
7030	0.000	7223	0.053	7357	0.866	7698	0.088	8157	0.264	8578	0.176	9328	0.088	9832	0.712
		7253	0.000	7401	0.848	7718	0.000	8202	0.097	8593	0.088	9358	0.018	9847	0.510
				7431	0.791			8231	0.044	8608	0.026	9417	0.000	9871	0.264
				7499	0.351			8305	0.000	8661	0.000			9907	0.088
				7549	0.088									9921	0.044
				7623	0.000									9936	0.000

Fig. 153. continued

Sloan DSS - Fukugita *et al.* - 1996

Photometric system of the SLOAN Digital Sky Survey.

GENERAL INFORMATION

AUTHORS	M. Fukugita, T. Ichikawa, J. E. Gunn, M. Doi, K. Shimasaku and D. P. Schneider
TELESCOPE	2.5m (reflector), Apache Point Obs.
DETECTOR	thinnned, antireflection UV-coated CCD
MAIN ARTICLE	Fukugita, M., Ichikawa, T., Gunn, J. E., Doi, M., Shimasaku, K., Schneider, D. P. 1996, AJ 111, 1748

SYSTEM DESCRIPTION

BANDS DESCRIPTION [109]

band	filter	coating	λ_{eff} (Å) (#)		FWHM (Å) (#)	
u'	1mm UG11 + 1mm BG38 + 3mm quarz	suppresses 6600-8200 Å	3557	3522	599	634
g'	2mm GG400 + 3mm BG38	short-pass coating cut off λ 5500 Å	4825	4803	1379	1409
r'	4mm OG550 + 1mm BK7	short-pass coating cut off λ 7000 Å	6261	6254	1382	1388
i'	4mm RG695 + 1mm BK7	short-pass coating cut off λ 8500 Å	7672	7668	1535	1535
z'	4mm RG830 + 1mm BK7		9097	9114	1370	1409

(#) left-side values comprise atmospheric extinction, those at right not.

SYSTEM ANALYSIS

RELATIONS WITH OTHER SYSTEMS [109]

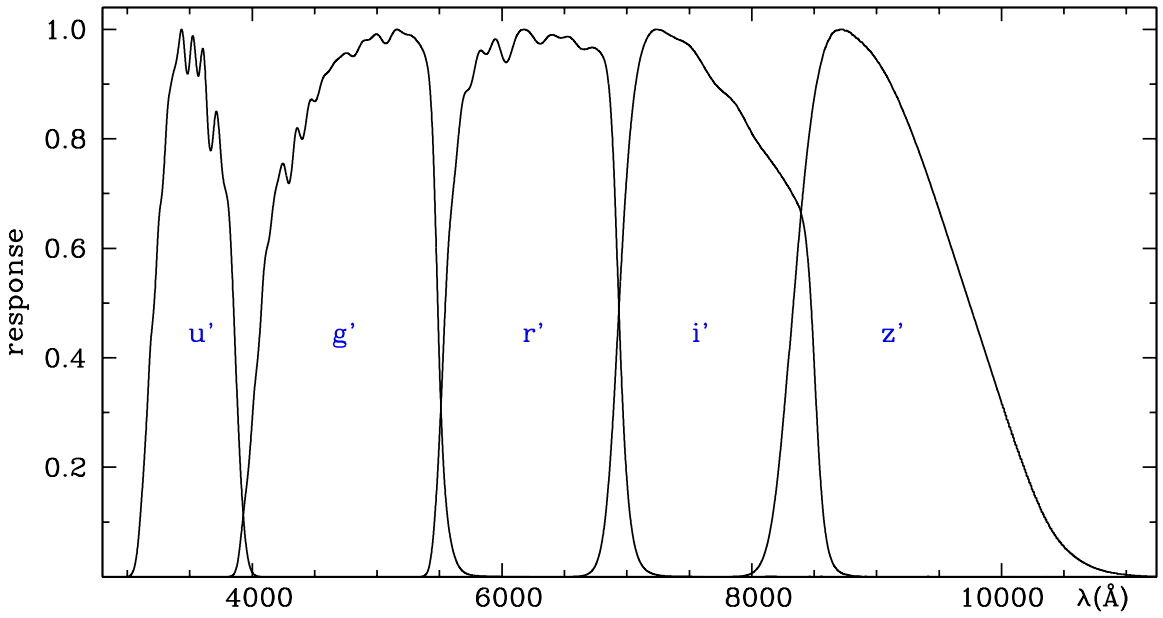
UBV - Johnson and Morgan - 1953, *RI* - Cousins - 1976

For stars with $(B-V) \leq +1.5$:

g'	=	$V + 0.56\,(B-V) - 0.12$	
r'	=	$V - 0.49\,(B-V) + 0.11$	
r'	=	$V - 0.84\,(V-R_C) + 0.13$	
$(u'-g')$	=	$1.38\,(U-B) + 1.14$	
$(g'-r')$	=	$1.05\,(B-V) - 0.23$	
$(r'-i')$	=	$0.98\,(R_C-I_C) - 0.23$	for $(R_C-I_C) < +1.15$
$(r'-i')$	=	$1.40\,(R_C-I_C) - 0.72$	for $(R_C-I_C) \geq +1.15$
$(r'-z')$	=	$1.59\,(R_C-I_C) - 0.40$	for $(R_C-I_C) < +1.65$
$(r'-z')$	=	$2.64\,(R_C-I_C) - 2.16$	for $(R_C-I_C) \geq +1.65$

Fig. 154. The photometric system Sloan DSS – Fukugita el al. – 1996

TRASMISSION CURVES [109]



u'		*g'*		*r'*		*i'*		*z'*			
λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ
2935	0.000	3760	0.000	5280	0.000	6540	0.000	7830	0.000	10430	0.077
2985	0.000	3860	0.008	5380	0.002	6640	0.002	7930	0.001	10530	0.049
3035	0.005	3960	0.176	5480	0.171	6740	0.017	8030	0.012	10630	0.030
3085	0.060	4060	0.442	5580	0.633	6840	0.136	8130	0.065	10730	0.018
3135	0.211	4160	0.663	5680	0.861	6940	0.505	8230	0.232	10830	0.010
3185	0.420	4260	0.748	5780	0.926	7040	0.843	8330	0.491	10930	0.006
3235	0.581	4360	0.820	5880	0.955	7140	0.973	8430	0.748	11030	0.003
3285	0.718	4460	0.868	5980	0.968	7240	1.000	8530	0.912	11130	0.001
3335	0.881	4560	0.907	6080	0.962	7340	0.990	8630	0.987	11230	0.000
3385	0.934	4660	0.940	6180	1.000	7440	0.979	8730	1.000		
3435	1.000	4760	0.957	6280	0.977	7540	0.960	8830	0.986		
3485	0.919	4860	0.968	6380	0.989	7640	0.923	8930	0.964		
3535	0.977	4960	0.985	6480	0.985	7740	0.892	9030	0.934		
3585	0.937	5060	0.975	6580	0.978	7840	0.872	9130	0.891		
3635	0.868	5160	1.000	6680	0.964	7940	0.837	9230	0.840		
3685	0.801	5260	0.990	6780	0.960	8040	0.796	9330	0.782		
3735	0.813	5360	0.965	6880	0.819	8140	0.764	9430	0.717		
3785	0.707	5460	0.705	6980	0.250	8240	0.731	9630	0.579		
3835	0.579	5560	0.117	7080	0.042	8340	0.693	9730	0.508		
3885	0.297	5660	0.017	7180	0.008	8440	0.602	9830	0.438		
3935	0.094	5760	0.003	7280	0.002	8540	0.213	9930	0.367		
3985	0.016	5860	0.001	7380	0.001	8640	0.030	10030	0.300		
4035	0.001	5960	0.000	7480	0.000	8740	0.005	10130	0.233		
4085	0.000					8840	0.001	10230	0.171		
4135	0.000					8940	0.000	10330	0.118		

Fig. 154. continued

StrömVil - Straizys *et al.* - 1996

Combines the *uvby Hβ - Strömgren and Crawford -1956* system with three bands from *Vilnius - Straizys et al. - 1965*.

GENERAL INFORMATION

AUTHORS V. Straizys, D. L. Crawford and A. G. Davis Philip

MAIN ARTICLE Straizys V., Crawford, D. L., Davis Philip A. G. 1996, Baltic Astron. 5, 83

SYSTEM DESCRIPTION

BANDS DESCRIPTION [290]

band	band (#)	λ_0 (A)	FWHM (A)
u	35	3500	300
P	37	3740	260
v	41	4110	190
b	47	4670	180
Z	51	5160	210
y	55	5470	230
S	66	6560	200

(#) Alternative name.

It has been proposed for implementation on the GAIA mission by ESA. [290]

TRANSMISSION CURVES [211]

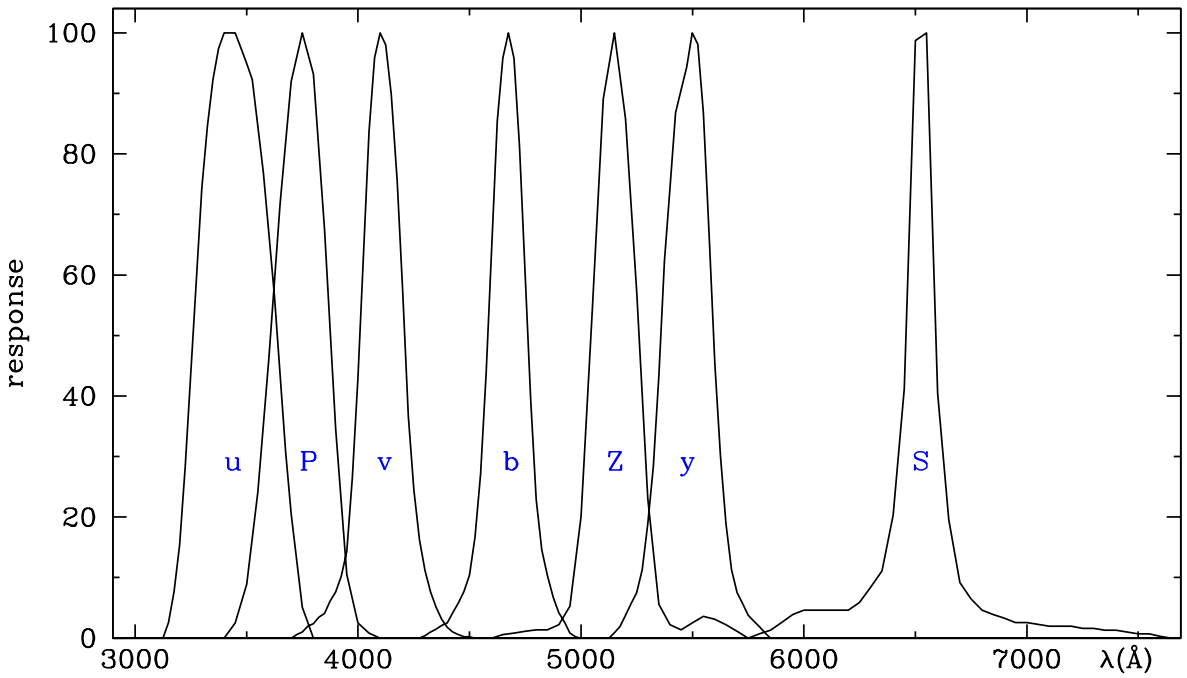


Fig. 155. The photometric system StrömVil – Straižys et al. – 1996

u		*P*		*v*		*b*		*Z*		*y*		*S*			
λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ
3125	0.0	3400	0.0	3700	0.0	4275	0.0	4600	0.0	5150	0.0	5750	0.0	6950	2.6
3150	2.6	3450	2.5	3750	1.0	4300	0.4	4650	0.6	5200	3.8	5800	0.7	7000	2.6
3200	15.4	3500	8.9	3800	2.4	4350	1.5	4700	0.8	5250	7.5	5850	1.3	7050	2.3
3250	43.6	3550	24.1	3850	4.1	4400	2.5	4750	1.1	5300	18.9	5900	2.6	7100	2.0
3300	74.4	3600	46.4	3900	7.6	4450	5.8	4800	1.4	5350	43.4	5950	3.9	7150	2.0
3350	92.3	3650	71.7	3950	14.3	4500	10.4	4850	1.4	5400	77.4	6000	4.6	7200	2.0
3400	100.0	3700	92.0	4000	42.9	4550	27.1	4900	2.2	5450	90.6	6050	4.6	7250	1.6
3450	100.0	3750	100.0	4050	83.7	4600	64.6	4950	5.3	5500	100.0	6100	4.6	7300	1.6
3500	94.9	3800	93.2	4100	100.0	4650	95.8	5000	20.1	5550	86.8	6150	4.6	7350	1.3
3550	84.6	3850	67.5	4150	89.8	4675	100.0	5050	53.8	5600	45.3	6200	4.6	7400	1.3
3600	66.7	3900	34.6	4200	57.1	4700	95.8	5100	89.1	5650	18.9	6250	5.9	7450	1.0
3650	43.6	3950	10.5	4250	24.5	4750	60.4	5150	100.0	5700	7.5	6300	8.5	7500	0.7
3700	20.5	4000	2.5	4300	11.2	4800	22.9	5200	85.8	5750	3.8	6350	11.1	7550	0.7
3750	5.1	4050	0.8	4350	5.1	4850	10.4	5250	57.4	5800	1.9	6400	20.3	7600	0.3
3800	0.0	4100	0.0	4400	1.8	4900	4.2	5300	23.1	5850	0.0	6450	41.2	7650	0.0
				4450	0.6	4950	0.8	5350	5.6			6500	98.7		
				4500	0.2	5000	0.0	5400	2.2			6550	100.0		
				4525	0.0			5450	1.4			6600	40.5		
								5500	2.5			6650	19.6		
								5550	3.6			6700	9.2		
								5600	3.1			6750	6.5		
								5650	2.2			6800	4.6		
								5700	1.1			6850	3.9		
								5750	0.0			6900	3.3		

Fig. 155. continued

ESO MIR - Van der Bliek *et al* - 1996

Mid-infrared photometry at ESO.

GENERAL INFORMATION

AUTHORS	N. S. Van der Bliek, J. Manfroid and P. Bouchet
TELESCOPE	3.6m, 2.2m, 1.0m (reflectors), ESO (La Silla)
DETECTOR	bolometer
MAIN ARTICLE	Van der Bliek, N. S., Manfroid, J., Bouchet, P. 1996, A&AS 109, 547

SYSTEM DESCRIPTION

BANDS DESCRIPTION [38]				FLUX CALIBRATION (#) [38]	
band	λ_0 (μm)	λ_{eff} (μm)(##)	FWHM (μm)	$F_{\lambda,0}$ (W m^{-2} nm^{-1})	$F_{\nu,0}$ (Jy)
N	11.055	9.682	5.47	$1.29\ 10^{-15}$	$4.17\ 10^{1}$
N_1	8.361	8.328	0.72	$2.50\ 10^{-15}$	$5.78\ 10^{1}$
N_2	9.787	9.650	1.57	$1.40\ 10^{-15}$	$4.35\ 10^{1}$
N_3	12.819	12.774	1.15	$4.64\ 10^{-16}$	$2.53\ 10^{1}$
Q_0	18.666	18.425	3.23	$1.09\ 10^{-16}$	$1.23\ 10^{1}$

(#) Fluxes for a 0.0 mag star.

(##) For a 11400 K blackbody.

ZERO POINT: The colors of β Hyi (G2 IV) and α Cen (G2 V) are taken equal to the colors of the Sun. [38]

Fig. 156. The photometric system ESO MIR – Van der Bliek et al. – 1996

ESO NIR - Van der Bliek *et al.* - 1996

Infrared line photometry via CWF at ESO.

GENERAL INFORMATION

AUTHORS	N. S. Van der Bliek, J. Manfroid and P. Bouchet
TELESCOPE	ESO 3.6m, ESO/MPI 2.2m, ESO 1m
DETECTOR	InSb
MAIN ARTICLE	Van der Bliek, N. S., Manfroid, J., Bouchet, P. 1996, A&AS 109, 547

SYSTEM DESCRIPTION

BANDS DESCRIPTION [38]				FLUX CALIBRATION (#) [38]	
band	λ_0 (μm)	λ_{eff} (μm)(##)	FWHM (μm)	$F_{\lambda,0}$ (W m^{-2} nm^{-1})	$F_{\nu,0}$ (Jy)
H_0	1.577	1.577	0.031	1.37 10^{-12}	1.14 10^{3}
Br_γ	2.161	2.161	0.037	4.38 10^{-13}	6.83 10^{2}
K_0	2.221	2.220	0.038	3.97 10^{-13}	6.53 10^{2}
CO	2.291	2.290	0.039	3.54 10^{-13}	6.19 10^{2}
L_0	3.706	3.706	0.050	5.78 10^{-14}	2.65 10^{2}

(#) Fluxes for a 0.0 mag. star.

(##) Best fit values with a 11400 K black body.

The bands are obtained via a Continous Wheel Filter (CWF), at fixed positions.

ZERO POINT: For the star HR 3314 (A0 V) it is $H_0 = H$, $Br_\gamma = K_0 = CO = K$ and $L_0 = L'$ where H, K, and L', are from the *JHKL'M ESO - Bouchet et al. - 1991* system. [38]

Fig. 157. The photometric system ESO NIR – Van der Bliek et al. – 1996

MANIAC - Böker *et al.* - 1997

Photometric system for the Mid And Near Infrared Array Camera (MANIAC).

GENERAL INFORMATION

AUTHORS	T. Böker, J. W. V. Storey, A. Krabbe and T. Lehmann
TELESCOPE	2.2m (reflector), ESO (La Silla)
DETECTOR	Si:As CCD, 128 X 128 pixels
MAIN ARTICLE	Böker, T., Storey, J. W. V., Krabbe, A., Lehmann, T. 1997, PASP 109, 827

SYSTEM DESCRIPTION

BANDS DESCRIPTION [40]

band	λ_0 (μm)	width (μm)	Υ_{peak} (%)	feature
803(#)	8.03	0.15	45	
1036	10.36	0.12	60	continuum
N	10.50	5.0	80	N-band
1053	10.53	0.12	60	SIV
1068	10.68	0.12	60	continuum
1256	12.56	0.15	54	continuum
1282	12.82	0.15	54	NeII
1295	12.95	0.12	62	continuum
Q'	17.60	1.80	60	Q'-band
1843	18.43	0.19	40	continuum
1873	18.73	0.19	40	SIII
1900	19.00	0.21	40	continuum
Q	20.00	5.40	45	Q-band

(#) The *803* band is also called "the Sweet Spot".

Fig. 158. The photometric system MANIAC – Böker et al. – 1997

Damineli *et al.* - 1997

Near-infrared photometry of Wolf-Rayet stars.

GENERAL INFORMATION

AUTHORS	A. Damineli, F. Jablonski, L. C. de Freitas and J. A. de Freitas-Pacheco
TELESCOPE	1.6m (reector), Laboratorio Nacional de Astrosica, Brazil
DETECTOR	GEC 385 x 578 pixel, front illuminated CCD
MAIN ARTICLE	Damineli, A., Jablonski, F., de Freitas, L. C., de Freitas-Pacheco, J. A. 1997, PASP 109, 633

SYSTEM DESCRIPTION

BANDS DESCRIPTION [82]

band	λ_c (A)(#)		FWHM (A)(#)		feature
970	9716	9709	143	150	CIII
990	9901	9894	192	198	continuum
1013	10133	10126	90	96	HeII

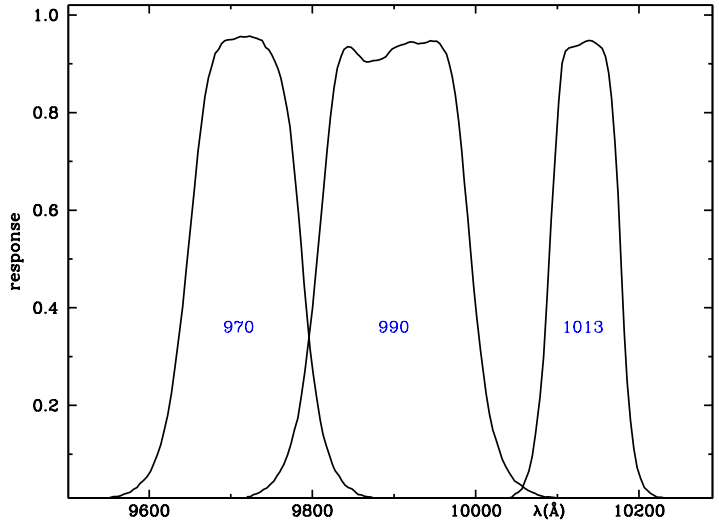
(#) Left side values are for an unobstructed parallel incident beam, right side quantities are for an f/5.6 and 20% central obstruction incident beam.

Filters by Boston Electronics.

ZERO POINT: Colors are zero for θ Vir (A1 IV) [82].

TRANSMISSION CURVES

As derived from Fig 3 of [82] for the case of a parallel beam.



970		*990*		*1013*	
λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ
9500	0.000	9690	0.000	10010	0.000
9515	0.004	9700	0.005	10020	0.006
9530	0.007	9715	0.013	10030	0.008
9545	0.009	9730	0.018	10040	0.010
9560	0.013	9745	0.032	10050	0.020
9575	0.021	9760	0.063	10060	0.042
9590	0.042	9775	0.128	10070	0.103
9605	0.077	9790	0.261	10080	0.235
9620	0.159	9805	0.487	10090	0.499
9635	0.321	9820	0.757	10100	0.781
9650	0.554	9835	0.915	10110	0.926
9665	0.787	9850	0.930	10120	0.935
9680	0.917	9865	0.904	10130	0.942
9695	0.949	9880	0.907	10140	0.948
9710	0.955	9895	0.926	10150	0.938
9725	0.956	9910	0.939	10160	0.908
9740	0.943	9925	0.944	10170	0.752
9755	0.902	9940	0.948	10180	0.418
9770	0.798	9955	0.944	10190	0.162
9785	0.553	9970	0.884	10200	0.060
9800	0.277	9985	0.681	10210	0.026
9815	0.128	10000	0.401	10220	0.014
9830	0.061	10015	0.200	10230	0.010
9845	0.031	10030	0.102	10240	0.007
9860	0.016	10045	0.051	10250	0.003
9875	0.010	10060	0.030	10260	0.000
9890	0.005	10075	0.017		
9890	0.000	10090	0.008		
		10105	0.000		

Fig. 159. The photometric system Damineli et al. – 1997

TNG - Marchetti *et al.* - 1997

Discrimination between M, S and Carbon stars in observations obtained with the Speckle Camera at TNG.

GENERAL INFORMATION

AUTHORS	E. Marchetti, S. Mallucci, A. Ghedina, J. Farinato, A. Baruffolo, U. Munari, R. Ragazzoni
TELESCOPE	3.6m (reflector) Telescopio Nazionale Galileo, La Palma
DETECTOR	CCD
MAIN ARTICLE	Marchetti, E., Mallucci, S., Ghedina, A., Farinato, J., Baruffolo, A., Munari, U., Ragazzoni, R. 1997, proc. "The Three Galileos: the Man, the Spacecraft, the Telescope" (Padova 1997), Dordrecht Kluwer Academic Publishers, Ap&SpSci Lib. vol 220, 383 (C. Barbieri, J. H. Rahe, T. V. Johnson, A. M. Sohus ed.s)

SYSTEM DESCRIPTION

BANDS DESCRIPTION [196]

band	filter	λ_0 (Å)	half-width (Å)	feature
b (#)	Oriel 51690	4750	300	
y (#)	Oriel 51300 + Oriel 51970	5470	300	
C_2	interference	5500	100	C_2 band
C_2 *cont*	interference	5700	100	continuum
broad blue	Oriel 57377 (short-pass)	5800	1000	
ZrO	interference	6500	100	ZrO band
660	interference	6600	100	continuum, Hα and [NII]
TiO	interference	6700	100	TiO band

(#) *b, y* intended to match the corresponding bands of the *uvbyH*β - *Strömgren and Crawford - 1956* system.

SYSTEM ANALYSIS

COLOR INDICES AND PARAMETERS [196]

$(C_2 - C_{2\ cont})$: C_2 band index

(TiO – 660) : TiO band index

(ZrO – 660) : ZrO band index

Fig. 160. The photometric system TNG – Marchetti et al. – 1997

UBV(RI)$_{MW}$ - Sandage - 1997

Standard *UBVRI* photometry at Mount Wilson.

GENERAL INFORMATION

AUTHORS	A. Sandage
TELESCOPE	1.52m and 2.54m (reflectors), Mount Wilson Obs.
DETECTOR	extended S-20
MAIN ARTICLE	Sandage, A. 1997, PASP 109, 1193

SYSTEM ANALYSIS

RELATIONS WITH OTHER SYSTEMS [255]

UBVRI(JHKLMN) - Johnson - 1965

$(V-R)_{MW}$	=	$0.70\,(V-R)_J$	for $(V-R)_{MW} < 0.80$
$(V-R)_{MW}$	=	$0.43\,(V-R)_J + 0.312$	for $(V-R)_{MW} > 0.80$

RI - Eggen - 1965

$(R-I)_{MW}$	=	$1.20\,(R-I)_E + 0.08$	$0 < (R-I)_{MW} < 2.3$

Fig. 161. The photometric system UBV(RI)$_{MW}$ – Sandage – 1997

UWTAT - Strassmeier *et al.* - 1997

Photometry with the Twin Automatic Photoelectric Telescope of the University of Wien.

GENERAL INFORMATION

AUTHORS	K. Strassmeier, L. J. Boyd, D. H. Epand and Th. Granzer
TELESCOPE	0.75m (reflectors), Fairborn Obs.
DETECTOR	EMI-9124QB (telescope Wolfgang)
	EMI-9828 (telescope Amadeus)
MAIN ARTICLE	Strassmeier, K. G., Boyd, L. J., Epand, D. H., Granzer, Th. 1997, PASP 109, 697

SYSTEM DESCRIPTION

BANDS DESCRIPTION [291]

band	λ_c (Å)	FWHM (Å)	Υ_{peak}
u	3500	340	
U	3540	675	79
v	4102	165	52
B	4340	985	57
Hβ wide	4862	180	72
Hβ narrow	4864	30	66
b	4870	240	78
V	5500	1150	78
y	5491	248	77
R_C	6255	1700	75
Hα wide	6562	285	82
Hα narrow	6564	31	77
I_C	7875	1350	82

Fig. 162. The photometric system UWTAT – Strassmeier et al. – 1997

NICMOS HST - 1997

Filter system for the Near-Infrared Camera and Multi-Object Spectrograph on board HST.

GENERAL INFORMATION

TELESCOPE 2.4m Hubble Space Telescope
DETECTOR HgCdTe arrays (NIC1, NIC2, NIC3)
MAIN ARTICLE Calzetti *et al* 1999, NICMOS Instrument Handbook, Version 3.0 (Baltimore: STScI)

SYSTEM DESCRIPTION

BANDS DESCRIPTION [56], pg. 41

band	λ_c (μm)	bandwidth (μm)	NIC	feature
F090M	0.9	0.8-1.0	1	
F095N	0.953	1%	1	[S III]
F097N	0.97	1%	1	[S III] continuum
F108N	1.083	1%	1,3	He I
F110M	1.1	1.0-1.2	1	
F110W	1.025	0.8-1.35	1,2,3	
F113N	1.13	1%	1,3	He I continuum
F140W	1.3	0.8-1.8	1	
F145M	1.45	1.35-1.55	1	H_2O
F150W	1.5	1.1-1.9	3	
F160W	1.55	1.35-1.75	1,2,3	
F164N	1.644	1%	1,3	[Fe II]
F165M	1.6	1.55-1.75	1,2	
F166N	1.66	1%	1,3	[Fe II] continuum
F170M	1.7	1.6-1.8	1	
F171M	1.715	1.68-1.75	2	HCO_2 and C_2 continuum
F175W	1.75	1.2-2.3	3	
F180M	1.80	1.765-1.835	2	HCO_2 and C_2 band
F187N	1.87	1%	1,2,3	Pashen α
F187W	1.875	1.75-2.0	2	
F190N	1.90	1%	1,2,3	Pashen α continuum
F196N	1.962	1%	3	[Si VI]
F200N	2.0	1%	3	[Si VI] continuum
F204M	2.04	1.9-2.09	2	CH_4
F205M	2.05	1.8-2.3	3	
F205W	1.9	1.75-2.35	2	

continues

Fig. 163. The photometric system NICMOS HST – 1997

BANDS DESCRIPTION [56], pg. 41				
band	λ_c (μm)	bandwidth (μm)	NIC	feature
F207M	2.1	2.0-2.15	2	
F212N	2.121	1%	2,3	H_2
F215N	2.15	1%	2,3	H_2 and Br γ continuum
F216N	2.165	1%	2	Br γ
F222M	2.3	2.15-2.30	2,3	CO continuum
F237M	2.375	2.3-2.45	2	CO
F240M	2.4	2.3-2.5	3	CO

The "NIC" column lists the cameras for which the given lter is available

SYSTEM ANALYSIS

RELATIONS WITH OTHER SYSTEMS [282]

JHKL' CTIO - Elias *et al.* - 1982

from observations obtained with the NIC2 camera:

for $-1.3 < (F110W - F222M) < 0.0$

J_{CIT}	=	$F110W - 0.198(\pm0.036)\ (F110W - F222M) + 21.754(\pm0.030)$
H_{CIT}	=	$F160W - 0.177(\pm0.037)\ (F110W - F222M) + 21.450(\pm0.028)$
K_{CIT}	=	$F222W - 0.074(\pm0.037)\ (F110W - F222M) + 20.115(\pm0.031)$

for $0.1 < (F110W - F160W) < 0.9$

J_{CIT}	=	$F110W - 0.344(\pm0.063)\ (F110W - F160W) + 22.054(\pm0.034)$
H_{CIT}	=	$F160W - 0.305(\pm0.065)\ (F110W - F160W) + 21.715(\pm0.037)$

TRANSMISSION CURVES [56]

To save space the transmission proles of the bands are plotted but not tabulated. The proles can be obtained in tabular form via STSDAS (inside Iraf) or from the ADPS *www* site.

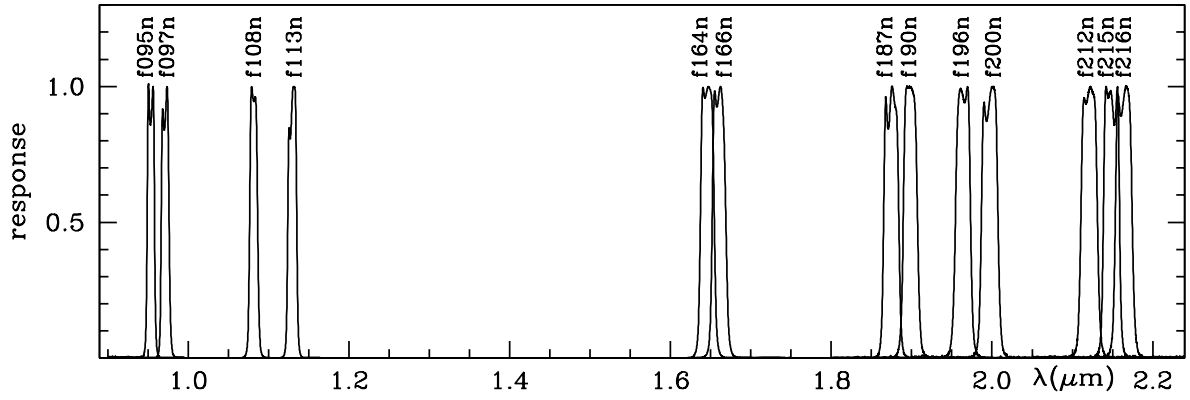


Fig. 163. continued

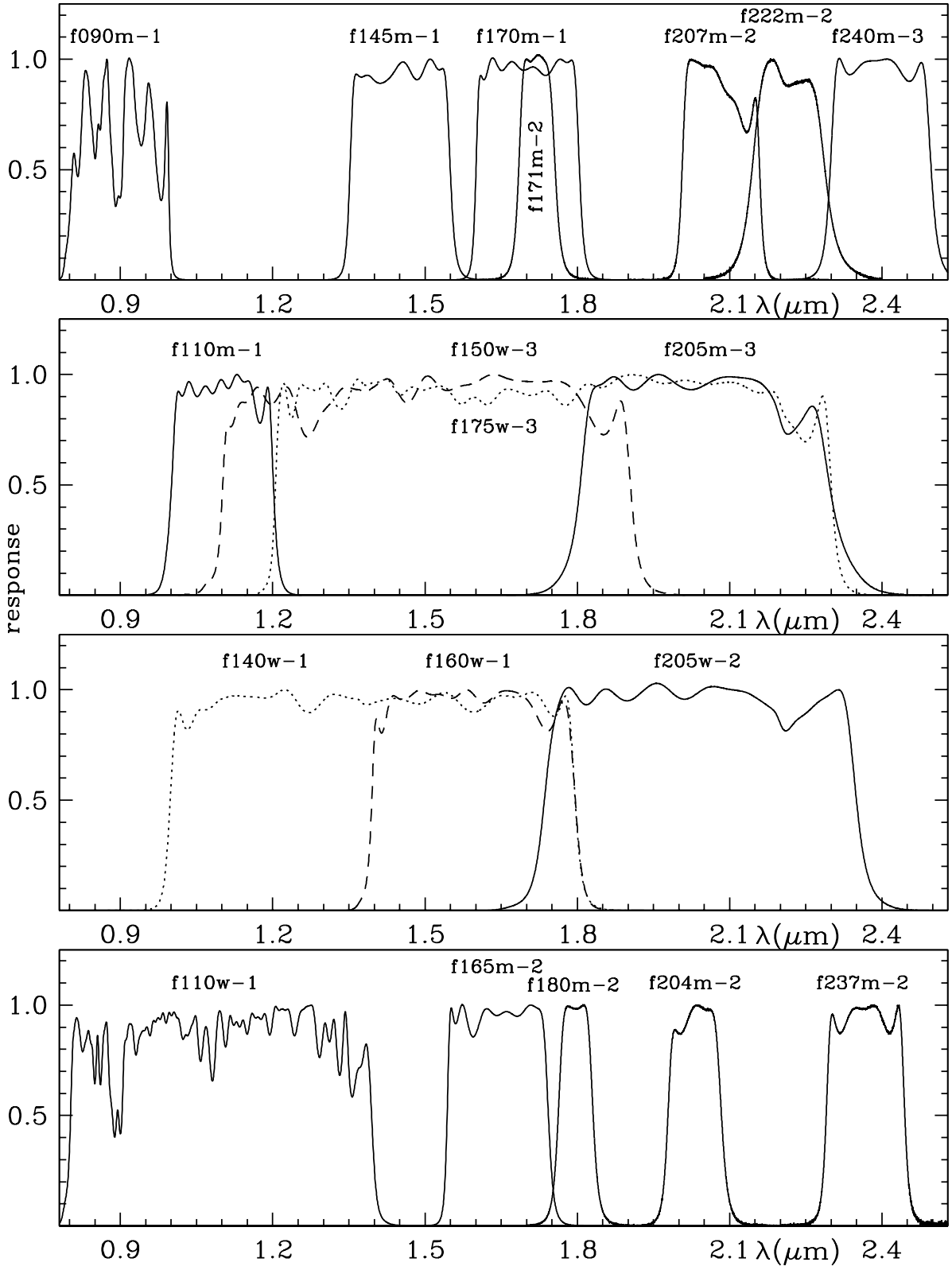


Fig. 163. continued

STIS HST - 1997

Filter system of the Space Telescope Imaging Spectrograph (STIS).

GENERAL INFORMATION

TELESCOPE	2.4m Hubble Space Telescope
DETECTOR	SITe 1024x1024 thinned CCD
MAIN ARTICLE	Baum, S., *et al* 1996 STIS intrument Handbook, Version 1.0 (Baltimore, STScI)

SYSTEM DESCRIPTION

BANDS DESCRIPTION [24], pg. 48

band		λ_c (Å)	FWHM (Å)	feature
Visible				
50CCD	Oclear	≈ 3750-8300 Å		Clear
F28X50LP	Oclear-lp	$\lambda > 5550$ Å		longpass
F28X50OII	[OII]	3740	80	[OII]
F28X50OIII	[OIII]	5007	5	[OIII]
Ultraviolet				
25MAMA-F	Fclear	≈ 1150-1700 Å		Clear
F25SRF2	Fsrf2	$\lambda > 1280$ Å		longpass
F25QTZ	Fqtz	$\lambda > 1450$ Å		longpass
25MAMA-N	Nclear	≈ 1750-3100 Å		Clear
N25SRF2	Nsrf2	$\lambda > 1280$ Å		longpass
N25QTZ	Nqtz	$\lambda > 1450$ Å		longpass
F25LYA	Lya	1216	85	Lyman α
F25CN182	cn182	1820	350	continuum at 1800 Å
F25CIII	CIII	1909	70	[CIII]
F25CN270	cn270	2700	350	continuum at 2700 Å
F25MGII	MgII	2800	70	Mg II

Fig. 164. The photometric system STIS HST – 1997

TRANSMISSION CURVES [24]

To save space the transmission proles of the bands are plotted but not tabulated. The proles can be obtained in tabular form via STSDAS (inside Iraf) or from the ADPS *www* site.

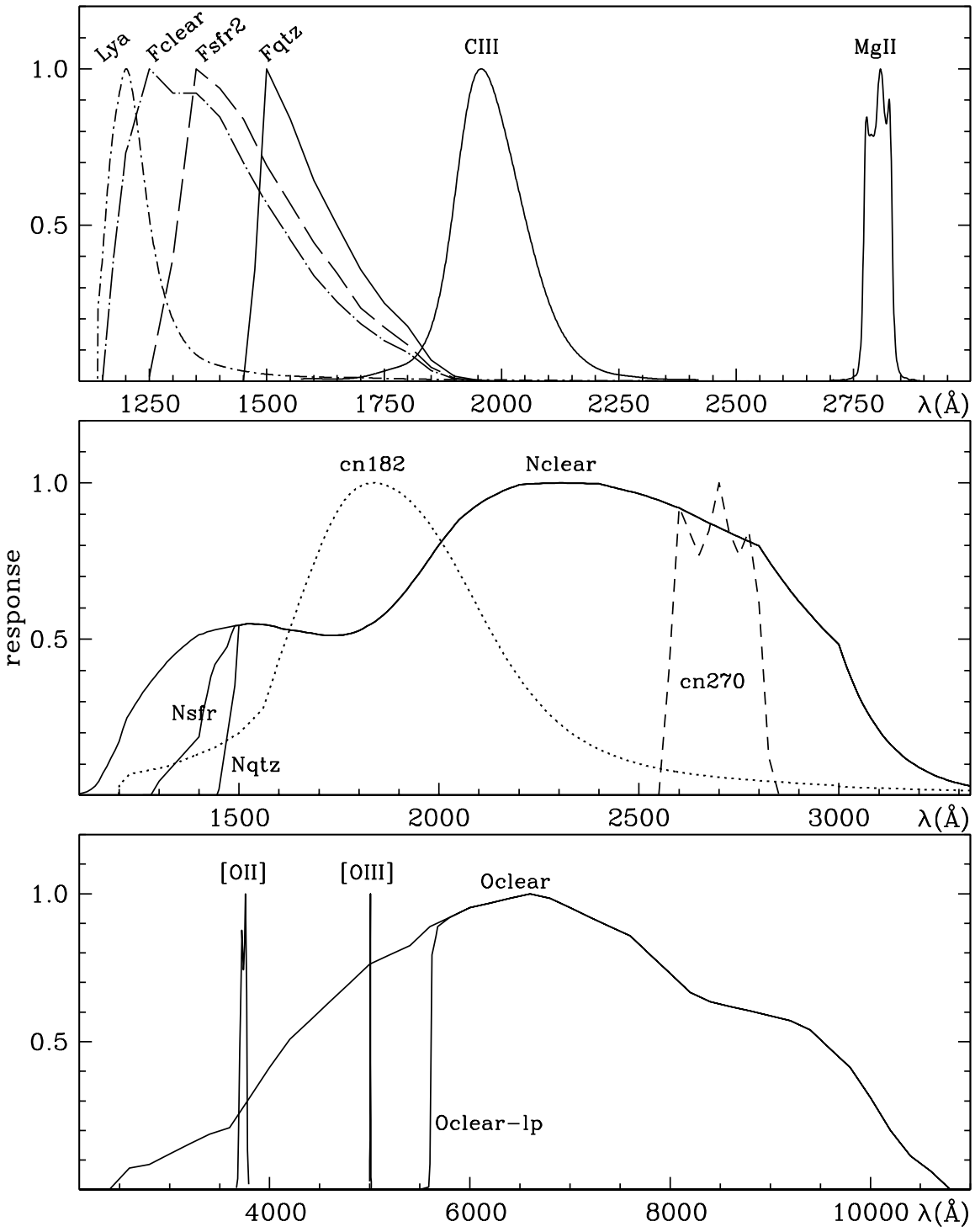


Fig. 164. continued

Royer *et al.* - 1998

Classification of Wolf-Rayet stars.

GENERAL INFORMATION

AUTHORS	P. Royer, J. -M. Vreux and J. Manfroid
TELESCOPE	1m (reflector), ESO (La Silla)
DETECTOR	RCA 31034
MAIN ARTICLE	Royer, P., Vreux, J.-M., Manfroid, F. 1998, A&AS 130, 407

SYSTEM DESCRIPTION

BANDS DESCRIPTION [253]

filter	λ_c (Å)	FWHM (Å)	feature
r_{HeII}	4648	30	HeII 4686 Å
c_1	5057	53	continuum
r_{CIV}	5806	27	CIV 5801- 12 Å
r_{HeI}	5881	26	HeI 5876 Å
c_2	6051	28	continuum

Interference filters.

SYSTEM ANALYSIS

COLOR INDICES AND PARAMETERS [253]

$l(HeII) = [c_1 + 0.373\,(c_1 - c_2)] - r_{HeII}$: normalized intensity of the HeII line at 4686 Å .

$l(CIV) = [c_2 + 0.2475\,(c_1 - c_2)] - r_{CIV}$: normalized intensity of the CIV line at 5807 Å .

$l(HeI) = [c_2 + 0.177\,(c_1 - c_2)] - r_{HeI}$: normalized intensity of the HeI line at 5876 Å .

Fig. 165. The photometric system Royer et al. – 1998

Asiago GAIA - Munari - 1998

Conceptual study of a 5 broad + 5 intermediate bands photometric system for the GAIA satellite by ESA.
The study by [221] is a revision of a preliminary design by [216].

GENERAL INFORMATION

AUTHORS U. Munari
MAIN ARTICLE Munari, U. 1998, Proc. *ESA Leiden Workshop on GAIA*, Baltic Astron. 8, 123

SYSTEM DESCRIPTION

BANDS DESCRIPTION [221]

band	λ_{peak} (Å)	FWHM (Å)	band	λ_{peak} (Å)	FWHM (Å)
broad bands			*intermediate bands*		
b300	3000	1415	*i387*	3865	190
b480	4800	1500	*i410*	4095	178
b630	6300	1500	*i430*	4302	118
b792	7920	1720	*i517*	5173	84
b964	9640	1700	*i531*	5307	168

substitute and supplementary bands					
b340	3400	615	*i656*	6560	75
			i839	8390	180
			i853	8535	118

ZERO POINT: α Lyr has all colors equal to 0.00.
b340 is a substitute for *b300* if the latter could not be accommodated in the final Focal Plane Assembly design.
i839, i853 are substitute bands for *i517, i531. i656* is a supplementary band aimed to detect Hα in emission and in combination with *b480, b630, b792* bands to measure the strength of 6200 and 6700 Å TiO absorption bands.

SYSTEM ANALYSIS

COLOR INDICES AND PARAMETERS [221]

Metallicity indices from intermediate bands:

$m_a = i378 - i410 - 0.10$: Fe discontinuity index.

$m_b = (i430 - i410) - (i410 - i387) - 0.11 = i430 - 2\,i410 + i387 - 0.11$: reddening-free index based on Fe and CH abundances.

$m_c = i517 - i531 - 0.10$: Mg index.

$m_d = i853 - i839 - 0.02$: Ca II index.

$m_e = (i656 - b630) - 0.12\,(b480 - b792)$: TiO index.

metallicity of G dwarfs: $[Z/Z_\odot] = -2.53 + 4.13\,m_a$ $[Z/Z_\odot] = -2.80 + 3.98\,m_b$

metallicity of G supergiants: $[Z/Z_\odot] = -2.32 + 3.60\,m_a$ $[Z/Z_\odot] = -2.33 + 3.86\,m_b$

REDDENING RATIOS [221]

$E_{b300-b480} = 1.82\,E_{B-V}$ $E_{b480-b630} = 1.04\,E_{B-V}$ $E_{b630-b792} = 0.76\,E_{B-V}$ $E_{b792-b964} = 0.58\,E_{B-V}$

$A_{b300} = 5.55\,E_{B-V}$ $A_{b480} = 3.73\,E_{B-V}$ $A_{b630} = 2.69\,E_{B-V}$ $A_{b792} = 1.93\,E_{B-V}$ $A_{b964} = 1.35\,E_{B-V}$

REDDENING-FREE PARAMETERS [221]

$Q_a = (b300 - b480) - 1.75\,(b480 - b630)$ $Q_b = (b480 - b630) - 1.79\,(b792 - b964)$

Fig. 166. The photometric system Asiago GAIA – Munari – 1998

RELATIONS WITH OTHER SYSTEMS [221]

UBV - Johnson and Morgan - 1953

$b300 - b480$	=	$-0.043 + 1.961\,(U-B)$	for $(U-B) < -0.05$
	=	$+0.701 + 1.181\,(U-B) + 0.644\,(U-B)^2$	for $(U-B) > +0.02$
$b480 - b630$	=	$+0.004 + 1.061\,(B-V) + 0.092\,(B-V)^2$	

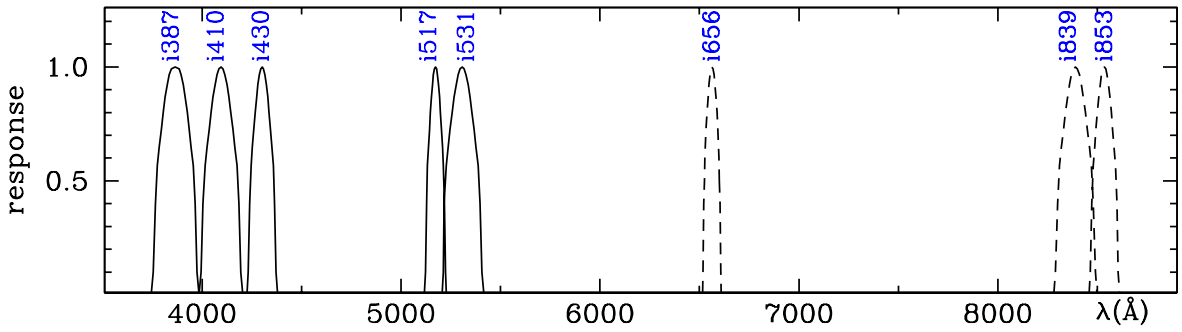
RI - Cousins - 1976

$b630 - b792$	=	$-0.011 + 1.550\,(V-R) - 1.138\,(V-R)^2 - 0.625\,(V-R)^3$	for $(V-R) < 0.70$
$b792 - b964$	=	$+0.021 + 2.064\,(R-I) + 2.712\,(R-I)^2$	for $(R-I) < 0.00$
	=	$-0.028 + 0.113\,(R-I) + 0.806\,(R-I)^2 - 0.127\,(R-I)^3$	for $(R-I) > 0.00$

Sloan DSS - Fukugita *et al.* - 1996

$b300 - b480$	=	$+0.005 + 1.527\,(u-g)$	for $(u-g) < -0.10$
	=	$-0.405 + 1.374\,(u-g)$	for $(u-g) > +0.10$
$b480 - b630$	=	$+0.002 + 1.021\,(g-r)$	
$b630 - b792$	=	$-0.002 + 1.108\,(r-i)$	
$b792 - b964$	=	$+0.007 + 1.433\,(i-z)$	for $(i-z) < -0.02$
	=	$-0.033 + 1.243\,(i-z)$	for $(i-z) > +0.05$

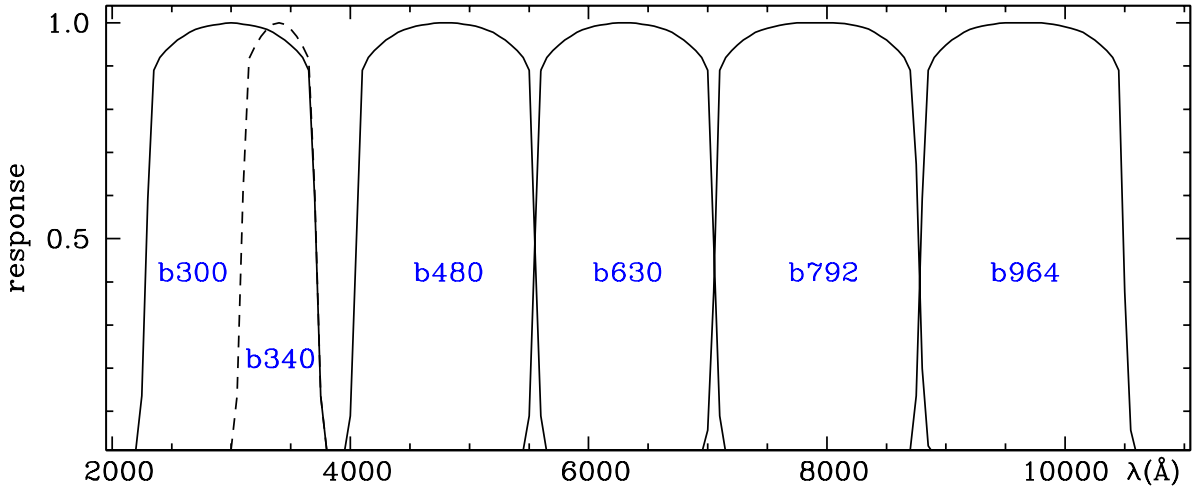
TRANSMISSION CURVES [221]



i387		*i410*		*i430*		*i517*		*i531*	
λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ
3745	0.000	3985	0.000	4225	0.000	5118	0.000	5207	0.000
3755	0.100	3995	0.100	4232	0.100	5123	0.100	5212	0.100
3765	0.400	4005	0.400	4239	0.400	5128	0.400	5217	0.400
3775	0.566	4015	0.566	4246	0.566	5133	0.566	5227	0.566
3785	0.647	4025	0.647	4253	0.647	5138	0.647	5237	0.647
3795	0.726	4035	0.726	4260	0.726	5143	0.726	5247	0.726
3805	0.801	4045	0.801	4267	0.801	5148	0.801	5257	0.801
3815	0.867	4055	0.867	4274	0.867	5153	0.867	5267	0.867
3825	0.923	4065	0.923	4281	0.923	5158	0.923	5277	0.923
3835	0.965	4075	0.965	4288	0.965	5163	0.965	5287	0.965
3845	0.991	4085	0.991	4295	0.991	5168	0.991	5297	0.991
3865	1.000	4095	1.000	4302	1.000	5173	1.000	5307	1.000
3885	0.991	4105	0.991	4309	0.991	5178	0.991	5317	0.991
3895	0.965	4115	0.965	4316	0.965	5183	0.965	5327	0.965
3905	0.923	4125	0.923	4323	0.923	5188	0.923	5337	0.923
3915	0.867	4135	0.867	4330	0.867	5193	0.867	5347	0.867
3925	0.801	4145	0.801	4337	0.801	5198	0.801	5357	0.801
3935	0.726	4155	0.726	4344	0.726	5203	0.726	5367	0.726
3945	0.647	4165	0.647	4351	0.647	5208	0.647	5377	0.647
3955	0.566	4175	0.566	4358	0.566	5213	0.566	5387	0.566
3965	0.400	4185	0.400	4365	0.400	5218	0.400	5397	0.400
3975	0.100	4195	0.100	4372	0.100	5223	0.100	5407	0.100
3985	0.000	4205	0.000	4379	0.000	5228	0.000	5417	0.000

i656		*i839*		*i853*	
λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ
6515	0.000	8280	0.000	8458	0.000
6517	0.080	8290	0.100	8465	0.100
6522	0.390	8300	0.400	8472	0.400
6525	0.500	8310	0.566	8479	0.566
6528	0.600	8320	0.647	8486	0.647
6533	0.720	8330	0.726	8493	0.726
6538	0.800	8340	0.801	8500	0.801
6543	0.867	8350	0.867	8507	0.867
6548	0.923	8360	0.923	8514	0.923
6553	0.965	8370	0.965	8521	0.965
6558	0.991	8380	0.991	8528	0.991
6563	1.000	8390	1.000	8535	1.000
6568	0.991	8400	0.991	8542	0.991
6573	0.965	8410	0.965	8549	0.965
6578	0.923	8420	0.923	8556	0.923
6583	0.867	8430	0.867	8563	0.867
6588	0.800	8440	0.801	8570	0.801
6593	0.720	8450	0.726	8577	0.726
6598	0.600	8460	0.647	8584	0.647
6600	0.500	8470	0.566	8591	0.566
6603	0.390	8480	0.400	8598	0.400
6608	0.080	8490	0.100	8605	0.100
6610	0.000	8500	0.000	8612	0.000

Fig. 166. continued



b300		*b480*		*b630*		*b792*		*b964*	
λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ	λ (A)	ϒ
2150	0.000	3900	0.000	5400	0.000	6900	0.000	8650	0.000
2200	0.011	3950	0.006	5450	0.006	6950	0.003	8700	0.011
2250	0.136	4000	0.089	5500	0.089	7000	0.056	8750	0.136
2300	0.592	4050	0.489	5550	0.489	7050	0.377	8800	0.592
2350	0.890	4100	0.890	5600	0.890	7100	0.890	8850	0.890
2400	0.920	4150	0.920	5650	0.920	7150	0.920	8900	0.920
2450	0.936	4200	0.936	5700	0.936	7200	0.936	8950	0.936
2500	0.948	4250	0.948	5750	0.948	7250	0.948	9000	0.948
2550	0.960	4300	0.960	5800	0.960	7300	0.960	9050	0.960
2600	0.969	4350	0.969	5850	0.969	7350	0.969	9100	0.969
2650	0.978	4400	0.978	5900	0.978	7400	0.978	9150	0.978
2700	0.985	4450	0.984	5950	0.984	7450	0.983	9200	0.985
2750	0.989	4500	0.988	6000	0.988	7500	0.987	9250	0.989
2800	0.992	4550	0.992	6050	0.992	7550	0.991	9300	0.992
2850	0.995	4600	0.995	6100	0.995	7600	0.994	9350	0.995
2900	0.997	4650	0.997	6150	0.997	7650	0.997	9400	0.997
2950	0.999	4700	0.999	6200	0.999	7700	0.998	9450	0.999
3000	1.000	4750	1.000	6250	1.000	7750	1.000	9500	1.000
3050	0.999	4800	1.000	6300	1.000	7900	1.000	9650	1.000
3100	0.997	4850	1.000	6350	1.000	8050	1.000	9800	1.000
3150	0.995	4900	0.999	6400	0.999	8100	0.999	9850	0.998
3200	0.992	4950	0.997	6450	0.997	8150	0.998	9900	0.997
3250	0.989	5000	0.995	6500	0.995	8200	0.996	9950	0.994
3300	0.985	5050	0.992	6550	0.992	8250	0.993	10000	0.991
3350	0.978	5100	0.988	6600	0.988	8300	0.990	10050	0.987
3400	0.969	5150	0.983	6650	0.984	8350	0.986	10100	0.983
3450	0.960	5200	0.978	6700	0.978	8400	0.978	10150	0.978
3500	0.948	5250	0.969	6750	0.969	8450	0.969	10200	0.969
3550	0.936	5300	0.960	6800	0.960	8500	0.960	10250	0.960
3600	0.920	5350	0.948	6850	0.948	8550	0.948	10300	0.948
3650	0.890	5400	0.936	6900	0.936	8600	0.936	10350	0.936
3700	0.592	5450	0.920	6950	0.920	8650	0.920	10400	0.920
3750	0.136	5500	0.890	7000	0.890	8700	0.890	10450	0.890
3800	0.011	5550	0.489	7050	0.489	8750	0.673	10500	0.377
3850	0.000	5600	0.089	7100	0.089	8800	0.199	10550	0.056
		5650	0.006	7150	0.006	8850	0.020	10600	0.003
		5700	0.000	7200	0.000	8900	0.000	10650	0.000

b340	
λ (A)	ϒ
2950	0.000
3000	0.011
3050	0.136
3100	0.610
3150	0.917
3200	0.946
3250	0.969
3300	0.986
3350	0.997
3400	1.000
3450	0.997
3500	0.986
3550	0.969
3600	0.946
3650	0.917
3700	0.610
3750	0.136
3800	0.011
3850	0.000

Fig. 166. continued

Geneva GAIA - Grenon *et al.* - 1999

Conceptual study of a photometric system for the GAIA satellite by ESA.

GENERAL INFORMATION

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MG-PWG-002 Tech. Rep. to the GAIA Photom. Working Group

SYSTEM DESCRIPTION

BANDS DESCRIPTION [18], [122]

band	λ_c (A)	FWHM (A)	Υ_{peak}	band	λ_c (A)	FWHM (A)	Υ_{peak}
33	3260	820	0.92	*66*	6560	240	0.72
37	3750	1460	0.96	*67*	6740	1160	0.94
41	4050	600	0.90	*73*	7330	1850	0.97
47	4645	450	0.86	*75*	7470	280	0.79
51	5075	270	0.78	*78*	7775	310	0.81
53	5250	2070	0.97	*82*	8160	480	0.87
57	5700	900	0.93	*89*	8940	480	0.87

The bands *37*, *53*, *66* and *73* are not included in the original proposal by [122].
They are reported by [18] to have been added later.

TRANSMISSION CURVES

To plot and tabulate the bands a gaussian prole is adopted following [18].

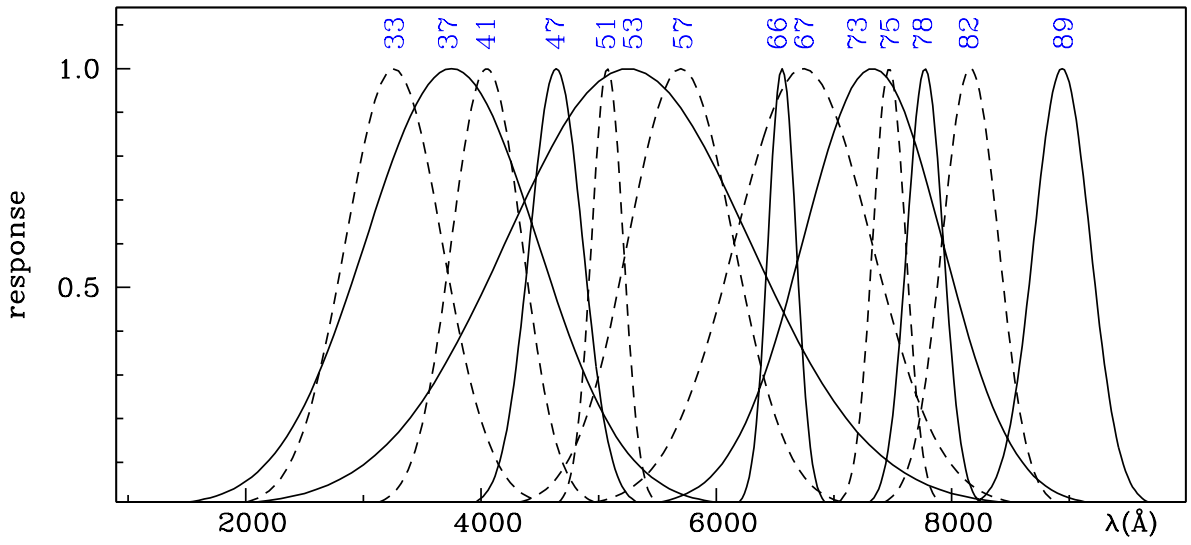

Fig. 167. The photometric system Geneva GAIA – Grenon et al. – 1999

33		37		41		47		51		53				57			
λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ
1650	0.000	950	0.000	2950	0.000	3740	0.000	4585	0.000	1650	0.000	7450	0.104	3900	0.000	6800	0.050
1850	0.003	1150	0.002	3050	0.004	3840	0.002	4635	0.005	1850	0.005	7650	0.068	4000	0.001	6900	0.029
2050	0.013	1350	0.004	3150	0.011	3940	0.008	4685	0.015	2050	0.008	7850	0.043	4100	0.002	7000	0.015
2250	0.048	1550	0.011	3250	0.029	4040	0.029	4735	0.042	2250	0.015	8050	0.026	4200	0.004	7100	0.008
2450	0.142	1750	0.023	3350	0.066	4140	0.085	4785	0.100	2450	0.026	8250	0.015	4300	0.008	7200	0.004
2650	0.331	1950	0.048	3450	0.135	4240	0.206	4835	0.206	2650	0.043	8450	0.008	4400	0.015	7300	0.002
2850	0.607	2150	0.091	3550	0.249	4340	0.411	4885	0.371	2850	0.068	8650	0.005	4500	0.029	7400	0.001
3050	0.877	2350	0.159	3650	0.411	4440	0.674	4935	0.584	3050	0.104	8850	0.002	4600	0.050	7500	0.000
3250	0.999	2550	0.259	3750	0.606	4540	0.906	4985	0.801	3250	0.155	9050	0.000	4700	0.085		
3450	0.898	2750	0.391	3850	0.801	4640	1.000	5035	0.957	3450	0.220			4800	0.135		
3650	0.636	2950	0.549	3950	0.946	4740	0.906	5085	0.997	3650	0.303			4900	0.206		
3850	0.355	3150	0.713	4050	1.000	4840	0.674	5135	0.906	3850	0.401			5000	0.298		
4050	0.156	3350	0.861	4150	0.946	4940	0.411	5185	0.718	4050	0.511			5100	0.411		
4250	0.054	3550	0.963	4250	0.801	5040	0.206	5235	0.495	4250	0.627			5200	0.539		
4450	0.015	3750	1.000	4350	0.606	5140	0.085	5285	0.298	4450	0.742			5300	0.674		
4650	0.003	3950	0.963	4450	0.411	5240	0.029	5335	0.157	4650	0.845			5400	0.801		
4850	0.001	4150	0.861	4550	0.249	5340	0.008	5385	0.072	4850	0.928			5500	0.906		
5050	0.000	4350	0.713	4650	0.135	5440	0.002	5435	0.029	5050	0.981			5600	0.976		
		4550	0.549	4750	0.066	5540	0.000	5485	0.010	5250	1.000			5700	1.000		
		4750	0.391	4850	0.029			5535	0.003	5450	0.981			5800	0.976		
		4950	0.259	4950	0.011			5585	0.001	5650	0.928			5900	0.906		
		5150	0.159	5050	0.004			5635	0.000	5850	0.845			6000	0.801		
		5350	0.091	5150	0.001					6050	0.742			6100	0.674		
		5550	0.048	5250	0.000					6250	0.627			6200	0.539		
		5750	0.023							6450	0.511			6300	0.411		
		5950	0.011							6650	0.401			6400	0.298		
		6150	0.004							6850	0.303			6500	0.206		
		6350	0.002							7050	0.220			6600	0.135		
		6550	0.000							7250	0.155			6700	0.085		

66		67		73		75		78		82		89	
λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ
6060	0.000	4340	0.000	4930	0.000	6920	0.000	7175	0.000	7260	0.000	8040	0.000
6110	0.001	4540	0.001	5130	0.001	6970	0.002	7225	0.002	7360	0.004	8140	0.004
6160	0.004	4740	0.003	5330	0.003	7020	0.006	7275	0.006	7460	0.014	8240	0.014
6210	0.014	4940	0.008	5530	0.010	7070	0.017	7325	0.015	7560	0.044	8340	0.044
6260	0.044	5140	0.022	5730	0.026	7120	0.044	7375	0.036	7660	0.114	8440	0.114
6310	0.114	5340	0.054	5930	0.061	7170	0.101	7425	0.078	7760	0.249	8540	0.249
6360	0.249	5540	0.118	6130	0.129	7220	0.203	7475	0.154	7860	0.458	8640	0.458
6410	0.458	5740	0.226	6330	0.241	7270	0.360	7525	0.272	7960	0.707	8740	0.707
6460	0.707	5940	0.386	6530	0.402	7320	0.563	7575	0.435	8060	0.917	8840	0.917
6510	0.917	6140	0.586	6730	0.599	7370	0.775	7625	0.626	8160	1.000	8940	1.000
6560	1.000	6340	0.788	6930	0.796	7420	0.938	7675	0.812	8260	0.917	9040	0.917
6610	0.917	6540	0.942	7130	0.945	7470	1.000	7725	0.949	8360	0.707	9140	0.707
6660	0.707	6740	1.000	7330	1.000	7520	0.938	7775	1.000	8460	0.458	9240	0.458
6710	0.458	6940	0.942	7530	0.945	7570	0.775	7825	0.949	8560	0.249	9340	0.249
6760	0.249	7140	0.788	7730	0.796	7620	0.563	7875	0.812	8660	0.114	9440	0.114
6810	0.114	7340	0.586	7930	0.599	7670	0.360	7925	0.626	8760	0.044	9540	0.044
6860	0.044	7540	0.386	8130	0.402	7720	0.203	7975	0.435	8860	0.014	9640	0.014
6910	0.014	7740	0.226	8330	0.241	7770	0.101	8025	0.272	8960	0.004	9740	0.004
6960	0.004	7940	0.118	8530	0.129	7820	0.044	8075	0.154	9060	0.000	9840	0.000
7010	0.001	8140	0.054	8730	0.061	7870	0.017	8125	0.078				
7060	0.000	8340	0.022	8930	0.026	7920	0.006	8175	0.036				
		8540	0.008	9130	0.010	7970	0.002	8225	0.015				
		8740	0.003	9330	0.003	8020	0.000	8275	0.006				
		8940	0.001	9530	0.000			8325	0.002				
		9140	0.000	9730	0.000			8375	0.000				

Fig. 167. continued

Table 2. List of references used in the figures describing the various photometric systems

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