HI observations of blue compact galaxies from the first and second Byurakan surveys[★]

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Abstract. We present the results of a neutral hydrogen survey of 79 galaxies from a statistical sample of 88 Blue Compact Galaxies (BCGs) selected from the First and Second Byurakan objective prism surveys to have a HII region-like spectrum, an equivalent width of the [O III] $\lambda 5007$ line larger than ~ 50 Å, and a velocity ≤ 6000 km s⁻¹. The detection rate for the statistical sample is 74%. HI masses range between $4 \cdot 10^7 M_\odot$ and $5 \cdot 10^9 M_\odot$ with the HI mass distribution peaking at $3 \cdot 10^8 M_\odot$. The full width at half-maximum of the HI profile varies between ~ 30 km s⁻¹ and 160 km s⁻¹, with a mean of ~ 92 km s⁻¹. These small widths are characteristic of dwarf galaxies. For comparison, we have also observed an additional 92 BCGs with weaker star formation and/or larger distances, and/or interesting astrophysical properties. These in general have larger widths and HI masses.

Key words: galaxies: compact — galaxies: ism — galaxies: startburst — radio lines: galaxies — radio lines: ISM

1. Introduction

Blue Compact Galaxies (BCGs) are low-luminosity ($M_B \geq -18$) extragalactic objects characterized by a very high current star formation rate ($0.1 - 1$) $M_\odot$ yr⁻¹ (Fanelli et al. 1988), responsible for their optical appearance: one or several high surface brightness compact star-forming regions superimposed in the majority of cases on a more extended low surface brightness component (Loose & Thuan 1985; Kunth et al. 1988; Papaderos

et al. 1996). Their optical spectra show strong narrow emission lines on top of a stellar continuum which is rising towards the blue, similar to spectra of HII regions, and indicating the presence of a large population of massive OB stars. Much attention has been devoted to BCGs since their discovery by Sargent & Searle (1970), because of the realization that BCGs best approximate young galaxies, as implied by their low metallicity ($Z_\odot/50 < Z < Z_\odot/3$), and their very high gas content (see Thuan 1991 for a review). Because the gas in the most metal-poor BCGs has not been processed through many generations of stars, it is nearly primordial. Thus such BCGs are the best objects in which to attack such problems as the determination of the helium abundance (Izotov & Thuan 1998 and references therein). They are also excellent nearby laboratories for studying physical processes which occurred in the galaxy formation era, in a very metal-deficient environment. Many observational studies of BCGs have been carried out in a variety of wavelength domains, from spectrophotometric studies to derive metal abundances (e.g. Thuan et al. 1995) to UV spectral synthesis (Fanelli et al. 1988) and optical and near-infrared imaging to study stellar populations (Thuan 1983), to single-dish and interferometric 21 cm observations to examine the HI content and structure (Thuan & Martin 1981; Lequeux & Viallefond 1980; Viallefond & Thuan 1983). In this paper, we present a large set of HI single dish observations for a new sample of BCGs assembled from the First (Markarian et al. 1989) and Second Byurakan (Markarian et al. 1983) objective prism surveys. Such observations are crucial for the understanding of BCGs for several reasons:

1) They yield accurate (± 15 km s⁻¹) redshifts for the study of the large scale distribution of BCGs (Pustilnik et al. 1995).

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[★] Tables 1, 2, 3 also available in electronic form at the CDS via anonymous ftp to cdsarc.u-strasbg.fr (130.79.128.5) or via <http://cdsweb.u-strasbg.fr/Abstract.html>

2) The HI flux allows to determine the neutral atomic gas mass and the width of the HI profile yields an estimate of the total mass of the BCG. The gas mass fraction combined with abundance measurements are crucial for testing chemical evolution models of BCGs, such as closed-box models, models with galactic winds or infall, etc. (Lequeux et al. 1979; Pilyugin 1993; Marconi et al. 1994; Peimbert et al. 1994; Carigi et al. 1995; Pustilnik et al. 1996).

3) Combining with other data, the HI data permit to derive global parameters of BCGs (such as $M(\text{HI})/L_B$ or $M(\text{total})/L_B$, study general trends and correlations (for example $M(\text{HI})/L_B$ vs. L_B) suggested by various galaxy formation theories and compare with other types of galaxies. For example, one question of great interest is the relationship between BCGs and another class of dwarf galaxies, the low-surface-brightness (LSB) dwarfs. Star formation in BCGs is known to occur in bursts lasting $\leq 10^8$ yr, separated by long quiescent periods of $2 - 3 \cdot 10^9$ yr (Thuan 1991). If LSB dwarfs are BCGs in their quiescent phases, then their HI properties should be statistically similar (Thuan 1985). The HI data obtained here can be compared statistically with the large HI data set for LSB dwarfs assembled by Schneider, Thuan and their colleagues (1990, 1992) to test the above hypothesis. Finally, a HI single-dish survey allows to judge the feasibility of follow-up HI interferometric studies of particularly interesting objects in the sample.

The first comprehensive HI survey of BCGs was carried out by Thuan & Martin (1981). These authors assembled a list of 115 blue compact dwarfs known at that time from the objective prism surveys of Markarian and Haro, with a few objects from Zwicky and other investigators. Other HI surveys of BCGs followed, such as that of Gordon & Gottesman (1981) which included mainly brighter BCGs ($M_B < -18$) from the Markarian, Haro and Zwicky lists, that of Hoffman et al. (1992) for BCGs in the Virgo cluster, and that of Staveley-Smith et al. (1992) for a small sample of nearby BCGs.

The BCG sample we are concerned with here was primarily assembled from objective prism survey plates obtained with the 1 m Schmidt Telescope at the Byurakan Observatory during the Second Byurakan Survey (SBS; Markarian et al. 1983). The objective prism plates cover the sky area defined by $7^{\text{h}}40^{\text{m}} \leq \alpha \leq 17^{\text{h}}20^{\text{m}}$, $49^\circ \leq \delta \leq 61^\circ$, an area of about 1000 square degrees. All objects with prism spectra showing strong or moderate emission lines were observed spectroscopically with the 6m telescope of the Special Astrophysical Observatory. Then all emission-line galaxies with a HII region-like spectrum and an equivalent width of the $[\text{O III}] \lambda 5007$ emission line larger than $\approx 30 \text{ \AA}$, were selected to constitute the BCG sample. The above criterion excluded massive nuclear starburst galaxies and galaxies with an active galactic nucleus such as Seyfert galaxies and quasars. In addition, we have also added ~ 50 BCGs from the First Byurakan Survey

(Markarian et al. 1989) and a few BCGs from the Case Survey (Pesch & Sanduleak 1987) in the same sky area and satisfying the same selection criterion. The resulting sample contains a total of 220 BCGs (Izotov et al. 1993). The redshift distribution of the total sample along with the large-scale space distribution are given in Pustilnik et al. (1995). The BCG sample is reasonably complete out to $\approx 10000 \text{ km s}^{-1}$, with increasing incompleteness beyond. The redshift distribution shows 3 peaks, one at $V \approx 1000 \text{ km s}^{-1}$ due to the Virgo cluster, and two additional peaks at $V \approx 3000 \text{ km s}^{-1}$ and $V \approx 7000 - 10000 \text{ km s}^{-1}$. In order not to spend inordinately large amounts of telescope time on a single galaxy and still reach interesting upper limits for the BCG HI content with a given telescope sensitivity, we have extracted a complete subsample of 88 BCGs by further imposing a lower limit on the equivalent width of the $[\text{O III}] \lambda 5007$ emission line of $50 \text{ \AA}$, and a velocity upper limit of 6000 km s^{-1} .

Of these 88 BCGs, 10 were already observed in earlier studies (Thuan & Martin 1981; Gordon & Gottesman 1981). We have obtained new HI observations for 77 BCGs, and obtained measurements with better signal-to-noise ratio of two BCGs with published data. One BCG which is close to a HI rich galaxy with the same velocity was not observed.

This complete subsample will be used for statistical studies in a subsequent paper. For comparison, we have observed in addition 20 BCGs in the SBS zone with $V \leq 6000 \text{ km s}^{-1}$ but with less strong emission lines, 47 BCGs not in the SBS zone with the same velocity limit, and 17 BCGs in the SBS zone with $6000 \leq V \leq 14000 \text{ km s}^{-1}$, which are of particular astrophysical interest. Finally 8 more BCGs outside the SBS zone with $V \geq 6000 \text{ km s}^{-1}$ were observed. Altogether we have obtained HI parameters or upper limits for 171 BCGs.

We discuss the HI observations and the data reduction in Sect. 2. In Sect. 3 we describe the data tables and present the observed HI profiles. We give a preliminary discussion of the data in Sect. 4. A more complete discussion is deferred to a subsequent paper.

2. Observations and data reduction

The 21 cm observations were carried out in 1992–1996 with the Nançay¹ 300-m and Green Bank² 43-m radio telescopes.

The Nançay radio telescope has a half-power beam width (HPBW) of $3.7'$ (EW) $\times 22'$ (NS) at the

¹ The Nançay Radioastronomy Station is part of the Paris Observatory and is operated by the Ministère de l'Éducation Nationale and Institut des Sciences de l'Univers of the Centre National de la Recherche Scientifique.

² The Green Bank Observatory is part of the National Radio Astronomy Observatory, which is operated by Associated Universities, Inc. for the National Science Foundation.

declination $\delta = 0^\circ$. We used a dual-polarization receiver, with a system temperature of ≈ 40 K in the horizontal linear polarization and ≈ 40 K and 60 K in the vertical linear polarization in the periods 1992–1994 and 1995 respectively. As all the candidate BCGs had known optical redshifts from the 6m spectroscopic observations, we split the 1024-channel autocorrelator into two, covering a bandwidth of 6.4 MHz each, and centered at the frequency corresponding to the optical redshift. In this configuration, each segment covered a velocity range of 1350 km s^{-1} . The channel spacing was 2.6 km s^{-1} before smoothing and the effective resolution after averaging pairs of adjacent channels and Hanning smoothing was $\approx 21 \text{ km s}^{-1}$. The gain of the telescope was 1.1 K/Jy at the declination $\delta = 0^\circ$. The observations were made in the standard total power (position switching) mode with 2-minute on-source and 2 minute off source integrations. Typically, we aim to achieve a rms noise of 2.5 mJy per channel, after smoothing the channel spacing to 21 km s^{-1} . This leads to a typical integration time of 1 hour on the galaxy and 1 hour on the comparizon field. For BCGs with the faintest HI flux densities, the ON integration time may go up to 3-4 hours. Since the calibration noise diode power has changed significantly over the years, and since its power is frequency-dependent, we have exercised great care in improving the standard Nançay radio telescope calibration method to correct the data for the time and frequency dependencies. This procedure is detailed in Appendix A.

The NRAO 43 m radio telescope has a HPBW of $22'$. We use a two channel dual-polarization prime-focus receiver with a system temperature of ≈ 20 K in both polarizations. A bandwidth of 20 MHz covering 4225 km s^{-1} was used with the 1024-channel autocorrelator split in two. The channel spacing was $\approx 8 \text{ km s}^{-1}$ and the effective resolution after Hanning smoothing was $\approx 16 \text{ km s}^{-1}$. The observations were also made in the position switching mode, with 6 minutes off-source and 6 minutes on-source integrations. The calibration signal levels and telescope pointing errors were checked by observing standard calibrators listed in the 43 m Telescope Observer's Manual. The calibration noise diode temperature was measured in the laboratory before the observing run. The gain of the telescope was 0.29 K/Jy .

The Green Bank data was reduced using NRAO's standard LINE program, while the Nançay data was reduced using the software developed by the telescope's staff. For each integration, the two polarizations which were detected independently were averaged to improve sensitivity. The baselines were generally well fitted by a polynomial of third order or lower and subtracted out.

To check that the data taken from the two telescopes are on the same flux scale, we have observed several galaxies with both telescopes. To within the errors, the Nançay and Green Bank fluxes agree with each other.

3. Results

We present the data in three tables. Table 1 gives the data for the galaxies for which we feel the HI results are secure. This means we are relatively certain that the signal is not produced by confusion or receiver baseline anomalies, and that the signal-to-noise value is adequate. Table 2, on the other hand, lists detections of emission which may be all right, but for various reasons such as confusion or a low signal-to-noise ratio, we feel should be used more cautiously. Table 3 lists the undetected galaxies and upper limits for their HI flux densities.

The cut-off between Table 1 and Table 2 is not rigorously defined as it is based on a mixture of subjective evaluation of the HI profiles as well as more objective guidelines. The possibility of confusion was checked for every galaxy by using the Lyon-Meudon Extragalactic Database (LEDa) to generate sky plots of a circular area of radius $30'$ centered on the galaxy. This allows also to check for the environment of the galaxy, whether it is isolated or in a group. The properties and angular separations of possible companion galaxies are given in the Notes to Tables 1 and 2. There is generally a signal-to-noise ratio lower limit of 4 for inclusion in Table 1. The signal is measured as the peak flux in the galaxy's HI profile, while the noise is measured in the baseline away from the observed signal. In a few cases, repeated observations yielded essentially the same parameters, and although the signal-to-noise ratio remained low, we have included the galaxies in Table 1.

Tables 1 and 2 include all of the basic information about the galaxies and the observations, along with the optical angular size information used in calculating corrections to the measured HI fluxes. They are organized as follows:

Column (1). Name following the IAU nomenclature. Some BCGs in physical pairs are characterized by additional letters (A, B, N = North, E = East), but in the tables the two components are lumped together in the same name entry, as they are not resolved by the radio telescope beam. The BCGs which are in the statistical sample are marked by a cross in all tables. Galaxies marked by an asterisk in Table 2 are non-confused.

Column (2). Cross-references to other names in the Markarian (MK, Markarian et al. 1989), Michigan (UM, Salzer et al. 1989) or in the Case (CG, Pesch et al. 1991) lists. When the galaxy is from the Second Byurakan Survey (Markarian et al. 1983; Stepanian et al. 1993a–d), it is designated by the initials SBS.

Columns (3) and (4). Right ascension and declination at the epoch 1950. The coordinates have been measured either from the Palomar Sky Survey prints or plates, or taken to be the pointing coordinates of the 6 m telescope during the spectroscopic observations. The errors in each coordinate are typically between 1 and 5 arcsec.

Table 1. HI detections of BCGs

IAU name	Other name or prefix	Coord. (1950.0)		Angul. size axb	PA	$V(\text{HI})$ km s^{-1}	Dist. Mpc Vir	W_{50} km s^{-1}	W_{20} km s^{-1}	Obs. Flux Jy km s^{-1}	Cor. Flux Jy km s^{-1}	Log $M(\text{HI})/$ $M_{\odot}$	R & N
		R.A. h m s	Dec. ° ' "										
1	2	3	4	5	6	7	8	9	10	11	12	13	14
0012 − 018	MK546	00 12 01.6	01 49 43	30×27	30	3974 ± 17	52.7	119 ± 29	156 ± 40	0.62 ± 0.15	0.63 ± 0.15	8.62	N93*
0034 + 356	MK953	00 34 30.8	35 37 39	$44 \times 16^{\circ}$	−10	4441 ± 1	61.3	81 ± 21	147 ± 33	1.96 ± 0.24	1.97 ± 0.24	9.24	N94*
0111 + 075	MK564	01 11 12.1	07 31 07	$35 \times 25^{\circ}$	45	5514 ± 13	73.3	149 ± 26	171 ± 41	0.90 ± 0.22	0.92 ± 0.22	9.07	N94*
0125 − 065	MK996	01 25 04.6	−06 35 07	$62 \times 50^{\circ}$	30	1622 ± 21	21.7	83 ± 42	177 ± 65	1.26 ± 0.20	1.30 ± 0.20	8.16	N94*
0142 + 046	UM133	01 42 05.3	04 38 25			1623 ± 04	22.4	104 ± 07	122 ± 11	4.30 ± 0.67		8.71	G92*
0143 + 346	MK1006	01 43 33.4	34 40 40	$58 \times 36^{\circ}$	20	5508 ± 05	75.0	129 ± 29	152 ± 14	1.99 ± 0.20	2.02 ± 0.20	9.43	N94*
0144 + 024A	UM369	01 44 29.0	02 26 38	$37 \times 17^{\circ}$	45	5694 ± 08	75.2	112 ± 15	128 ± 24	0.67 ± 0.19	0.68 ± 0.19	8.96	N94*
0214 + 292	MK1030	02 14 39.2	29 17 27			5262 ± 03	71.3	72 ± 07	100 ± 10	6.65 ± 0.72		9.90	G92*
0216 − 032	MK1031	02 16 20.3	−03 16 14			2360 ± 12	31.2	154 ± 24	182 ± 38	2.63 ± 0.80		8.78	G92
0225 − 103	MK1039	02 25 06.2	−10 23 21	$117 \times 43^{\circ}$	90	2098 ± 05	27.3	149 ± 11	198 ± 17	5.96 ± 0.36	6.76 ± 0.40	9.08	N94*
0225 − 104	MK1042	02 25 38.0	−10 24 23	$32 \times 20^{\circ}$	15	2133 ± 08	27.8	83 ± 16	117 ± 26	1.32 ± 0.22	1.33 ± 0.22	8.38	N94*
0237 + 166	MK1182	02 37 54.8	16 37 00	47×32	0	8754 ± 17	116.3	176 ± 35	225 ± 55	1.86 ± 0.36	1.88 ± 0.36	9.78	N93
0305 − 140	MK1069	03 05 57.5	−14 05 35	60×25	60	1562 ± 03	20.2	106 ± 05	136 ± 08	8.50 ± 0.46	8.74 ± 0.48	8.93	N93
0335 − 052	SBS	03 35 15.1	−05 12 26	14×12	0	4043 ± 05	52.8	83 ± 09	105 ± 14	1.28 ± 0.22	1.45 ± 0.25	8.98	N93*
0741 + 535 ⁺	MK1409	07 41 34.8	53 32 55	$65 \times 21^{\circ}$	−45	5564 ± 30	77.1	109 ± 60	216 ± 94	1.89 ± 0.34	1.93 ± 0.35	9.43	N94*
0743 + 550	MK1410	07 43 10.0	55 04 15	45°	−25	5490 ± 04	76.2	167 ± 08	183 ± 12	3.29 ± 0.37	3.32 ± 0.38	9.66	N94*
0749 + 568 ⁺	SBS	07 49 37.8	56 49 41	$25 \times 25^{\circ}$	30	5488 ± 25	76.3	91 ± 49	150 ± 77	0.58 ± 0.17	0.58 ± 0.17	8.90	N94*
0813 + 521	SBS	08 13 52.7	52 11 56	27×27	0	7065 ± 16	96.8	79 ± 32	119 ± 50	0.83 ± 0.26	0.84 ± 0.26	9.27	N93
0832 + 664	MK93	08 32 09.7	66 24 23	$26 \times 13^{\circ}$	45	5292 ± 05	74.2	252 ± 10	276 ± 15	2.72 ± 0.23	2.79 ± 0.23	9.56	N94
0847 + 612	MK99	08 47 25.2	61 12 29	42×23	60	4120 ± 12	58.8	126 ± 23	179 ± 37	2.18 ± 0.29	2.21 ± 0.29	9.26	N95*
0916 + 543	SBS	09 16 39.1	54 19 11	36×26	−60	3582 ± 18	51.6	126 ± 36	179 ± 56	0.75 ± 0.20	0.76 ± 0.20	8.68	N93
0917 + 527 ⁺	MK1416	09 17 25.7	52 46 53	30×15	−30	2323 ± 07	35.4	65 ± 13	99 ± 21	1.96 ± 0.32	1.97 ± 0.32	8.77	N94*
0930 + 554 ⁺	MK116	09 30 30.2	55 27 47	$26 \times 13^{\circ}$	−40	751 ± 02	14.2	53 ± 04	84 ± 06	2.71 ± 0.14	2.72 ± 0.14	8.11	N95*
0939 + 592	MK1423	09 39 24.4	59 12 08	105×60	−45	1358 ± 08	23.1	95 ± 15	116 ± 24	0.79 ± 0.20	0.84 ± 0.21	8.02	N94*
0940 + 662	MK119	09 40 10.7	66 12 25			3316 ± 17	48.6	158 ± 33	189 ± 52	2.86 ± 1.24		9.20	G92*
0940 + 544 ⁺	SBS	09 40 50.8	54 25 18			1638 ± 05	26.7	120 ± 09	130 ± 15	3.06 ± 0.97		8.71	G91*
0942 + 573 ⁺	MK1424	09 42 56.4	57 20 55	60×30	−30	1177 ± 19	20.6	127 ± 39	190 ± 60	2.46 ± 0.37	2.50 ± 0.38	8.40	N94*
0946 + 487	MK1426	09 46 03.1	48 47 49			1835 ± 04	29.1	82 ± 07	92 ± 10	1.81 ± 0.55		8.56	G92*
0946 + 558 ⁺	MK22	09 46 03.4	55 48 49			1551 ± 12	25.6	80 ± 24	101 ± 38	2.19 ± 0.90		8.53	G92*
1001 + 555 ⁺	SBS	10 01 20.7	55 33 18			1116 ± 04	19.7	106 ± 08	125 ± 12	4.54 ± 0.73		8.62	G92*
1006 + 578	SBS	10 06 12.1	57 48 45	40×21	25	1512 ± 01	25.4	127 ± 02	137 ± 03	3.14 ± 0.18	3.16 ± 0.18	8.68	N96*
1033 + 531 ⁺	SBS	10 33 30.6	53 06 34			986 ± 04	17.9	124 ± 09	135 ± 14	3.17 ± 0.81		8.38	G91
1037 + 494 ⁺	SBS	10 37 42.1	49 28 05			1496 ± 11	25.0	117 ± 21	142 ± 33	3.47 ± 0.95		8.71	G91
1114 + 587 ⁺	SBS	11 14 10.7	58 47 22	32×29	20	1594 ± 21	26.7	144 ± 43	200 ± 67	1.15 ± 0.36	1.16 ± 0.36	8.29	N94*
1119 + 586 ⁺	SBS	11 19 45.7	58 36 05	$20 \times 10^{\circ}$	0	1583 ± 06	26.5	52 ± 13	95 ± 20	1.32 ± 0.36	1.32 ± 0.36	8.34	N94*
1123 + 644	MK170	11 23 55.8	64 24 48			988 ± 14	18.4	90 ± 28	153 ± 44	7.52 ± 1.24		8.78	G92*
1124 + 541 ⁺	MK1446	11 24 45.5	54 11 25	44×39	20	2940 ± 11	44.0	53 ± 22	106 ± 34	0.99 ± 0.20	1.01 ± 0.20	8.66	N95
1152 + 579 ⁺	MK193	11 52 51.9	57 56 34	22×19	−15	5157 ± 17	72.6	53 ± 34	106 ± 54	0.72 ± 0.22	0.72 ± 0.22	8.95	N94
1203 + 592 ⁺	SBS	12 03 43.2	59 14 59	48×26	5	3256 ± 07	48.1	156 ± 13	179 ± 20	4.05 ± 0.60	4.08 ± 0.60	9.35	N94
1205 + 557 ⁺	SBS	12 05 57.5	55 42 08	24×19	−40	1740 ± 08	28.7	42 ± 16	63 ± 25	0.37 ± 0.25	0.37 ± 0.25	7.86	N94
1211 + 540 ⁺	SBS	12 11 34.0	54 01 58	23×14	−50	907 ± 05	17.2	53 ± 01	84 ± 16	0.71 ± 0.12	0.71 ± 0.12	7.70	N95*
1213 + 597 ⁺	MK1468	12 13 34.8	59 47 09	46×31	10	4420 ± 10	62.7	253 ± 21	274 ± 33	0.96 ± 0.25	0.97 ± 0.25	8.95	N93*
1241 + 549 ⁺	SBS	12 41 30.3	54 55 11	28×15	60	4945 ± 13	67.5	116 ± 25	169 ± 40	1.72 ± 0.26	1.73 ± 0.26	9.27	N95
1317 + 523A ⁺	SBS	13 17 42.9	52 19 57	35×26	60	4619 ± 10	65.8	137 ± 19	211 ± 30	4.74 ± 0.35	4.79 ± 0.35	9.69	N96*
1318 + 520 ⁺	SBS	13 18 07.6	52 01 37	43×28	40	4740 ± 09	67.4	137 ± 18	190 ± 29	1.78 ± 0.22	1.80 ± 0.22	9.29	N94*
1323 + 483	SBS,HS	13 23 13.1	48 18 01	26×18	0	4925 ± 10	69.6	42 ± 20	63 ± 32	0.24 ± 0.12	0.24 ± 0.12	8.44	N94*

Table 1. continued

IAU name	Other name or prefix	Coord. (1950.0)		Angul. size axb	PA	$V(\text{HI})$ km s ⁻¹	Dist. Mpc Vir	W_{50} km s ⁻¹	W_{20} km s ⁻¹	Obs. Flux Jy km s ⁻¹	Cor. Flux Jy km s ⁻¹	Log $M(\text{HI})/M_{\odot}$	R & N
		R.A. h m s	Dec. ° ' "										
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1331 + 493 ⁺	SBS	13 31 19.9	49 21 32	71 × 58	0	590 ± 02	11.3	53 ± 03	74 ± 04	6.27 ± 0.43	6.48 ± 0.44	8.29	N93
1332 + 518	MK1479	13 32 42.6	51 52 11	180 × 120	0	235 ± 02	4.7	32 ± 04	53 ± 06	4.98 ± 0.53	5.77 ± 0.61	7.48	N96*
1341 + 594 ⁺	SBS	13 41 45.0	59 25 07	23 × 15	60	3037 ± 07	45.6	53 ± 14	84 ± 22	0.68 ± 0.06	0.68 ± 0.06	8.52	N94
1358 + 554E ⁺	SBS	13 58 48.8	55 29 44	33 × 23	75	3857 ± 05	55.9	63 ± 09	84 ± 15	1.41 ± 0.31	1.43 ± 0.31	9.02	N95-96*
1400 + 461	CG328	14 00 11.6	46 06 10	47 × 35	-15	2095 ± 04	33.4	123 ± 07	134 ± 11	1.44 ± 0.36	1.46 ± 0.36	8.58	N93
1413 + 495 ⁺	CG383	14 13 18.8	49 34 26	37 × 21	60	3923 ± 11	56.8	116 ± 22	148 ± 34	1.18 ± 0.27	1.19 ± 0.27	8.96	N95
1415 + 437	CG389	14 15 03.2	43 43 55	81 × 30	30	609 ± 02	11.4	53 ± 03	74 ± 05	4.73 ± 0.33	4.85 ± 0.34	8.17	N95
1422 + 573	MK812	14 22 57.8	57 21 48			3171 ± 07	47.2	169 ± 14	190 ± 22	2.99 ± 0.57		9.20	G92*
1430 + 596 ⁺	SBS	14 30 03.5	59 36 42	53 × 16	-40	1855 ± 20	30.4	169 ± 24	211 ± 37	1.59 ± 0.28	1.61 ± 0.29	8.54	N94*
1430 + 526A ⁺	CG470	14 30 53.3	52 37 59	60 × 30 ^e	-30	3424 ± 06	50.4	84 ± 12	116 ± 18	1.58 ± 0.23	1.61 ± 0.23	8.98	N95*
1437 + 370	MK475	14 37 03.7	37 01 13	39 × 26	70	583 ± 02	9.5	32 ± 05	42 ± 08	0.15 ± 0.04	0.15 ± 0.04	6.50	N95
1448 + 526 ⁺	MK826	14 48 27.6	52 36 43			726 ± 06	14.9	69 ± 11	85 ± 17	1.09 ± 0.50		7.76	G92
1455 + 443	CG587	14 55 32.9	44 22 37			3563 ± 17	52.0	132 ± 34	171 ± 53	1.97 ± 0.69		9.10	G92
1504 + 514N ⁺	CG625	15 04 18.8	51 26 54	60 × 53	-10	3796 ± 04	55.1	148 ± 07	179 ± 11	5.54 ± 0.32	5.70 ± 0.33	9.61	N94*
1506 + 553	CG638	15 06 25.0	55 22 35	125 × 90	70	3367 ± 08	49.7	102 ± 15	146 ± 24	4.81 ± 0.37	5.49 ± 0.42	9.51	N94*
1509 + 527	CG652	15 09 31.8	52 44 46	33 × 25 ^e		3545 ± 13	51.9	126 ± 25	157 ± 41	0.65 ± 0.16	0.66 ± 0.16	8.62	N94*
1519 + 496	CG690	15 19 16.8	49 41 34	33 × 21	90	4543 ± 04	64.9	194 ± 08	206 ± 13	0.96 ± 0.23	0.97 ± 0.23	8.98	N94*
1524 + 554 ⁺	SBS	15 24 40.0	55 25 30	41 × 24	45	3409 ± 04	50.3	190 ± 07	211 ± 11	2.43 ± 0.21	2.46 ± 0.21	9.16	N93
1535 + 554 ⁺	MK487	15 35 48.8	55 25 35	43 × 39	-65	667 ± 10	50.3	74 ± 20	116 ± 31	1.41 ± 0.26	1.44 ± 0.26	8.93	N96
1551 + 601A ⁺	SBS	15 51 46.3	60 11 29	45 × 24	50	2932 ± 10	44.2	63 ± 20	95 ± 31	1.05 ± 0.27	1.06 ± 0.27	8.69	N94*
1629 + 205	MK884	16 29 38.2	20 31 01	30 × 25	90	5151 ± 04	71.6	137 ± 08	158 ± 13	1.45 ± 0.19	1.46 ± 0.19	9.25	N95
1634 + 523 ⁺	MK1499	16 34 07.8	52 18 57	39 × 34	40	2700 ± 04	41.0	84 ± 40	137 ± 62	0.44 ± 0.11	0.44 ± 0.11	8.24	N96
1640 + 516	MK1500	16 40 48.3	51 36 32	32 × 25	0	8950 ± 03	122.9	148 ± 06	158 ± 10	1.29 ± 0.22	1.30 ± 0.22	9.67	N93
1707 + 565 ⁺	SBS	17 07 03.3	56 34 34	36 × 21	60	3323 ± 19	49.3	116 ± 38	169 ± 60	0.76 ± 0.20	0.77 ± 0.20	8.65	N93
1714 + 602	MK893	17 14 23.0	60 16 15	29 × 21	40	6014 ± 11	83.7	179 ± 22	200 ± 35	1.02 ± 0.26	1.03 ± 0.26	9.23	N94*
1809 + 318	MK1121	18 09 28.6	31 50 55	50 × 36	0	4520 ± 12	63.7	84 ± 23	169 ± 36	2.68 ± 0.23	2.71 ± 0.23	9.41	N94*
2116 + 020	MK513	21 16 18.5	02 03 02	39 × 24	90	5460 ± 15	73.0	190 ± 28	327 ± 44	2.97 ± 0.19	3.02 ± 0.19	9.58	N93*
2127 + 021	MK900	21 27 27.5	02 11 39	169 × 106	43	1152 ± 05	17.4	106 ± 08	158 ± 12	2.00 ± 0.12	2.36 ± 0.14	8.23	N93*
2220 + 377	MK908	22 20 28.2	37 43 25	124 × 64	-80	1240 ± 02	20.4	202 ± 03	218 ± 05	8.89 ± 0.38	10.19 ± 0.43	9.00	N93*
2221 + 409	MK909	22 21 17.5	40 55 41	46 × 39	-30	4433 ± 05	62.0	168 ± 09	187 ± 15	2.22 ± 0.32	2.25 ± 0.33	9.31	N93*
2246 + 315	MK921	22 46 09.9	31 31 00	39 × 24	33	3848 ± 13	53.6	137 ± 27	201 ± 42	2.30 ± 0.27	2.32 ± 0.27	9.20	N93*
2311 + 129	MK528	23 11 34.9	12 54 19			2676 ± 03	37.1	189 ± 06	203 ± 09	8.26 ± 0.82		9.43	G92*
2329 + 286	MK930	23 29 29.5	28 40 18	26 × 21 ^e	0	5485 ± 10	74.8	137 ± 20	190 ± 31	2.25 ± 0.25	2.26 ± 0.25	9.47	N94

Notes to Table 1:

0012-018 ≡ UM 219 ≡ KUG 0012-018.

0034+356 – Wegner et al. (1993) found $F = 1.67$ Jy km s⁻¹, $W(50) = 94$ km s⁻¹ and $W(20) = 156$ km s⁻¹ in good agreement with our data.

0111+075 – Sc galaxy of the same brightness at 22' to North. No velocity.

0125-065 – Our unpublished VLA data show a large HI envelope around the BCG. A HST study by Thuan et al. (1996) indicates an extremely compact and dense HII region in this galaxy. There is a galaxy at 10.5" to the West and 13' to the South with no measured velocity.

0142+046 ≡ MCG 1-5-30. Comet-like structure (~5/h kpc), with a very compact (7") HII region at the S edge.

0143+346 ≡ KUG 0143 + 346. Wegner et al. (1993) obtained $F = 3.26$ Jy km s⁻¹ and $W_{20} = 122$ km s⁻¹, about 30% higher than our flux measurement. In group: 3 Sc galaxies within inside 30' with $V = 5677$, 5653 and 5577 km s⁻¹.

0144+024A – UM370 at 10.2" to the East and 4' to the South is an O or B star according to Terlevich et al. (1991).

0214+292 ≡ V Zw 212. Possible satellite galaxy from HI spectrum at $V = 5365$ km s⁻¹ with $F = 1.04$ Jy km s⁻¹, $W_{50} = 52$ km s⁻¹, $W_{20} = 62$ km s⁻¹ (compact galaxy with $d(25) = 5$ kpc 22" away). Keel & van Soest (1992) found that this is a "probably paired" Markarian galaxy. The possible companion galaxy is at 2.9', with no known velocity

Table 1. continued

Notes to Table 1 (continued):

and 1 mag fainter than SBS 0214+292.

0225–103 $\equiv$ MCG -2-7-10 $\equiv$ KUG 0225–103. Galaxy 1 mag fainter at $5.8'$ to the East and $14'$ to the North. In group: 2 galaxies inside of $30'$ radius with velocities equal to in 2100 km s^{-1} .

0225–104 $\equiv$ KUG 0225–104. In group with 0225–103.

0335–052 – With a metallicity of $Z_{\odot}/41$, this is the most metal-deficient BCG known after I Zw 18 ($Z_{\odot}/50$). Detailed studies with the HST (Thuan et al. 1997; Thuan & Izotov 1997), MMT (Izotov et al. 1997), Russian 6 m (Pustilnik et al. 1997) and Keck (Lipovetsky et al. 1999a) telescopes suggest that this galaxy is a young galaxy, containing stars not older than 100 Myr. A VLA map (Pustilnik et al. 1999) shows that the HI envelope is unusually large ($64 \times 24 \text{ kpc}^2$) and seen nearly edge-on. As the HI gas structure is not well approximated by our adopted model of a gaussian disk, the beam correction is somewhat uncertain. However the single-dish and VLA HI masses agree quite well. NGC 1376 is at $37.3'$ to the West at $V = 4155 \text{ km s}^{-1}$ ($\sim 100/\text{h kpc}$ in projection). The BCG is at the outskirts of a medium density group GH 47 (Garcia 1993).

0741+535 – Galaxy at 7.2° to the East and $17'$ to the North. In the same group with 2 SB galaxies with velocities of 5641 km s^{-1} and 5679 km s^{-1} , inside a radius of $30'$.

0743+550 $\equiv$ MCG 9-13-55 $\equiv$ VV 654, pair? In group? Sb galaxy NGC 2446 at $\sim 25'$ with $\Delta V = 180 \text{ km s}^{-1}$.

0749+568 – Possible HI satellite at $V = 5339 \text{ km s}^{-1}$, $F = 0.24 \pm 0.11 \text{ Jy km s}^{-1}$, $W_{50} = 70 \text{ km s}^{-1}$. This HI component may be associated with a brighter galaxy at $\sim 2'$ to the West and $\sim 1.7'$ to the North, or with a fainter galaxy at $0.2'$ to the East and $\sim 6'$ to the South, or with a very faint fuzz at $10''$ to the East and $30''$ to the South.

0847+612 $\equiv$ MCG 10-13-25. Compact galaxy with a bright nucleus and two tails.

0917+527 $\equiv$ KUG 0917+527.

0930+554 $\equiv$ I Zw 18 $\equiv$ UGCA 166. The most metal-deficient BCG known (1/50 of solar metallicity) and a young galaxy (stars not older than 100 Myr, Izotov & Thuan 1998).

0939+592 $\equiv$ UGC 5179. Spiral galaxy seen almost face-on. The bright SO galaxy NGC 2950 is 3.5 mag brighter at 25.3° to the West and $7'$ to the South, $V = 1378 \text{ km s}^{-1}$ ($\sim 30/\text{h kpc}$ in projection).

0940+662 $\equiv$ NGC 2909 $\equiv$ UGC 5188. Haynes et al. (1988) obtained $F = 2.02 \text{ Jy km s}^{-1}$ and $W_{50} = 130 \text{ km s}^{-1}$, $W_{20} = 188 \text{ km s}^{-1}$ consistent with our data.

0940+544 $\equiv$ KUG 0940+544. KUG 0940+543, 1 mag brighter galaxy at 10° to the West and $1.5'$ to the South. Its velocity is about 27000 km s^{-1} (6 m data).

0942+573 $\equiv$ KUG 0942+573.

0946+487 $\equiv$ KUG 0946+487.

0946+558 $\equiv$ UGCA 184 $\equiv$ KUG 0946+588, spiral, Thuan & Martin (1981) obtained $F = 1.23 \pm 0.8 \text{ Jy km s}^{-1}$, $W_{50} = 69 \text{ km s}^{-1}$, $W_{20} = 104 \text{ km s}^{-1}$.

1001+555 $\equiv$ UGC 5421 $\equiv$ MCG 9-17-18, Dwarf ($\sim 9 \text{ kpc}$) galaxy seen edge-on. Schneider et al. (1992) obtained $F = 4.19 \pm 0.6 \text{ Jy km s}^{-1}$, $W_{50} = 100 \text{ km s}^{-1}$, $W_{20} = 116 \text{ km s}^{-1}$, Haynes & Giovanelli (1991) obtained $F = 4.53 \text{ Jy km s}^{-1}$, $W_{50} = 105 \text{ km s}^{-1}$, $W_{20} = 127 \text{ km s}^{-1}$ and Theureau et al. (1998) obtained $F = 4.4 \pm 0.5 \text{ Jy km s}^{-1}$, $W_{50} = 110 \text{ km s}^{-1}$, $W_{20} = 119 \text{ km s}^{-1}$ in good agreement with our data.

1006+578 $\equiv$ KUG 1006+578.

1114+587 – In group? Two galaxies inside a $30'$ radius with velocities of 1772 km s^{-1} and 1808 km s^{-1} .

1119+586 – Galaxy 2 mag brighter, 11.4° to the West and $18'$ to the South, with no known velocity. Background HI emission at $V = 1943 \text{ km s}^{-1}$ with $F = 0.37 \pm 0.18 \text{ Jy km s}^{-1}$, $W_{50} = 36 \text{ km s}^{-1}$. It may come from either a pair of galaxies at $\sim 1'$ to the East and $\sim 4'$ to the South, or a faint galaxy at $8''$ to the East and $\sim 7.3'$ to the North.

1123+644 $\equiv$ UGC 6448 $\equiv$ MCG 11-14-25. Dwarf Irr disk with 2 bright knots. Thuan & Martin (1981) obtained $F = 4.2 \pm 1.06 \text{ Jy km s}^{-1}$, $W_{50} = 60 \text{ km s}^{-1}$, $W_{20} = 87 \text{ km s}^{-1}$. In group? UGC 6390 inside of $30'$ radius at $V = 1009 \text{ km s}^{-1}$ ($\sim 75/\text{h kpc}$ in projection).

1211+540 – One of the smallest objects in our sample.

1213+597 $\equiv$ MCG 10-18-13. Spiral seen almost face-on. In group? NGC 4195 inside $30'$ radius at $V = 4350 \text{ km s}^{-1}$.

1317+523A $\equiv$ MCG 9-22-47. Observation was made at 13° to the West. A correction factor of 1.27 has been taken into account for the integrated flux density. With this offset, the integrated flux density contribution of the nearby galaxy SBS 1317+523B ($\equiv$ MK251, at 20° to the East and $1.5'$ to the North, at $V = 4618 \text{ km s}^{-1}$) is less than 15% of the measured integrated flux density of SBS 1317+523A, which is, after subtraction, of 4.2 Jy km s^{-1} . In group with the companion galaxy MCG 9-22-48, located at 3° to the East and $30''$ to the South, with $V = 4444 \pm 40 \text{ km s}^{-1}$, yielding no confusion, with SBS 1317+523B, and with SBS 1318+520 at 25° to the East, $18'$ to the South and $V = 4740 \text{ km s}^{-1}$.

1318+520 $\equiv$ MCG 9-22-51. In group with SBS 1317+523A and B and MCG 9-22-48 (see the note for SBS 1317+523A).

1323+483 – Foreground HI source at $V = 4602 \text{ km s}^{-1}$ with $F = 0.15 \pm 0.07 \text{ Jy km s}^{-1}$, $W_{50} = 32 \text{ km s}^{-1}$. Fainter galaxy at $3''$ to the West and $24''$ to the South.

1332+518 $\equiv$ NGC 5238 $\equiv$ UGC 8565 $\equiv$ I Zw 64 $\equiv$ VV 828 $\equiv$ CP 384ab.

1358+554E – Edge-on spiral NGC 5422 ($B = 12^{\text{m}}8$) about $6'$ to the SE with $V = 1785 \text{ km s}^{-1}$.

1422+573 $\equiv$ KUG 1422+573. Spheroid with 2 tails along major axis.

1430+596 – Edge-on Spiral. There is also a HI component at $V = 1955 \text{ km s}^{-1}$ with $F = 0.43 \pm 0.17 \text{ Jy km s}^{-1}$, $W_{50} = 46 \text{ km s}^{-1}$. This may be associated with a galaxy 2 mag fainter at $4'$ to the North. In group. Two SBc galaxies inside $30'$ radius at velocities of 2001 km s^{-1} and 1918 km s^{-1} .

1430+526A $\equiv$ KUG 1430+526.

1504+514N $\equiv$ KUG 1504+514 $\equiv$ CGCG 274-13. Sc galaxy UGC 9702 at $8'$ to the SW with unknown velocity.

1506+553 $\equiv$ Sc galaxy UGC 9737 $\equiv$ MCG 9-25-23. In group. 2 Sc galaxies inside $30'$ radius at velocities 3128 km s^{-1} and 3421 km s^{-1} .

1509+527 $\equiv$ KUG 1509+527. Paired with Sdm galaxy MCG 9-25-31, 0.4 mag brighter and with $a(25) = 1'$, at $36''$ to the West and $6'$ to the South, at $V = 3314 \text{ km s}^{-1}$ ($F = 0.34 \pm 0.14 \text{ Jy km s}^{-1}$, $W_{50} = 86 \text{ km s}^{-1}$). In group. 3 galaxies with velocities equal to 3526 km s^{-1} , 3360 km s^{-1} and 3470 km s^{-1} inside a $30'$ radius.

Notes to Table 1 (continued):

1519+496 – Two galaxies at 3.7° to the West and $23'$ to the South, with unknown velocities.

1551+601A – The HI and optical velocities differ by 300 km s^{-1} . Possible faint foreground HI emission at $V = 2516 \text{ km s}^{-1}$, $F = 0.16 \pm 0.11 \text{ Jy km s}^{-1}$, $W_{50} = 28 \text{ km s}^{-1}$ which could be associated either to a faint galaxy at $3.3'$ to the South, or to a faint galaxy with bright knots $76''$ to the East and $\sim 6'$ to the South.

1714+602 – There is a second component of the HI profile with $V = 6070 \text{ km s}^{-1}$ and $F = 0.36 \pm 0.12 \text{ Jy km s}^{-1}$. It may correspond to faint galaxy at $\sim 1.5'$ to South.

1809+318 Keel & van Soest (1992) found that this is a “probably paired” Markarian galaxy. The possible companion galaxy is at $0.3'$, with no known velocity and 2.2 mag fainter than SBS 1809+318.

2116+020 Keel & van Soest (1992) found that this is a “probably paired” Markarian galaxy. The possible companion galaxy is at $2.2'$, with no known velocity and 1.8 mag fainter than SBS 2116+020.

2127+021 $\equiv$ NGC 7077 $\equiv$ Arakelian 549. Lewis (1987) obtained $F = 1.97 \text{ Jy km s}^{-1}$, $W_{50} = 121 \text{ km s}^{-1}$, $W_{20} = 131 \text{ km s}^{-1}$, in good agreement with our data.

2220+377 $\equiv$ UGC 12009. Wegner et al. (1993) obtained $F = 8.78 \text{ Jy km s}^{-1}$, $W_{50} = 202 \text{ km s}^{-1}$ and $W_{20} = 189 \text{ km s}^{-1}$ in good agreement with our data.

2221+409 – Sm galaxy UGC 12027 at $\sim 10'$ with $V = 4130 \text{ km s}^{-1}$ (Schneider et al. 1992). In group?

2246+315 – Jackson et al. (1987) obtained $F = 3.37 \text{ Jy km s}^{-1}$, $W_{20} = 206 \text{ km s}^{-1}$, 60% higher than our flux.

2311+129 $\equiv$ UGC 12434.

Table 2. Uncertain and confused HI detections

IAU name	Other name or prefix	Coord. (1950.0)		Angul. size axb	PA	$V(\text{HI})$ km s^{-1}	Dist. Mpc Vir	W_{50} km s^{-1}	W_{20} km s^{-1}	Obs. Flux Jy km s^{-1}	Cor. Flux Jy km s^{-1}	Log $M(\text{HI})/$ $M_{\odot}$	R & N
		R.A. h m s	Dec. ° ' "										
1	2	3	4	5	6	7	8	9	10	11	12	13	14
0028+081	MK552	00 28 43.9	08 11 59	103×61 ^e	0	4368 ± 11	58.5	239 ± 21	337 ± 33	23.60 ± 1.36		10.28	G92*
0127+307A	KUG	01 27 53.6	30 43 29	33×20 ^e	−30	4958 ± 04	67.5	67 ± 08	85 ± 12	1.46 ± 0.26	1.47 ± 0.26	9.20	N94*
0136+328	KUG	01 36 20.8	32 51 52	27×22 ^e	0	6230 ± 21	84.4	34 ± 42	112 ± 66	0.63 ± 0.23	0.63 ± 0.23	9.03	N93*
0201+284*	MK365	02 01 26.0	28 24 57	70×55 ^e	90	5151 ± 05	69.8	63 ± 11	74 ± 17	0.25 ± 0.13	0.26 ± 0.13	8.48	N94*
0207−080	MK1023	02 07 20.6	−08 01 05	26×20 ^e	0	3793 ± 12	49.5	100 ± 24	139 ± 38	1.13 ± 0.24	1.13 ± 0.24	8.82	N94*
0310−054	MK604	03 10 18.4	−05 27 19	48×23 ^e	10	2177 ± 05	28.6	144 ± 10	186 ± 15	4.63 ± 0.38	4.66 ± 0.38	8.95	N93*
0335−057A	SBS	03 35 44.6	−05 42 11	25×25 ^e	0	6617 ± 07	86.6	201 ± 13	222 ± 21	2.70 ± 0.45	2.72 ± 0.45	9.68	N93*
0743+591B	SBS	07 43 32.2	59 07 52	64×31	45	6340 ± 14	87.5	88 ± 28	130 ± 44	0.84 ± 0.29	0.86 ± 0.30	9.19	N93*
0750+603AB	SBS	07 50 53.7	60 19 10	30×18 ^e	65	10844 ± 17	146.9	183 ± 34	238 ± 54	1.41 ± 0.27	1.42 ± 0.27	9.86	N93*
0755+587	SBS	07 55 42.8	58 45 12	83×66 ^e	10	5720 ± 12	79.4	210 ± 24	253 ± 38	5.55 ± 0.92		9.92	G92*
0756+611*	SBS	07 56 29.3	61 07 25	20×16 ^e	−20	6269 ± 05	86.7	93 ± 09	100 ± 15	0.70 ± 0.41		9.09	G92*
0814+579A	SBS	08 14 08.9	57 54 51	53×32	−45	8048 ± 23	110.0	142 ± 46	253 ± 72	2.87 ± 0.41	2.93 ± 0.42	9.92	N93*
0844+703	MK95	08 44 33.4	70 20 53	49×24	−33	3649 ± 07	52.9	286 ± 13	294 ± 20	4.01 ± 2.06		9.42	G92*
0912+599 ⁺⁺	MK19	09 12 53.5	59 58 53	65×30	60	4150 ± 13	59.2	144 ± 26	206 ± 40	2.33 ± 0.37	2.41 ± 0.38	9.30	N93*
0926+606AB ⁺	SBS	09 26 20.1	60 40 02	43×26	90	4050 ± 10	59.1	148 ± 20	175 ± 32	2.53 ± 0.53	2.59 ± 0.54	9.33	G93*
1011+601 ⁺	SBS	10 11 31.5	60 06 07	16×13 ^e	90	2160 ± 17	33.7	42 ± 34	95 ± 53	0.52 ± 0.19	0.52 ± 0.19	8.14	N93*
1028+566*	SBS	10 28 55.3	56 37 06	35×28	−50	7261 ± 26	100.0	148 ± 52	190 ± 82	0.56 ± 0.20	0.57 ± 0.20	9.13	N93*
1054+504 ⁺⁺	SBS	10 54 02.7	50 24 28	42×27	−45	1375 ± 31	23.4	87 ± 62	158 ± 97	0.58 ± 0.21	0.59 ± 0.21	7.88	N93*
1057+511A*	U6074	10 57 02.7	51 10 14	78×52	90	2885 ± 14	43.0	84 ± 28	152 ± 43	5.25 ± 0.85		9.36	G92*
1114+517 ⁺	MK1445	11 14 42.7	51 42 16	41×29	0	2838 ± 30	43.1	30 ± 10	50 ± 20	0.90 ± 0.26	0.90 ± 0.26	8.56	N94*
1114+5145	U6309	11 14 57.0	51 45 17	105×83	−60	2870 ± 06	43.4	223 ± 13	257 ± 20	4.12 ± 0.35	4.53 ± 0.39	9.26	N96*
1123+576 ⁺⁺	SBS	11 23 23.2	57 37 42	24×22	0	289 ± 07	6.3	32 ± 14	42 ± 23	0.12 ± 0.08	0.12 ± 0.08	6.05	N94*
1125+562 ⁺	SBS	11 25 16.8	56 13 03	33×25	−40	5602 ± 11	78.4	74 ± 22	95 ± 34	0.47 ± 0.23	0.47 ± 0.23	8.83	N95*
1125+524	SBS	11 25 50.8	52 27 21	44×22	55	3075 ± 32	45.6	53 ± 65	148 ± 101	0.71 ± 0.19	0.72 ± 0.20	8.55	N94*
1129+576 ⁺	SBS	11 29 15.5	57 39 17	65×18	−15	1566 ± 02	26.3	89 ± 04	119 ± 05	21.62 ± 0.80	21.74 ± 0.85	9.55	G92*
1136+607 ⁺	SBS	11 36 26.3	60 47 22	29×21	45	3481 ± 08	51.0	278 ± 17	305 ± 26	4.18 ± 0.57	4.21 ± 0.58	9.41	N93*
1137+589 ⁺⁺	SBS	11 37 48.4	58 55 10	20×14	0	2032 ± 09	32.5	110 ± 17	124 ± 27	0.85 ± 0.39	0.85 ± 0.39	8.33	N94*
1144+591*	SBS	11 44 21.9	59 09 50	28×22	20	2488 ± 11	38.1	84 ± 23	148 ± 36	2.75 ± 0.42	2.78 ± 0.42	8.97	N93*
1147+520 ⁺	SBS	11 47 16.4	52 00 51	28×23	0	1257 ± 07	22.2	148 ± 15	169 ± 23	1.79 ± 0.39	1.80 ± 0.39	8.32	N93*
1149+596 ⁺⁺	SBS	11 49 55.9	59 39 37	30×22 ^e	40	3351 ± 25	49.0	42 ± 51	116 ± 80	0.55 ± 0.21	0.55 ± 0.21	8.49	N94*
1159+516B ⁺	SBS	11 59 31.8	51 40 18	22×22 ^e	0	4424 ± 08	8.3	35 ± 16	48 ± 24	0.37 ± 0.25	0.37 ± 0.25	6.78	N94*
1216+460	MK1471	12 16 10.8	46 03 45	30×17	−28	5796 ± 06	80.8	232 ± 11	244 ± 17	4.65 ± 0.90		9.86	G92*
1216+551*	SBS	12 16 55.5	55 08 13	20×20 ^e	0	5195 ± 06	73.2	32 ± 11	42 ± 18	0.47 ± 0.32	0.47 ± 0.32	8.77	N94*
1221+585 ⁺	SBS	12 21 19.8	58 31 23	38×25	70	4610 ± 09	65.6	88 ± 17	115 ± 26	0.75 ± 0.18	0.76 ± 0.18	8.89	N94*
1221+545B ⁺⁺	SBS	12 21 58.6	54 31 24	15×11	−50	5704 ± 57	78.1	40 ± 129	129 ± 178	0.16 ± 0.16	0.16 ± 0.16	8.36	N94*
1222+614 ⁺	SBS	12 22 44.5	61 25 45	38×34	75	706 ± 02	14.1	67 ± 04	84 ± 07	5.26 ± 0.55	5.34 ± 0.56	8.40	N93*
1240+554C	SBS	12 40 36.6	55 25 09	139×39	−45	4797 ± 19	68.1	74 ± 38	159 ± 59	1.45 ± 0.27	1.59 ± 0.30	9.24	N94*
1242+549 ⁺	SBS	12 42 20.2	54 59 51	41×33	45	4757 ± 12	67.2	63 ± 23	106 ± 37	1.33 ± 0.21	1.35 ± 0.21	9.16	N93*
1314+605 ⁺⁺	SBS	13 14 54.1	60 34 20	45×23	−70	1848 ± 07	30.3	42 ± 13	53 ± 21	0.52 ± 0.32	0.53 ± 0.32	8.06	N96*
1317+523B ⁺	MK251	13 17 56.3	52 18 47	35×26	90	4618 ± 16	65.8	131 ± 31	228 ± 49	3.85 ± 0.36	3.90 ± 0.36	9.60	N94*
1319+579AB ⁺	SBS	13 19 28.4	57 57 36	83×32	39	2097 ± 10	33.5	136 ± 20	218 ± 31	10.25 ± 0.85		9.43	G91*
1340+529 ⁺⁺	MK1480	13 40 56.0	52 57 35	35×24	−15	1801 ± 06	29.6	42 ± 00	84 ± 00	1.95 ± 0.32	1.96 ± 0.32	8.61	N94*
1341+529 ⁺⁺	MK1481	13 41 03.6	52 56 22	48×36	60	1797 ± 09	29.7	55 ± 12	96 ± 19	3.16 ± 0.43		8.82	G91*
1401+490 ⁺	CG337	14 01 50.0	49 00 18	42×25	45	777 ± 17	14.9	48 ± 33	102 ± 52	0.83 ± 0.28	0.84 ± 0.28	7.64	N93*
1450+439	CG564	14 50 09.8	43 55 27	100×77	−10	2480 ± 04	38.2	136 ± 08	160 ± 13	7.32 ± 0.69	7.76 ± 0.73	9.43	N94*
1523+519 ⁺⁺	CG707	15 23 51.6	51 55 22	36×18	52	3645 ± 61	53.1	42 ± 123	196 ± 192	0.39 ± 0.26	0.39 ± 0.26	8.41	N94*

Table 2. continued

IAU name	Other name or prefix	Coord. (1950.0)		Angul. size axb	PA	$V(\text{HI})$ km s ⁻¹	Dist. Mpc Vir	W_{50} km s ⁻¹	W_{20} km s ⁻¹	Obs. Flux Jy km s ⁻¹	Cor. Flux Jy km s ⁻¹	Log $M(\text{HI})/M_{\odot}$	R & N
		R.A. h m s	Dec. ° ' "										
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1533+574 ⁺	SBS	15 33 03.3	57 27 04	40×22	−60	3310 ± 09	49.0	152 ± 19	202 ± 30	4.89 ± 0.55	4.96 ± 0.56	9.45	N93*
1533+469*	IZw116	15 33 23.9	46 58 48	35×19	−50	5687 ± 15	79.8	91 ± 30	153 ± 48	1.43 ± 0.28	1.44 ± 0.28	9.34	N93*
1542+573B*	SBS	15 42 41.1	57 23 19	82×22	−45	4027 ± 08	58.3	283 ± 16	301 ± 25	13.13 ± 2.36	13.52 ± 2.39	10.02	N94*
1555+515 ⁺	SBS	15 55 40.2	51 30 54	17×14	38	4004 ± 20	55.3	137 ± 40	196 ± 63	1.20 ± 0.25	1.20 ± 0.25	8.94	N94*
1558+585	SBS	15 58 54.8	58 31 11	13×11	90	4218 ± 13	60.9	158 ± 27	211 ± 42	1.40 ± 0.25	1.40 ± 0.25	9.09	N95*
1632+578 ⁺⁺	SBS	16 32 40.8	57 52 38	24×12	−42	5530 ± 05	69.7	42 ± 11	53 ± 17	0.20 ± 0.11	0.20 ± 0.11	8.36	N94*
2304+097*	MK1129	23 04 09.7	09 44 02	25×25 ^e	0	4794 ± 13	64.6	63 ± 26	87 ± 40	0.45 ± 0.20	0.45 ± 0.20	8.65	N93*
2311+235*	MK317	23 11 20.7	23 32 54	90×60	−20	6202 ± 05	84.0	53 ± 10	63 ± 15	0.16 ± 0.10	0.17 ± 0.10	8.45	N93*

Notes to Table 2:

0028+081 ≡ Holmberg 11. Confusion. The BCG is a member of the Hickson compact group No. 2B (Hickson 1982). Three galaxies in beam. The nearest one is UGC 312, an Sc galaxy 0.7 mag brighter at 5^s to the East and 27'' to the South with $V = 4335$ km s⁻¹.

0127+307A – Confusion? galaxy 0.5 mag brighter, at 2.3^s to the East and 4' to the North, with no known velocity.

0136+328 – Confusion? Scd galaxy KUG 0136+329, 0.5 mag fainter, at 3.6^s to the West and 6' to the North, with no known velocity.

0201+284 ≡ KUG 0201+284. No confusion. Uncertain parameters. In group with the SO galaxy NGC 805 at 11^s to the East and 9.3' to the North with $V = 4573$ km s⁻¹ and with NGC 807 at 21' with $V = 4764$ km s⁻¹.

0207−080 ≡ KUG 0207−080. Confusion by E-S0 galaxy NGC 842 at 1.3^s to the East and 1' to the North, at $V = 3836$ km s⁻¹? No beam correction was made.

0310−054 ≡ KUG 0310−054. Confusion? S0 galaxy NGC 1248, 2.5^m brighter, at 1.1^s to the East and 2.7' to the North with $V = 2209$ km s⁻¹ (17/h kpc in projection).

0335−057A – Confusion? Scd galaxy PGC 13407, 4 mag brighter, no velocity, at 6^s to the East and 8' to the South.

0743+591B – Confusion. Irr galaxy 14.7 mag at 11.4^s to the East and 16'' to the North, $V = 6420$ km s⁻¹.

0750+603AB – Pair of BCGs with $\Delta V \sim 200$ km s⁻¹, separated by 3^s in the EW direction and 32'' in the SN direction, corresponding to a projected distance of 24/h kpc. Not resolved by the single-dish telescope beam.

0755+587 ≡ MCG 10-12-47. Flux corrected by 25% due to a large offset in the pointing. Confusion with MCG 10-12-51 (≡ KUG 0755+588) at 17^s to the East and 5.7' to the North, at $V = 5760$ km s⁻¹.

0756+611 – No confusion. Uncertain parameters.

0814+579A – Confusion with the BCG SBS 0814+579B with $V = 7918$ km s⁻¹, 2.2^s to the East, 1.1' to the North, and faint galaxy at 5.1^s to the West.

0844+703 ≡ KUG 0844+703. In group. Confused by Sm galaxy UGC 4593 at $V = 3626$ km s⁻¹ at 5.1' and NGC 2650 at $V = 3826$ km s⁻¹ at 8'. $F(\text{NGC } 4953) = 4.66$ Jy km s⁻¹ and $W_{50} = 241$ km s⁻¹ (Mebold et al. 1979), in good agreement with our data.

0912+599 – Interacting galaxies in contact.

0926+606 A and B – Pair of BCGs of similar brightnesses, separated by 2.5^s in the EW direction and by 1.2' in the SN direction, corresponding to 14/h kpc in projection. $\Delta V \sim 100$ km s⁻¹. We have modeled the two peak HI-profile to derive parameters for each component of the pair. For 0926+606A (RA(1950) = 09^h26^m20.1^s, DEC(1950) = 60°40'02''), $V(\text{HI}) = 4090$ km s⁻¹, $W_{50} = 78 \pm 23$ km s⁻¹, $W_{20} = 120 \pm 37$ km s⁻¹, and $\log M(\text{HI}) = 9.04$; For 0926+606B (RA(1950) = 09^h26^m23.0^s, DEC(1950) = 60°41'15''), $V(\text{HI}) = 4002$ km s⁻¹, $W_{50} = 67 \pm 23$ km s⁻¹, $W_{20} = 120 \pm 37$ km s⁻¹, and $\log M(\text{HI}) = 8.96$.

1011+601 – Paired with another BCG (SBS 1011+600) which is also included in the statistical sample. The separation is 1.0^s in the EW direction and 3' in the NS direction, corresponding to 20/h kpc in projection. The pair is not resolved by the single-dish beam.

1028+566 – No confusion. Uncertain parameters.

1054+504 – No confusion. Uncertain parameters.

1057+511A ≡ UGC 6074. Sdm galaxy MCG 9-18-67, 1.3 mag fainter, at 2.8^s to the West, 4.3' to the South, with a velocity of 230 ± 100 km s⁻¹ larger (6 m data). Physical pair (45 kpc/h in projection). Armstrong & Wooten (1986) obtained $F = 2.2$ Jy km s⁻¹.

1114+517 – Confusion with Sb galaxy UGC 6309, 2.7 mag brighter, at 14.4^s to the East and 3' to the North with $V = 2876$ km s⁻¹ and $F = 4.35$ Jy km s⁻¹. $W_{50} = 220$ km s⁻¹, $W_{20} = 264$ km s⁻¹ (Haynes & Giovanelli 1991). Pair? ~ 40 /h kpc in projection.

1114+5145 ≡ UGC 6309, not a BCG. See the note for SBS 1114+5145.

1123+576 – No confusion. Uncertain parameters.

1125+562 – Flux corrected by 42% due to offset of pointing relative to correct position. Possible confusion by Sc galaxy MCG 9-19-82 at 22.6^s to the West, 63'' to the South (13.1^s from telescope position). No known radial velocity.

1125+524 – Possible confusion with MCG 9-19-85, at 9.5^s to the East and 4.1' to the North; unknown velocity.

Table 2. continued

Notes to Table 2 (continued):

- 1129+576** – Confusion with a close Irr galaxy (MCG 10-17-10) 1.7 mag brighter, 1.3° to the East, $3.8'$ to the North, $V = 1296 \text{ km s}^{-1}$. Pair? (15/h kpc in projection).
- 1136+607** – Confusion with Sc galaxy UGC 6619, 2.6 mag brighter, at 19° to the East and $2'$ to the North, with $V(\text{HI}) = 3465 \text{ km s}^{-1}$, $F = 10.9 \text{ Jy km s}^{-1}$, $W_{50} = 279 \text{ km s}^{-1}$, $W_{50} = 327 \text{ km s}^{-1}$ (Haynes & Giovanelli 1991). Pair? (28/h kpc in projection). Also a close companion, a galaxy of the same brightness at 4.1° to the West.
- 1137+589** – Uncertain parameters. No confusion. Galaxy 0.5 mag fainter at 15.5° to the West and $2'$ to the South, with $V = 25440 \text{ km s}^{-1}$.
- 1144+591** – No confusion. MCG 10-17-56, 1.2 mag brighter, at 8° to the West and $9'$ to the South, at $V \sim 3500 \text{ km s}^{-1}$ (6 m data). In group or pair? UGC 6732 with $V = 2285 \text{ km s}^{-1}$, at $14'$ ($\sim 80/\text{h kpc}$ in projection).
- 1147+520** – Confusion with the Sc UGC 6802 at 13.9° to the East and $7'$ to the North with $V = 1253 \text{ km s}^{-1}$.
- 1149+596** – No confusion. In group. Inside $30'$ radius: NGC 3894 ($V = 3242 \text{ km s}^{-1}$) and NGC 3895 ($V = 3129 \text{ km s}^{-1}$).
- 1159+516B** – Possible confusion by faint galaxy at $\sim 5'$ to the North. Uncertain parameters.
- 1216+460** – Elongated edge-on spiral galaxy. Possible confusion with low-surface brightness galaxy at $1'$ to the South and with unknown velocity. Pair?
- 1216+551** – No confusion. Uncertain parameters.
- 1221+585** – Confusion? Large difference between optical and HI velocities. Sc galaxy ($a = 30''$) at 7.8° to the West and $11.5'$ to the North. No velocity. In group: 3 bright galaxies inside $30'$ radius with velocities near 4500 km s^{-1} .
- 1221+545B** – No confusion. Uncertain parameters.
- 1222+614** – Confusion? Sab galaxy of similar brightness (MCG 10-18-43) at 8° to the West and $9.5'$ to the South with no known velocity.
- 1240+554C** $\equiv$ UGC 7887. Confusion with SBb galaxy of the same brightness (NGC 4644) at 12° to the West with $V = 4764 \text{ km s}^{-1}$. In group: 5 galaxies of similar brightnesses inside $30'$ radius with velocities around 4800 km s^{-1} .
- 1242+549** – Confusion with the S galaxy NGC 4669, at 10° to the East and $11'$ to the North, with $V = 4835 \text{ km s}^{-1}$ (Bottinelli et al. 1999).
- 1314+605** – No confusion. Uncertain parameters.
- 1317+523B** $\equiv$ MCG 9-22-49. Confusion with the BCG SBS 1317+523A, which is at 20° to the West and $1.5'$ to the North, and has the same HI velocity ($V = 4619 \text{ km s}^{-1}$) and HI line widths. After subtraction of the integrated flux density contribution from SBS 1317+523A, we find $F = 3.7 \text{ Jy km s}^{-1}$. In a group with SBS 1317+523A, MCG 9-22-48 and SBS 1318+520 at 11.4° to the East and $17'$ to the South, with $V = 4740 \text{ km s}^{-1}$ (see the note for SBS 1317+523A, in Table 1).
- 1319+579AB** $\equiv$ NGC 5113, edge-on Sbc with two HII regions at the ends (A and B). Confusion with Sc galaxy NGC 5109 1.7 mag brighter at 29° to the West and $2.7'$ to the South with $V = 2131 \text{ km s}^{-1}$. Possible confusion with MCG 10-19-63 at $12'$ to the North. Unknown velocity.
- 1340+529** – Paired with MK 1481, a BCG which is 0.5 mag fainter, at 8° to the East and $1.2'$ to the South, with $V = 1880 \pm 78 \text{ km s}^{-1}$. The Green Bank flux of the pair is a factor of 1.6 larger than that measured at Nançay. No confusion.
- 1341+529** – Paired with MK 1480, a BCG 0.5 mag brighter, at 8° to the West and $1.2'$ to the North, with $V = 1847 \pm 48 \text{ km s}^{-1}$. No confusion.
- 1401+490** – Confusion? There are another compact galaxy of about the same brightness at $1.6'$ to the South, and a slightly brighter galaxy at 4.5° to the West and $2'$ to the North. Unknown velocities.
- 1450+439** $\equiv$ UGC 9569. Confusion with UGC 9567 ($a(25) = 60''$) at 13.5° to the West and $4.3'$ to the South with $V = 2504 \pm 5 \text{ km s}^{-1}$. ($\sim 30/\text{h kpc}$ in projection). Interaction? Schneider et al. (1992) give $F = 10.0 \text{ Jy km s}^{-1}$, $W_{50} = 154 \text{ km s}^{-1}$, $W_{50} = 183 \text{ km s}^{-1}$. We have attempted a decomposition to estimate fluxes for each galaxy: $F(\text{UGC 9569}) = 4.9 \pm 0.8 \text{ Jy km s}^{-1}$, $F(\text{UGC 9567}) = 5.9 \pm 1.0 \text{ Jy km s}^{-1}$.
- 1523+519** – No confusion, uncertain parameters.
- 1533+574** $\equiv$ VII Zw 611. Confusion? Pair or two components in the process of merging? Difference in optical velocities is about 150 km s^{-1} . Sc galaxy MCG 10-22-21, 0.5 mag brighter, at 12° to the West and $4'$ to the North. No known velocity.
- 1533+469** – Pair or interacting system, Galaxy 1.5 mag fainter at 2.2° to the West and $18''$ to the North. No confusion.
- 1542+573B** $\equiv$ UGC 10002. SBc galaxy. Interacting system with the BCG 1542+573A. In group. Sc galaxy UGC 10022 with $V = 3957 \text{ km s}^{-1}$ and galaxy MCG+10-22-36 inside $30'$ radius. The flux is highly uncertain due to a large correction for pointing offset.
- 1555+515** – Confusion? Optical and radio velocities differ by $\Delta V = 200 \text{ km s}^{-1}$. Sc galaxy ($a(25) = 1'$), 2 mag brighter, at 1.1° to the East and $7'$ to the North. No known velocity. In group? Sab galaxy at $V = 3706 \text{ km s}^{-1}$ inside $30'$ radius.
- 1558+585** – Pair with SBS 1559+585 ($\equiv$ MCG 10-23-15), 2 mag brighter, at 16.5° to the East and $17''$ to the North ($26/\text{h kpc}$ in projection). Parameters are given for the decomposed profile.
- 1632+578** – No confusion. Uncertain parameters. The $V = 4900 \text{ km s}^{-1}$ feature may be due to some faint radio interference, or may be associated with a brighter galaxy at $\sim 0.9'$ to the East and $3'$ to the North.
- 2304+097** – No confusion. Uncertain parameters.
- 2311+235** – No confusion. Uncertain parameters.

Table 3. HI non-detections of BCGs

IAU name	Other name or prefix	Coord. (1950.0)		$V(\text{opt})$ km s^{-1}	RMS mJy	Run Note
		R.A.	Dec.			
1	2	3	4	5	6	7
0109 – 019	MK563	01 09 16.9	–01 55 15	4900	2.0	N94
0155 + 021	MK1169	01 55 03.9	02 10 50	4950	5.8	N93*
0200 + 023	MK585	02 00 55.2	02 19 35	6400	6.3	G92*
0223 + 009	MK1038	02 23 53.9	00 56 11	1500	1.7	N94*
0323 – 003	MK611	03 23 40.9	–00 22 39	9095	5.7	G92*
0333 – 048	MK613	03 33 57.6	–04 51 56	6490	7.5	G92
0715 + 594	SBS	07 15 19.0	59 26 55	2400	2.1	N94*
0745 + 587	SBS	07 45 24.6	58 47 11	6370	2.9	N93*
0749 + 582	SBS	07 49 42.0	58 16 00	9424	1.9	N93
0807 + 580B	SBS	08 08 04.3	58 03 25	7980	6.4	G92
0810 + 583	SBS	08 10 11.2	58 21 04	7786	6.0	G92
0907 + 593	SBS	09 07 15.9	59 18 12	8894	8.4	G92
0911 + 472	SBS	09 11 13.1	47 14 28	8130	5.3	G92
0943 + 543 ⁺	SBS	09 43 40.8	54 19 33	1660	5.0	G92*
0948 + 532	SBS	09 48 16.7	53 13 00	13960	2.8	N95
1030 + 583 ⁺	MK1434	10 30 56.3	58 19 20	2400	2.7	N94*
1057 + 511B ⁺	SBS	10 57 10.5	51 07 22	3060	7.3	G92
1118 + 578B	SBS	11 18 39.1	57 53 30	2163	3.8	N93
1122 + 575 ⁺	SBS	11 22 12.8	57 32 37	1200	1.7	N94
1128 + 573 ⁺	SBS	11 28 28.9	57 20 33	1480	6.5	G92
1135 + 581 ⁺	MK1450	11 35 51.3	58 09 24	900	2.8	G92, N93*
1137 + 589 ⁺	SBS	11 37 48.3	58 55 10	1850	4.6	N94
1159 + 545 ⁺	SBS	11 59 29.0	54 32 32	3600	2.8	N94
1212 + 493 ⁺	SBS	12 12 06.0	49 23 18	3800	6.7	N92
1222 + 588 ⁺	SBS	12 22 29.1	58 49 17	4722	3.0	N93
1307 + 563 ⁺	SBS	13 07 41.5	56 18 21	5200	2.1	N94
1354 + 597B	SBS	13 54 02.1	59 42 17	3000	5.3	G92
1420 + 544	CG413	14 20 59.1	54 27 42	6280	5.7	G91
1423 + 518 ⁺	CG424	14 23 41.1	51 46 36	2140	7.6	G92
1446 + 595 ⁺	SBS	14 46 20.6	59 34 20	2120	7.0	G92
1453 + 526 ⁺	CG577	14 53 09.0	52 37 54	3280	7.5	G92
1459 + 483	CG608	14 59 44.2	48 18 12	3100	8.2	G92
1503 + 531 ⁺	CG618	15 03 02.0	53 06 54	5500	3.0	N94*
1614 + 600	SBS	16 14 51.9	60 02 59	9100	2.5	N93*
1620 + 577 ⁺	SBS	16 20 15.5	57 44 45	5600	2.0	N94
1716 + 302	MK894	17 16 32.4	30 14 06	4400	2.5	N96
2325 – 024	MK1131	23 25 27.0	–02 26 24	2580	7.2	G92

Notes to Table 3:

All optical velocities have been obtained with the 6m telescope IPCS with a typical accuracy of $100 - 150 \text{ km s}^{-1}$. They come either from Stepanian et al. 1993 (a-d), or Lipovetsky et al.'s unpublished catalog of BCGs.

0155+021 $\equiv$ UM 151

0200+023 $\equiv$ UM 391

0223+009 $\equiv$ IC 0225

0323–003 $\equiv$ KUG 0323-003

0715+594 $\equiv$ UGC 3789

0745+587 $\equiv$ KUG 0745+587

0943+543 $\equiv$ KUG 0943+543

1030+583 $\equiv$ KUG 1030+583

1135+581 – Observed in the G92 and N93 runs, with $F(\text{peak}) = 22 \pm 4.1 \text{ mJy}$, and $5.4 \pm 2.8 \text{ mJy}$ respectively. In both cases $V \sim 950 \text{ km s}^{-1}$ as compared to $V(\text{opt}) = 896 \pm 21 \text{ km s}^{-1}$. This HI emission may come from a galaxy with similar brightness at 14° to the East and $45''$ to the South, which is entirely in the beam of the 140 ft telescope but only partially in the beam of the Nançay telescope.

1503+531 – Elongated edge-on S galaxy. Uncertain parameters.

1614+600 – Confusion? Sc galaxy, 3 mag brighter. At 16.5° to the West and $1.8'$ to the North. No known velocity.

Fig. 1. HI profiles of the 79 certain BCG detections (Table 1). The ordinate is line flux density in mJy and the abscissa is heliocentric velocity in km s^{-1}

Fig. 1. continued

Fig. 1. continued

Fig. 1. continued

Fig. 1. continued

Fig. 2. HI profiles of the 53 less secure or confused BCG detections (Table 2). The ordinate is line flux density in mJy and the abscissa is heliocentric velocity in $km s^{-1}$

Fig. 2. continued

Fig. 2. continued

Fig. 2. continued

Column (5). Holmberg (H) major and minor diameters in arcsec to the limiting surface brightness of $B = 26.5 \text{ mag arcsec}^{-2}$, derived mainly from CCD surface photometry (Lipovetsky et al. 1999b; Kniazev 1995). When CCD data was not available, Holmberg diameters were derived from measurements on the Palomar Sky Survey (PSS) blue prints and the relation obtained by least-square fitting to the diameter data from a subsample of 48 of our BCGs with CCD photometry:

$$d_H (\text{arcsec}) = 2.53d_{\text{PSS}} (\text{arcsec}) + 7.4''.$$

Diameters derived in this way are marked by the letter e. They are less accurate than the CCD diameters and serve only to correct the HI fluxes for beam effects (Col. 12). We are in the process of deriving accurate CCD diameters for all BCGs in the statistical sample. Diameters are given only for BCGs observed at Nançay, which require a beam-flux correction (see Col. 12).

Column (6). Position angle in degrees of the major axis of the galaxy measured eastward from north.

Column (7). Heliocentric HI velocity in km s^{-1} determined as the midpoint between the half-peak points on both sides of the HI profile. The velocity error is estimated from the peak signal-to-noise ratio as described by Schneider et al. (1986), and includes an estimate of errors based on the slope of the profile edges. It is calculated as:

$$\Delta V = 1.5(W_{20} - W_{50})(S/N)^{-1}$$

where S/N is the ratio of the peak signal to the rms noise.

Column (8). Distance D in Mpc to the galaxy. We have used the Virgocentric flow model described by Kraan-Korteweg (1986) with a Virgocentric infall motion of 220 km s^{-1} and a Hubble constant of $75 \text{ km s}^{-1} \text{ Mpc}^{-1}$.

Columns (9) and (10). Velocity widths in km s^{-1} of the HI profile at 50% and 20% of peak. Again, errors are calculated following Schneider et al. (1986) and are based on the same method as for the velocities in Col. (7). The expected error for the 50% width is

$$3.0(W_{20} - W_{50})(S/N)^{-1} \text{ and}$$

for the 20% width is

$$4.7(W_{20} - W_{50})(S/N)^{-1}.$$

Column (11). Observed integrated flux density in Jy km s^{-1} . Following Schneider et al. (1990), we assume that the window over which the flux was measured is 20% wider than the velocity width measured at 20% of peak. The statistical error on the flux is then:

$$\sigma = 2(1.2W_{20}/\Delta V)^{1/2}\Delta V\sigma_V$$

where ΔV is the velocity resolution of the smoothed data, and σ_V is the rms dispersion in the baseline measured at that resolution. The factor of 2 accounts for baseline uncertainties.

Column (12). HI flux densities corrected for telescope beam size. This correction is negligible for observations made with the NRAO 43 m telescope, as the FWHP of the telescope beam is $22'$, much larger than the maximum

size of our galaxies ($\leq 3'$). The same holds for the north-south beam of the Nançay telescope which has a FWHP of $22'$. But the east-west beam of the Nançay radio telescope has a FWHP of only $3.7'$, and a beam correction needs to be applied. We follow Thuan & Martin (1981) in assuming that the neutral gas is distributed like an elliptical Gaussian with half-power major and minor axis a and b in arcmin. Then:

$$F_c = F_H [1 + (a^2 \sin^2 \text{PA} + b^2 \cos^2 \text{PA})/\theta^2]^{1/2}$$

where a and b are the Holmberg diameters given in Col. (5), PA is the position angle in degrees given in Col. (6), and θ is the HPBW of the Nançay telescope in the East-West direction. The beam correction are generally small, between 1.01 and 1.03. For only a few BCGs does the correction factor reach 1.10 – 1.18.

Column (13). Logarithm of the hydrogen mass M_H in solar masses calculated from:

$$M_H = 2.36 \times 10^5 F_c (\text{Jy km s}^{-1}) D^2 (\text{Mpc}^2)$$

where F_c is the corrected flux density given in Col. (12) and D the distance to the galaxy given in Col. (8).

Column (14). Telescope used (G = Green Bank, N = Nançay) and last two digits of the year of observation (The observation year ranges from 1992 to 1996). An asterisk in Table 1 means that there is additional information in the notes. All entries in Table 2 have supplemental notes.

Table 1 contains 79 entries with 34 galaxies in the statistical sample.

Table 2 contains 54 entries but only 53 are BCGs as 1114+5145 $\equiv$ UGC6074 is not a BCG and has been observed to check for confusion with the BCG 1114+517 $\equiv$ MK1445. Out of the 53 BCGs, we have determined that 32 BCGs are confused (see notes). The 21 non-confused BCGs in Table 2 are: 0201+284, 0756+611, 0912+599, 1028+566, 1054+504, 1057+511A, 1123+576, 1137+589, 1144+591, 1149+596, 1216+551, 1221+545B, 1314+605, 1340+529, 1341+529, 1523+519, 1533+469, 1542+573B, 1632+578, 2304+097 and 2311+235. They are marked by an asterisk in Col. 1. Table 2 contains 29 galaxies from the statistical sample, with 11 non-confused galaxies and 18 confused galaxies, among which are the pairs of BCGs 0926+606 A and B and 1011+600 and 1011+601 which are listed in a single entry.

Table 3 lists the BCGs which were not detected. It is organized as follows: the galaxy's IAU name (Col. 1), cross-reference to other names (Col. 2), its 1950 coordinates (Cols. 3 and 4). The heliocentric optical velocity on which the receiver was centered is given in Col. 5. The NRAO and Nançay receivers covered respectively a velocity range of 1350 and 4225 km s^{-1} . Col. 6 lists the rms noise in mJy of the spectrum smoothed to a velocity resolution of $\sim 16 \text{ km s}^{-1}$ for the Green Bank spectra and of $\sim 21 \text{ km s}^{-1}$ for the Nançay spectra. Finally, Col. 7 gives the telescope used and the year of the observations. An asterisk signifies that more information can be found in the notes.

Fig. 3. Histogram of the number of all non-confused observed (dashed line) and detected (solid line) BCGs versus heliocentric velocity

Figures 1 and 2 show in order of increasing right ascension the HI profiles of the BCGs listed respectively in Tables 1 and 2. Several of the BCGs in Table 1 have previous HI measurements. The detailed references are given in the Notes section. Comparison of our measurements with those of previous authors is given in Appendix A.

4. Discussion and summary

We present here the HI observations of 79 galaxies of a statistical sample of 88 BCGs selected from the First and Second Byurakan objective prism surveys to have a HII region-like spectrum, an equivalent width of the [O III] $\lambda 5007$ line larger than $\approx 50 \text{ \AA}$, and a heliocentric velocity less than or equal to 6000 km s^{-1} . This statistical BCG sample shall be used in a subsequent paper to: 1) study the physical parameters governing the burst mode of star formation in dwarf galaxies; 2) study the chemical evolution of dwarf galaxies and 3) compare statistically the properties of BCGs with those of other types of dwarf galaxies. For comparison, we have also observed an additional 20 BCGs in the SBS zone with weaker emission lines, 47 BCGs with $V \leq 6000 \text{ km s}^{-1}$ not in the SBS zone and 17 BCGs in the SBS zone with $V \geq 6000 \text{ km s}^{-1}$, which are of particular astrophysical interest. For the statistical sample which contains 61 non-confused galaxies, we detected 34 BCGs with $S/N \geq 3 - 4$ (Table 1) and 11 with $2 \leq S/N \leq 3$ and no confusion (Table 2), giving a detection rate of $\approx 74\%$. This is to be compared with the 80% detection rate of Thuan & Martin (1981).

Figure 3 shows the histogram of all non-confused observed (dashed line) and detected (solid line) BCGs as a function of heliocentric velocity. It is seen that the detection rate is roughly constant, equal to $\approx 75\%$, out to 6000 km s^{-1} , so that the complete statistical sample does

Fig. 4. Histogram of profile widths W_{50} for the 45 detected BCGs in the statistical sample (dashed line) and for the 100 detected BCGs in the enlarged sample (solid line)

not suffer from any bias due to telescope sensitivity drop off.

Figure 4 shows the distribution of W_{50} , the velocity width at half-maximum for both the statistical sample with $V \leq 6000 \text{ km s}^{-1}$ (a total of 45 galaxies, dashed line) and all detected BCGs (a total of 100 galaxies, solid line). The peak at $\sim 50 \text{ km s}^{-1}$ is due mainly to the statistical sample and may be slightly artificially enhanced as a third of the objects contributing to this peak are from Table 2 with lower signal-to-noise ratio profiles and hence with less reliable widths. Most of the statistical sample shows widths $\leq 160 \text{ km s}^{-1}$. The mean width is $92 \pm 48 \text{ km s}^{-1}$. These relatively small widths are characteristic of dwarf galaxies. The histogram of all detected BCGs shows a larger proportion of widths $\geq 60 \text{ km s}^{-1}$ with a high end extending to 300 km s^{-1} , implying rotational velocities comparable to those of large disk galaxies. Some of these high widths are contributed by more distant ($V \geq 6000 \text{ km s}^{-1}$) and hence more luminous and massive BCGs. Figure 5 shows the distribution of hydrogen masses for both the statistical (dashed line) and the enlarged sample of all detected BCGs (solid line). The HI masses for the statistical sample range between $4 \cdot 10^7 M_{\odot}$ and $5 \cdot 10^9 M_{\odot}$ with the distribution peaking at $\sim 3 \cdot 10^8 M_{\odot}$. The HI mass distribution for all detected BCGs extends from $\sim 10^6 M_{\odot}$ to $10^{10} M_{\odot}$, with a broad peak at $\sim 10^9 M_{\odot}$. The shifted peak toward higher HI masses is again partly due to more distant and more massive galaxies than in the statistical sample. BCGs are gas-rich objects, not a surprising conclusion, as gas is needed to fuel their very intense star-forming activity. We have also shown in dashed-dotted lines the distribution of upper limits for $M(\text{HI})$ derived using the data in Table 3, and assuming that the HI flux is less than $2 \text{ rms} \times 100 \text{ km s}^{-1}$. The HI mass upper limit distribution is very similar to the HI mass distribution of

Fig. 5. Histogram of HI masses for the 45 detected BCGs in the statistical sample (dashed line) and for the 100 detected BCGs in the enlarged sample (solid line). The dash-dotted line shows the histogram for the upper limits for the 37 undetected BCGs listed in Table 3. A Hubble constant of $75 \text{ km s}^{-1} \text{ Mpc}^{-1}$ has been adopted

the statistical sample, confirming again that there is no selection effect in the latter due to telescope sensitivities.

From the notes to Tables 1 and 2 we can estimate that at least $\sim 35\%$ of the BCGs in the statistical sample show evidence for being member of a pair, a group, or for signs of tidal interaction with another galaxy. This percentage is similar to that found by Campos-Aguilar & Moles (1991) and Campos-Aguilar et al. (1993) for other BCG samples.

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Appendix A: Calibration of the Nançay data

Since at Nançay, all 9, 18 and 21-cm receivers are permanently installed in the carriage chariot, the noise diode measurements are not made in the laboratory, but are

Table 4. Comparison with other authors

IAU name	Integrated flux densities (Jy km s ⁻¹)	
	Other Authors	This Work
1	2	3
0034+356	1.56	1.96 ± 0.24
0143+346	3.11	1.99 ± 0.20
0834+518	25.52	22.24 ± 0.48
0930+554	2.85	2.71 ± 0.14
0940+662	2.03	2.86 ± 1.24
0946+558	1.25	2.19 ± 0.90
1001+555	4.23	4.54 ± 0.73
1123+644	5.26	7.52 ± 1.24
1332+518	5.28	4.98 ± 0.53
1535+554	1.77	1.41 ± 0.26
2127+021	2.03	2.00 ± 0.12
2214+162	2.24	1.63 ± 0.22
2220+377	7.82	8.89 ± 0.38
2233+200	5.28	4.47 ± 0.37
2246+315	3.38	2.32 ± 0.27

made through drift scan observations of standard radio-continuum sources. Full sets of noise diode temperatures are measured twice a year for many observation frequencies and polarizations, on several extragalactic radio-continuum sources.

Calibration measurements were made at three frequencies: 1370, 1400 and 1425 MHz. A general drift of the noise diode temperature as a function of time is seen. The jump occurring on July 24, 1994 (hereafter 940724) is due to a hardware change.

Our observations were performed between November 1992 and mid-1996, but most of the data were taken in 1993 and 1994. The main variations of the noise diode temperature are due to the changing observation frequencies, corresponding to radial velocities of 500–6000 km s⁻¹. The following formulas were used: $T_{<940724} = 223.3 - 0.14 \times F$ and $T_{>940724} = 63.1 - 0.032 \times F$ where T is the estimated noise diode temperature in K and F the observation frequency in MHz. The overall calibration procedure accuracy is $\sim 10\%$.

A1. Comparison with data from other authors

Among the galaxies which have been detected with a high signal-to-noise ratio in the course of this survey and are not suffering any confusion, 12 have been observed by other authors and their HI parameters can be found in the literature. We have also observed 2 more Markarian galaxies (MK 303 and MK 307) to increase our comparison sample. The comparison sample is given in Table 4, with both our HI measurements and those of other authors.

We have plotted in Fig. 6 our measurements against those of others along with our error bars. The solid line

Fig. 6. Integrated HI flux densities from other authors (ordinate axis) versus our Nançay and Green Bank measurements (abscissa axis) for a sample of 15 common galaxies. The solid line represents equality

represents equality. The data points scatter evenly on either side of the equality line, demonstrating the correctness of our flux calibration.

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