Spatial Distribution of Galaxies in the Puppis Region behind the Milky Way

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ABSTRACT

Groups of galaxies have been searched in the zone obscured by the Milky Way defined by $205^0 < l < 260^0$ and $|b| < 25^0$, from a sample of 466 objects with redshifts cz<8000 km s^{-1}, 60 % complete to m=14.5. The grouping method used was the companionship one devised by Huchra and Geller (1982) and improved by Gourgoulhon et al. (1992). Eleven groups with 5 members at least have been identified, whose main physical parameters are provided. The members of one of the groups appear as HI deficient by a factor of 1.6, a result which could point towards the presence of intragroup hot gas inside it, where X-ray emission could be studied by XMM.

We have looked for groups of galaxies in the zone obscured by the Milky Way, $205^0 < l < 260^0$ and $|b| < 25^0$, following a HI survey we have carried out in this region, and which has lead to 101 detections (Chamaraux et al., 1999). Our total sample of galaxies with measured redshifts smaller than 8000 kms^{-1} comprises 466 objects. This sample is 60% complete down to an ESO diameter of 1.9′, corresponding to a total B magnitude m=14.5.

In order to sort out the groups, we have used the "companionship method" elaborated by Huchra & Geller (1982) and improved by Gourgoulhon et al. (1992). Eleven groups of galaxies at $|b| < 21^0$ with 5 members at least have been found, all of them but one having cz $\leq$ 2500kms^{-1}. The groups are listed in table 1, with their physical parameters. The richest has 18 members (l=244^0, b=−7^0): it is the Puppis cluster, found previously by Yamada et al. (1994). Figure 1 displays the whole sample of galaxies in the region studied; members of each of the eleven groups are noted by specific symbols.

Spiral galaxies in some clusters are systematically HI deficient, this deficiency reaching a factor of 4 in the Coma cluster (Haynes et al., 1984). This deficiency is interpreted as due to the removal of interstellar gas of the galaxies by intracluster gas of the cluster. The presence of this gas is evidenced by its X−ray emission. Such an HI deficiency is also found in a number of compact groups of galaxies, and seems also to be related to the presence of intragroup gas since, according to Ponman et al. (1996), 75% of the compact groups contain such a diffuse gas.

The spiral members of one of our eleven groups present a systematic HI deficiency of a factor of 1.6 on an average. This group is a large one. One can wonder whether this deficiency is related to
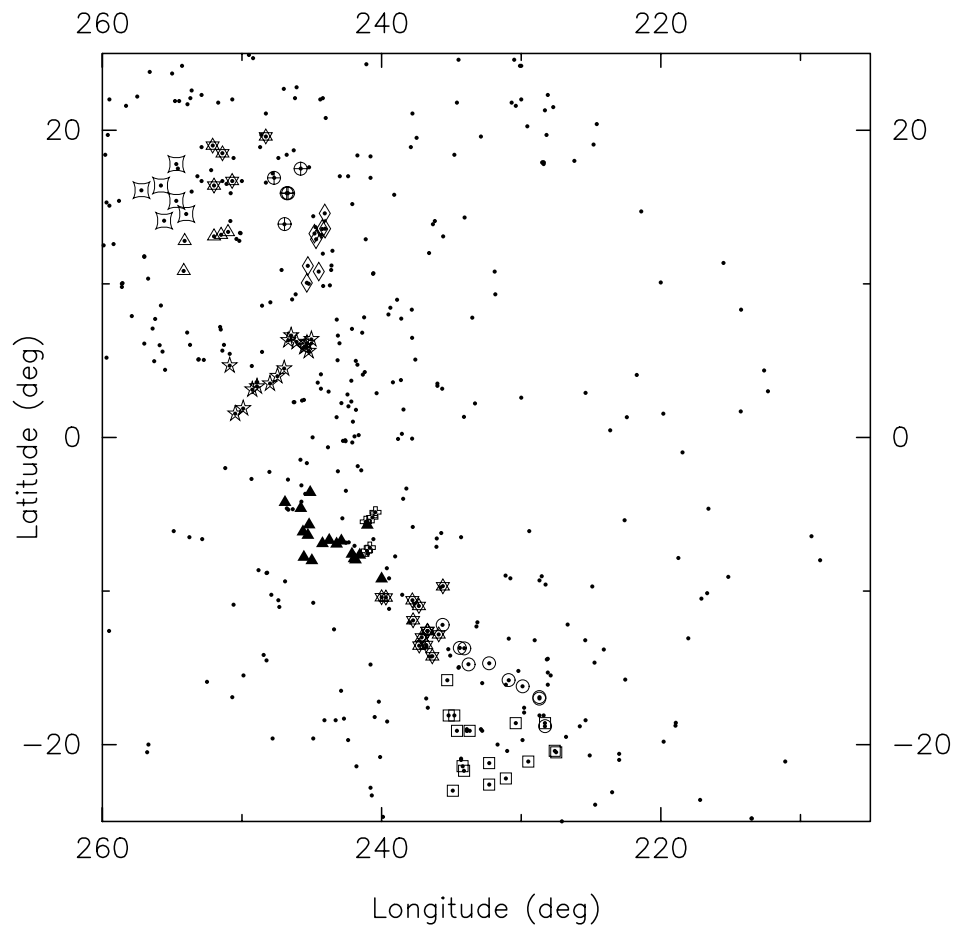
Fig. 1.— Distribution of the galaxies of the sample, with $100 < cz < 8000$ km s^{-1}, in galactic coordinates. Groups with at least five members are noted by specific symbols.

Table 1: Physical parameters of the groups.

Group	l	b	N	V_0	V_V^1	R_V	t_{cr}	M
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1	232.2	-20.1	16	1485	132	1.3	5.8	35
2	231.7	-15.4	10	2525	53	1.5	24.	7
3	237.3	-12.0	13	1918	154	0.7	3.7	23
4	243.7	-6.6	18	1786	202	1.2	3.4	70
5	240.8	-6.0	5	7138	96	2.2	13	35
6	247.4	+4.7	16	1385	103	0.7	5.5	11
7	244.6	+12.5	8	1461	79	0.6	4.7	6
8	252.6	+12.7	5	1705	47	0.8	9.4	3
9	255.8	+15.7	6	2047	96	1.5	5.4	23
10	246.8	+16.0	5	2335	110	0.6	4.7	12
11	250.9	+18.0	5	517	70	0.4	2.2	3

Column (1): rank of the group by order of increasing galactic latitude

Column (2): galactic longitude l of the group centre (degree)

Column (3): galactic latitude b of the group centre (degree)

Column (4): number N of members of the group pertaining to our sample

Column (5): $\overline{V_0}$: recession velocity of the group centre (km s^{-1}), referred to the centroïd of the Local Group ($V_0=V_h+300 \sin(l) \cos(b)$, where V_h is the heliocentric recession velocity).

Column (6): V_V^1: 1D weighted velocity dispersion of the group (km s^{-1})

Column (7): R_V: virial radius (Mpc)

Column (8): t_{cr}: crossing time in units of 10^9 years

Column (9): mass of the group in unit of 10^{12} solar masses

the presence of intragroup gas. As a matter of fact, this group was not known before our study and, therefore, has not been searched by ROSAT for X−ray emission. It is then a good candidate for observation with XMM. On the other hand, we have found that three loose groups detected by ROSAT, namely NGC533, NGC4261 and NGC5846 (Mulchaey et al., 1996) are in fact HI deficient.

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