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H I observations of nearby galaxies*

II. The second list of the Karachentsev catalog

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Abstract. We present H I observations of the galaxies in the second list of the Karachentsev catalog of previously unknown nearby dwarf galaxies (Karachentseva et al. 1999). This survey covers an area of 6000 square degrees within the boundaries RA [14h, 23h30] and Dec. [-20^0, $+60^0$] including the nearest cosmic void: RA = $18^{\rm h}38^{\rm m}$, Dec. = $+18^0$, $V_0 \leq 1500$ km s^{-1}. A total of 78 galaxies have been observed with a detection rate of 42%. We searched a frequency band corresponding to heliocentric radial velocities from -470 km s^{-1} to $+3970$ km s^{-1}. Non-detections are either due to limited coverage in radial velocity, confusion with Local H I (mainly in the velocity range -140 km s^{-1} to $+20$ km s^{-1}), or lack of sensitivity for very weak emission. In the general direction toward the Local Void we detected only one galaxy with a corrected radial velocity below 1500 km s^{-1}. The *Local Void* seems to be highly deficient in dwarf galaxies.

Key words: galaxies: distances and redshift — dwarft — fundamental parameters — general

1. Introduction

Among the most impressive features in the large-scale structure of the universe are huge areas void of galaxies that reach sizes of 100 Mpc. Besides these huge "empty" regions which are revealed in deep galaxy redshift surveys (e.g. Joeever et al. 1978; Kirshner et al. 1984; de Lapparent et al. 1986) there are also "empty" regions with diameters of 3 to 5 Mpc ("minivoids", Karachentsev 1994) in the nearby universe. Tully (1988) noted a wide region of sky toward RA ∼ 19h, and Dec. ∼ $+20^0$ which was free of cataloged galaxies. This *Local Void* is centered to RA = 18h 38m, Dec. = $+18^0$ and having a radius of 30^0 (Karachentseva et al. 1999).

In this paper we present results of a 21-cm line search for candidate dwarf galaxies out to $v_{\rm hel} = 3970$ km s^{-1} in a 6000 square degree area centered to RA [14h, 23h30], Dec. = [-20^0, $+60^0$] including the *Local Void*, taken from a list of Karachentseva et al. (1999). Ideas of biased galaxy formation (Dekel & Silk 1986) would expect dwarf galaxies to be less concentrated compared to the distribution of more massive galaxies.

The Local Void is an ideal field for this kind of search as it is very close and only here, at such small distances we do have the sensitivity to find tiny dwarf galaxies at all, both optically and in the 21-cm line of neutral hydrogen.

2. Observations

The 100-m radio telescope at Effelsberg has been used in the total power mode (ON–OFF) combining a reference field 5 min earlier in RA with the on-source position. The dual channel HEMT receiver had a system noise of 30 K. The 1024 channel autocorrelator was split into 4 bands (bandwidth 6.25 MHz) of 256 channels each shifted in frequency by 5 MHz with respect to their neighbor in order to cover a velocity range from -470 to 3970 km s^{-1} overlapping 1.5 MHz between channels. The resulting channel separation was 5.1 km s^{-1} yielding a resolution of 6.2 km s^{-1} (10.2 km s^{-1} after Hanning smoothing). The H I profiles observed with the 100-m radiotelescope are presented in Fig. 1 in order of increasing RA as in Table 1. The half power beam width (HPBW) of the Effelsberg telescope at this wavelength is 9$'$.3.

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* Table 2 is also available in electronic form at the CDS via anonymous ftp (139.79.128.5) or via
http://cdsweb.u-strasbg.fr/Abstract.html

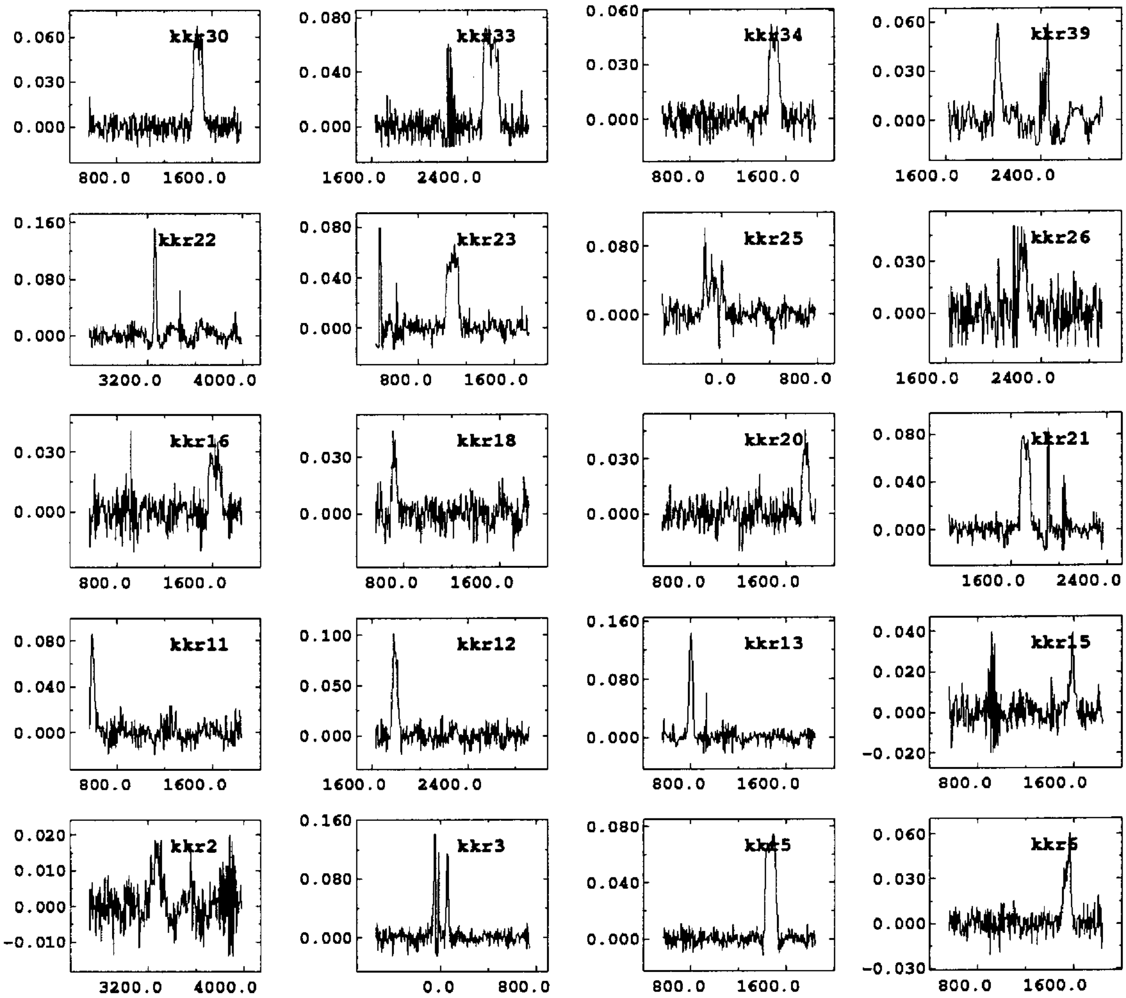

Fig. 1. H I profiles observed with the 100-m radio telescope at Effelsberg which has a HPBW of 9.′3. The flux scale is in Jy, the heliocentric radial velocity (optical convention) in km s^{-1}. Observations were obtained in the total power mode [ON–OFF] which yields a residual of the Local H I emission around 0 km s^{-1}. The profiles are arranged in ascending RA starting at the bottom left corner

3. The data

Optical data of our galaxies are given in Table 1. The kkr-number is given in Col. 1, RA and Dec. (1950) follow in Cols. 2 and 3. The optical diameters a and b in the Holmberg ($D_{26.5}$) system follow in Cols. 4 and 5, the morphological type in Col. 6 where we use the following coding:

Im - irregular blue object with bright knot(s);

Ir - irregular without knots or with amorphous condensations, the colour is neutral or bluish;

Sm - disturbed spiral or irregular with signs of spiral structure;

Sph - spheroidal, with very low brightness gradient or without any, the color is neutral or redish. The estimated optical surface brightness: high - H (22 – 23 mag/sq. arcsec), low - L (24 mag/sq. arcsec), very low - VL (25 mag/sq. arcsec), and extremely low - EL (26 mag/sq. arcsec) in Col. 7 is averaged over the visible galaxy ($\sim D_{26.5}$). The total blue magnitude $B_{\rm t}$ and its reference follow in Cols. 8 and 9. "NED" - data are from the NASA/ Extragalactic Database, "IK" - visual estimates from POSS (typical error is about 0.4 mag) by I. Karachentsev. The Galactic extinction (Schlegel et al. 1998) follows in Col. 10. Other names (identifications) are listed in Col. 11.

Results of the H I observations are summarized in Table 2. The kkr-number is given in Col. 1, the H I flux [Jy km s^{-1}] follows in Col. 2, the maximum emission and/or the rms noise [mJy] in Col. 3, the heliocentric radial velocity plus error in Col. 4, the line widths at the 50%, the 25%, and the 20% level of the peak emission in Col. 5. "Kinematic" distances (Col. 6) have been derived via corrected radial velocities assuming a Hubble constant of 75 km s^{-1} Mpc^{-1}. The absolute

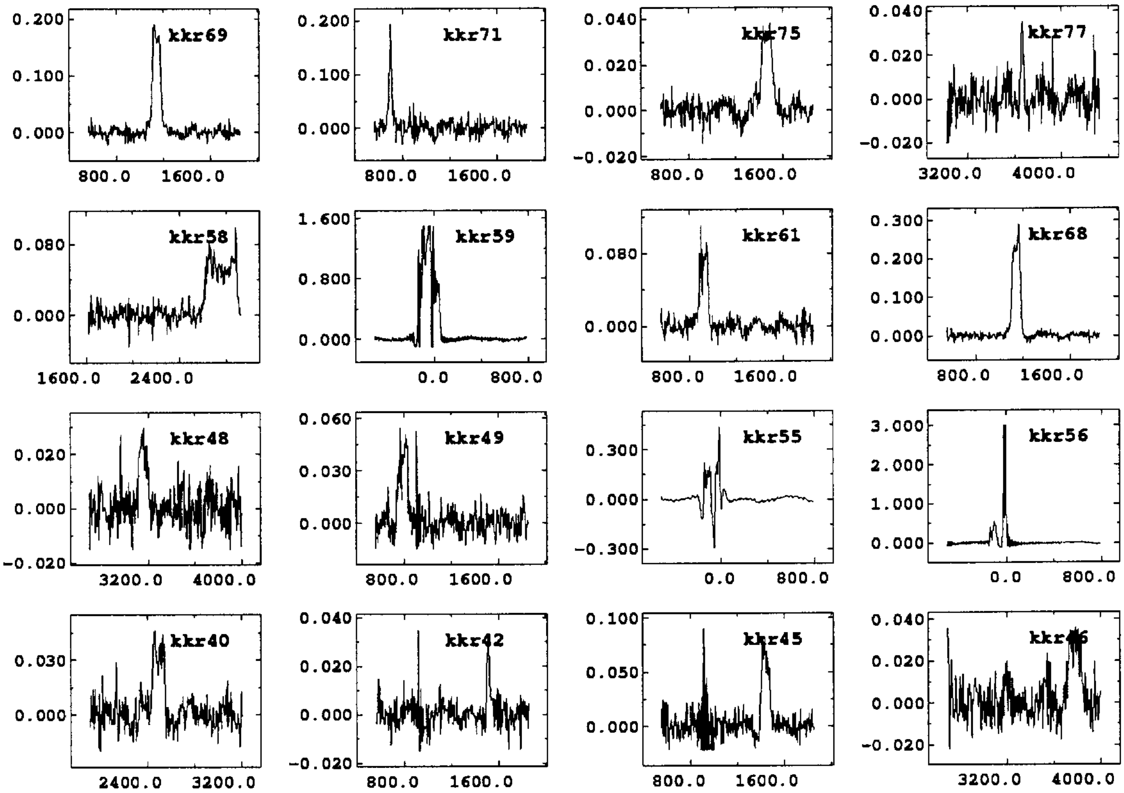

Fig. 1. continued

magnitude is given in Col. 7, the integrated H I mass (Col. 8) was calculated as (e.g. Roberts 1969)

$$(M_{\rm H\,I}/M_\odot) = 2.355\ 10^5\ D^2 \int S_v {\rm d}v$$

where D is the distance of the galaxy in Mpc and $\int S_v {\rm d}v$ is the integrated H I flux in Jy km s^{-1}. The relative H I content $M_{\rm H\,I}/L_B$ (in solar units) follows in Col. 9. Finally, Col. 10 contains comments. Possible confusion is mentioned in the footnotes to Table 2.

During the observing session we noticed radio interferences at certain times which did not have a strong influence on the observations. Most of the interference spikes are situated outside the velocity range of the H I profiles (e.g. kkr 21, kkr 39). In two cases a spike hits the profile (kkr 49, kkr 61). Baseline ripples are visible in a few spectra (e.g. kkr 2, kkr 22, kkr 77). None of these events really perturb the measurement of the line parameters of narrow emission lines as for these dwarf galaxies.

In the case of kkr 59 the H I emission from this galaxy is confused by Local H I emission. Its H I parameters may only be guessed, i.e. we get an upper limit for the radial velocity and lower limits for the line widths and the H I flux in this case.

In a number of cases emission at negative radial velocities has been observed (kkr25, kkr55, kkr56). The Dwingeloo H I survey (Hartmann & Burton 1997) shows that in all these cases extended H I emission was found at negative radial velocities suggesting that we may observe high velocity clouds in our Galaxy in these directions.

4. Discussion

A great majority (78%) of our galaxies are of type Im (1) and Ir (61), about 2% are of type Sph (2), while the other 16% is a collection of different types from spiral to Sm. The detection rate of our sample galaxies also depends on the morphological type. 77% of the spirals (type SB to Sm) were detected; the detection rate for types Im and Ir is close to 36%, whereas the galaxies of type Sph were not detected. The detection rate depends on the optical surface brightness (S.B.) class, too. From high S.B. to low, and very low S.B. the detection rate decreases from 100% to 43%, and 25%, respectively. This trend reflects the type dependence and the fact that we deal with fainter galaxies as we descend from high S.B. to very low S.B., the median absolute magnitudes for the detected galaxies change from −15.43 (H) to −13.92 (VL) for our brightness classes.

There are a few cases of high $M_{\rm H\,I}/L_B$ values in Table 2. The galaxy with $M_{\rm H\,I}/L_B \geq 6$ is actually found to be confused by emission from a nearby galaxy (kkr 69, kkr 68, see Table 2). Both profiles are nearly identical in shape, radial velocity and linewidths, but not in flux. Most of the H I flux originates from kkr 68; it is not possible

Table 1. List of new local void dwarf candidates: optical data

KKR	RA (1950.0)	Dec.	a	b	Type	S.B.	B_t	Ref.(B)	A_b	Identification
	h m s	° ′ ″	arcmin							
1	2	3	4	5	6	7	8	9	10	11
1	13 55 16.8	+08 04 51	0.50	0.30	Ir	L				D 721-17
2	14 03 58.2	+09 35 43	0.85	0.25	Im	L	16.8	IK	0.12	D 721-07
3	14 05 01.5	+35 17 47	1.10	0.65	Ir	VL	16.9	IK	0	
4	14 13 57.0	+14 06 24	1.10	1.10	PN?	VL				F650-01
5	14 14 26.1	+04 03 55	1.00	0.65	Ir	L	16.6	IK	0.13	BCh(83)
6	14 14 28.9	−01 16 24	1.00	0.50	Ir	L	16.9	IK	0.22	
7	14 14 44.3	+13 54 59	0.60	0.50	Ir	L				
8	14 16 45.4	+03 21 08	1.30	0.80	Ir?	L				BCh(83)
9	14 24 47.9	+22 54 51	0.90	0.60	Sph?	VL				
10	14 30 10.3	+31 43 45	0.65	0.50	Ir	L				
11	14 43 14.7	+55 47 56	0.80	0.55	Ir	L	16.9	IK	0.07	
12	14 44 01.3	+14 25 18	1.20	0.75	Ir	L	16.6	IK	0.09	F651-2
13	14 46 50.0	+34 54 58	1.10	0.90	Sm?	L	16.4	IK	0.09	U 9540
14	14 52 09.8	+01 21 50	0.50	0.30	Ir	L	17.8	NED	0.13	
15	15 01 22.7	+00 37 25	0.50	0.35	Ir	L	17.6	IK	0.26	
16	15 01 58.2	−02 23 35	1.00	0.70	Ir	H	16.5	IK	0.39	
17	15 08 46.1	+11 13 13	0.45	0.30	Ir	L				
18	15 15 35.5	+16 29 27	0.50	0.45	Ir	H	15.9	IK	0.14	MCG3-39-9
19	15 20 44.7	+57 29 17	0.90	0.60	Ir	VL				
20	15 28 36.0	+03 59 58	1.30	0.90	Sm	L	16.5	IK	0.21	
21	15 34 47.4	+20 57 31	1.1:	0.8:	SB?	L	16.8	IK	0.23	F583-2
22	15 43 27.7	+17 28 04	1.50	1.00	SB?	L	16.6	IK	0.16	F583-5
23	16 11 05.1	+17 19 07	1.40	0.90	Sm	L	16.0	IK	0.25	UGC 10281
24	16 11 25.5	+02 39 20	0.70	0.50	Ir	L				
25	16 12 37.3	+54 29 46	1.10	0.65	Ir	L	17.0	IK	0.04	
26	16 14 28.2	+16 12 30	0.45	0.40	Ir	L	17.1	IK	0.20	
27	16 38 47.8	+22 00 45	0.40	0.20	Ir?	L				
28	16 43 30.2	+02 44 39	1.00	0.30	Ir?	VL				
29	16 46 13.8	+22 25 27	0.70	0.35	SB?	L				
30	16 54 13.8	+08 04 34	1.10	0.85	Sm?	VL	17.0	IK	0.56	
31	16 56 27.4	+23 16 50	0.70	0.35	Ir	L				
32	16 59 25.4	+21 07 55	0.45	0.40	Ir	L				
33	17 07 31.2	+07 50 55	2.10	0.90	Sm	L	16.7	IK	0.56	
34	17 10 24.5	+13 57 58	0.50	0.30	Ir	L	17.8	IK	0.65	
35	17 28 26.6	+06 22 25	0.45	0.30	Ir	L				
36	17 43 45.0	+02 08 04	1.10	0.75	Sm?	L				
37	17 44 57.1	+22 21 47	0.70	0.40	Ir	L				
38	17 46 40.7	+26 13 01	0.80	0.45	Ir	L				F520-3
39	17 56 53.7	+21 51 02	0.60	0.35	Ir	VL	18.1	IK	0.46	
40	18 03 01.7	+23 08 12	1.30	0.90	Ir	L	16.5	IK	0.49	
41	18 06 14.5	+00 22 10	-	-	PN?	EL				
42	18 09 09.0	+37 14 09	0.45	0.40	Ir	L	17.7	IK	0.21	
43	18 14 54.8	+09 58 04	0.70	0.60	Sm?	L				
44	18 33 48.0	+31 02 18	0.70	0.60	Ir	L				
45	19 30 40.0	−00 43 45	1.00	0.90	Ir	L	17.5	IK	1.07	CGMW 3-4255

Table 1. continued

KKR	RA (1950.0)	Dec.	a	b	Type	S.B.	B_t	Ref.(B)	A_b	Identification
	h m s	° ′ ″	arcmin							
1	2	3	4	5	6	7	8	9	10	11
46	19 35 28.2	+54 31 33	0.85	0.65	Ir	L	17.5	IK	0.46	
47	19 55 54.0	+42 07 34	0.85	0.45	Ir	L				
48	19 57 14.7	+62 29 09	0.90	0.45	Ir	L	17.5	IK	0.36	
49	19 59 13.1	+42 09 05	0.70	0.35	Ir	L	17.7	IK	2.33	
50	20 08 49.0	+10 46 42	0.60	0.40	Ir	L				
51	20 19 52.6	+52 18 26	0.75	0.35	Ir	L				
52	20 28 05.4	+10 35 56	0.80	0.20	Ir	VL				
53	20 30 49.1	+01 23 35	0.65	0.30	Ir?	L				
54	20 33 23.7	−01 29 25	0.75	0.30	Ir	L				
55	20 44 15.2	+60 13 40	0.60	0.40	Ir	L	17.0	IK	2.94	comp. N6946?
56	20 47 11.5	+58 25 56	0.70	0.45	Ir	L	17.6	IK	3.14	comp. N6946?
57	20 46 36.5	+62 53 03	0.50	0.45	Ir	L				
58	20 48 19.1	+57 55 04	2.10	0.20	Sm	VL	17.9	IK	3.58	RFGC 3647
59	21 02 02.8	+57 05 17	2.30	1.40	Ir	VL	15.7	IK	3.86	comp. N6946
60	21 04 30.6	+57 00 15	0.70	0.50	Ir	VL				
61	21 16 29.6	+26 04 56	1.00	0.65	Sm?	L	16.9	IK	0.47	
62	21 29 04.3	+52 28 24	-	-	Ir?	VL				Dw095+1.0?
63	21 53 40.8	+40 14 05	0.60	0.35	Ir	L				
64	21 58 05.5	+41 47 15	1.0:	0.6	Ir	VL				
65	22 00 02.0	+41 54 27	0.60	0.40	Ir	L				
66	22 04 08.9	+37 25 25	1.00	0.60	Ir?	VL				
67	22 04 12.3	+37 06 31	0.45	0.30	Ir?	L				
68	22 09 43.2	+45 21 45	2.00	1.40	Sm	L	16.3	IK	1.38	
69	22 09 54.9	+45 25 12	0.70	0.40	Ir	L	17.9	IK	1.43	
70	22 25 44.2	+23 07 08	0.65	0.55	Ir	L				F533-1
71	22 28 24.7	+38 28 30	1.2:	0.80	Ir	VL	17.3	IK	0.53	
72	22 33 48.4	+23 27 02	0.75	0.55	Ir?	L	17.24	NED	0.14	F533-v1
73	22 33 17.5	+23 20 50	0.35	0.35	Sph?	VL				
74	23 08 19.5	+12 58 01	1.10	0.65	Ir	VL				
75	23 17 39.6	+10 20 57	0.60	0.35	Ir	L	18.0	IK	0.21	
76	23 19 09.1	+25 49 55	0.65	0.45	Ir	L				
77	23 22 46.2	+12 26 26	0.60	0.40	Ir	L	17.4	IK	0.25	F677-v4
78	23 28 31.1	+22 09 57	0.55	0.45	Ir	L				

to separate the contribution of each galaxy to the observed H I profiles. All detected galaxies have been checked in the NED for confusion within a circle of 15′ radius around the optical position. All objects found this way could be classified (on the POSS) as background objects except the discussed confusion of kkr68/69.

Galaxies in Paper I were searched from the environment of known nearby groups. The present sample essentially presents the northern sky in the RA range [14h, 23h30] including the Local Void. Hence one would expect the present sample to be more distant than the sample of Paper I which is the case with a median value of the distance of 12.5 Mpc and 21 Mpc for sample I and sample II, respectively. The relevant values for the linear diameters are 3.6 and 5.6 kpc, a consequence of limited sensitivity: at greater distances the detection limit is higher and we do not detect the very small objects we detect nearby. However, for the subsample of galaxies within 10 Mpc in Paper I and the present sample there are no significant differences: distance = 5.3 and 5.1 Mpc and the linear optical diameter $A_0 = 1.4$ and 1.1 kpc, respectively.

The present sample of galaxies as presented in Tables 1 and 2 is a collection of dwarf galaxies with the exception of kkr 58, a brighter edge-on galaxy ($M_B = -19.95$) with a “broad” H I line. They have narrow lines (Fig. 1 and Table 2). There are 22 sample galaxies within the Local

Table 2. List of new local void dwarf candidates: HI data

KKR	H I-flux	$S_{\max}$	velocity	line width	distance	$M_{\rm Bt}$	H I mass	$M_{\rm H\,I}/L_B$	Comments
No.	Jy km s^{-1}	mJy	km s^{-1}	km s^{-1}	Mpc		$10^7 M_\odot$		
1	2	3	4	5	6	7	8	9	10
1		± 6							
2	1.26	19 ± 6.3	3260 ± 3	57 95 96	43.2	−17.14	55	0.5	
3	2.1	110 ± 9.6	63 ± 2	18 27 28	1.9	−9.57	0.17	1.58	
4		± 6.8							
5	8.74	74 ± 4.2	1470 ± 3	93 106 109	19.2	−15.17	76	4.2	
6	2.76	61 ± 6.8	1546 ± 2	34 73 74	19.9	−15.18	26	1.4	
7		± 6.5							
8		± 5.8							
9		± 9							
10		± 10							
11	2.64	75 ± 9	590 ± 3	29 46 49	10.2	−13.41	6.5	1.8	
12	4.10	102 ± 8	1793 ± 3	42 60 65	24.4	−15.67	58	2.0	
13	4.83	49 ± 7.9	802 ± 2	39 44 47	12.2	−14.23	17	2.2	
14		± 11							
15	1.44	40 ± 8.4	1588 ± 4	23 44 61	21.1	−14.47	15	1.6	
16	2.67	37 ± 7.8	1616 ± 3	99 109 111	21.3	−15.72	29	0.95	
17		± 8.1							
18	1.25	44 ± 7	722 ± 2	38 44 45	10.5	−14.40	3.3	0.36	
19		± 9							
20	4.32	46 ± 8	1775 ± 2	80 106 108	24.1	−15.81	59	1.8	
21	6.12	57 ± 5.7	1719 ± 2	82 93 94	24.3	−15.52	85	3.4	
22	2.72	151 ± 10	3261 ± 1	19 25 27	44.7	−17.02	130	1.3	
23	5.83	66 ± 6.5	1084 ± 2	103 114 116	16.0	−15.50	35	1.4	
24		± 12							
25	2.20	101 ± 10	-135 ± 2	14 30 35					local H I
26	2.31	59 ± 7	2251 ± 2	60 71 72	31.6	−15.66	54	1.9	
27		± 6.7							
28		± 8.1							
29		± 8.4							
30	4.90	68 ± 5.8	1484 ± 2	80 87 91	21.4	−15.35	53	2.5	
31		± 11							
32		± 7.4							
33	8.06	74 ± 8	2596 ± 2	128 137 144	36.3	−17.10	250	2.3	
34	4.17	52 ± 6	1504 ± 5	89 102 106	22.1	−14.84	48	3.6	
35		± 7.2							
36		± 12							
37		± 13							
38		± 12							
39	2.58	59 ± 10	2043 ± 4	41 69 73	30.0	−15.03	55	3.4	
40	3.75	47 ± 7.9	2492 ± 3	106 115 116	36.1	−16.97	120	1.2	confused
41		± 8							
42	0.84	29 ± 5	1510 ± 7	27 38 41	23.4	−14.42	11	1.2	
43		± 12							
44		± 11							
45	5.31	81 ± 10	1435 ± 2	72 89 92	21.5	−15.29	58	2.8	

kkr 3 = kk230 (e.g. Huchtmeier et al. 2000).
kkr 40: UGC 11111 (at 3.3′) and UGC 11113 (at 3.8′) with similar radial velocities.

Table 2. continued

KKR No.	H I-flux Jy km s^{-1}	$S_{\max}$ mJy	velocity km s^{-1}	line width km s^{-1}	distance Mpc	$M_{\rm Bt}$	H I mass $10^7 M_\odot$	$M_{\rm H\,I}/L_B$	Comment
1	2	3	4	5	6	7	8	9	10
46	3.53	36 ± 8.4	3779 ± 5	50 127 130	54.2	−16.77	240	3.1	
47		± 9.3							
48	1.88	30 ± 7	3158 ± 3	48 51 92	45.9	−16.53	94	1.5	
49	3.57	55 ± 8.2	785 ± 4	72 91 99	14.4	−15.78	17	0.6	
50		± 11							
51		± 12							
52		± 18							
53		± 12							
54		± 11							
55	≥ 1:	68 ± 9.3	23:	≥ 44:	5.4	−14.8	≥ 0.7	≥ 0.07	local H I?
56	5.6:	470 ± 8.5	−135:	10 22 24:	6.4	−14.4	5.4	≥ 0.56	local H I
57		± 7.9							
58	16.04	101 ± 9.4	2756 ± 2	246 277 280	40.7	−19.95	630	0.42	
59	≥ 36	680 ± 8	≤ 17:	≥ 64:	4.7	−17.0	≥ 18.8	≥ 0.32	local H I?
60		± 9.1							
61	6.35	110 ± 8	919 ± 2	74 81 90	16.0	−14.82	3.8	2.9	
62		± 18							
63		± 8.1							
64		± 9.7							
65		± 10							
66		± 7.8							
67		± 14							
68	19.5	291 ± 7.4	1145 ± 1	72 86 90	19.2	−16.68	170	2.3	confused?
69	14.3	190 ± 8.5	1143 ± 1	74 90 94	19.2	−15.24	120	6.4	confused
70		± 11							
71	5.64	191 ± 14	693 ± 2	26 35 40	13.1	−14.03	23	3.6	
72		± 6.1							
73		± 5.9							
74		± 6.4							
75	3.56	38 ± 4.3	1469 ± 5	97 124 128	22.4	−14.24	42	5.4	
76		± 7							
77	0.45	32 ± 8.4	3665 ± 2	29 33 40	51.7	−16.63	28	0.4	
78		± 6.9							

kkr 55, kkr 56, kkr 59 are possible companions of NGC 6946.
kkr 69 within 4.1 arcmin from kkr 68, confused.

Void circle (they are indicated in Table 2: in italics for upper limits and as bold face for detections), 8 of these galaxies were detected in H I. Only one of these (kkr 49) lies within the Void volume ($V_0 = 1076$ km s^{-1}) very close to its projected edge. The velocity distribution of the 14 undetected galaxies is unknown. There is no reason to assume they may be fainter and smaller or have less H I mass than other galaxies in this sample on the average. If all galaxies would be in the background ($V_0 \geq 1500$ km s^{-1}) the void would be empty. If they all would be hidden by Local H I emission they would be a local phenomenon (Local Group or nearby group). So they would not populate the LV except perhaps the rim of the LV. The most unfavorable situation for an empty void would be a velocity distribution similar to that of the surrounding area outside the Local Void circle. In that case we would expect a total of two or three dwarf galaxies within the Void volume. The situation is complicated by the fact that the centre of the Void circle is situated close to the galactic equator; hence a large part of the Void area is affected by

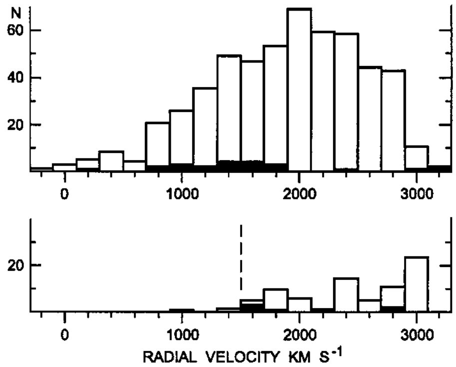

Fig. 2. Histogram of the velocity distribution of galaxies in the direction of the Local Void (lower panel) and around the Local Void (upper panel). Galaxies are binned in velocity intervals of 200 $\mathrm{km\,s^{-1}}$ (corrected radial velocities). Our present data are given by filled symbols. The comparison sample is from the LEDA catalog. The vertical broken line indicates the velocity limit of the Local Void

considerable galactic extinction, and within the velocity intervall of Galactic H I the weak emission of dwarf galaxies will be completely confused.

In Fig. 2 we present a histogram of corrected radial velocities from LEDA (Lyon Extragalactic Database) and the present data (shaded areas) for the field RA [14h, 23h30m], Dec. [0^{-20}, 60^0] (Fig. 2 upper panel) outside the Local Void and for the Local Void itself, i.e. within a radius of 30^0 around [18h38m, $+18^0$] (Fig. 2 lower panel).

Global parameters of the detected galaxies in Table 2, e.g. absolute magnitude, H I mass, and line width, point altogether toward the dwarfish character of these objects. The present sample of galaxies is relatively rich in H I (Col. 9 in Table 2). The median $M_{\mathrm{H\,I}}/L_B$ ratio is about 2 $M_\odot/L_\odot$, the minimum value is 0.36 $M_\odot/L_\odot$. These values are rather high, another indication for the dwarfish character of these galaxies.

5. Conclusion

In this paper we presented an H I search for 78 galaxies within the boundaries RA [14h, 23h30] and Dec. [-20^0, $+60^0$] including the Local Void. The detection rate of 42% (36% within the Local Void circle) is lower than that for the sample in Paper I (60%). One reason is that the present sample is more distant on the average (21 Mpc compared with 12.5 Mpc for the sample of Paper I). We detected only one galaxy within the Local Void volume. The Local Void nearly seems to be empty of galaxies. This seems to be in contrast with the predictions from biased galaxy formation which would permit the formation of dwarf galaxies further away from the preferred places of galaxy formation in general, i.e. within areas void of bright and massive galaxies.

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References

Dekel A., Silk J., 1986, ApJ 303, 39

Hartmann D., Burton W.B., 1997, Atlas of Galactic Neutral Hydrogen. Cambridge University Press, Cambridge

Huchtmeier W.K., Karachentsev I.D., Karachentseva V.E., 1997, A&A 322, 375

Huchtmeier W.K., Karachentsev I.D., Karachentseva V.E., Ehle M., 2000, A&AS 141, 469; A&A (Paper I)

Joeveer M., Einasto J., 1978, IAU Symp. 79, 241; McGaugh S.S., de Blok W.J.G., 1993, AJ 106, 548

Karachentsev I.D., 1994, Astron. Astrophys. Trans. 6, 3

Karachentseva V.E., Karachentsev I.D., 1998, A&AS 127, 409

Karachentseva V.E., Karachentsev I.D., Richter G.M., 1999, A&AS 135, 221

Kirshner R.P., Oemler A. Jr., Schechter P.L., 1984, Ann. N.Y. Acad. Sci. 422, 91

de Lapparent V., Geller M.J., Huchra J.P., 1986, ApJL 302, L1

Paturel G., Fouque P., Bottinelli L., Gouguenheim L., 1992, Catalogue of Principal Galaxies, Lyon (PGC)

Roberts M.S., 1969, AJ 74, 859

Schlegel D.J., Finkbeiner D.P., Davis M., 1998, ApJ 500, 525

Tully R.B., 1988, Nearby Galaxy Catalog. Cambridge Univ. Press