The Distribution of Galaxies within 10 Mpc *

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Most galaxy catalogs are magnitude limited samples. They have to be corrected (e.g. for the Malmquist bias) to become complete samples for determining the galaxy populations in a given volume of space. However, this is a rather difficult task due to the great width of the galaxy luminosity function. It would be desirable to have a nearby volume-limited sample for the discussion of the galaxy populations and their characteristic properties and for comparison with the properties of galaxies in deep sky areas like the Deep Hubble Field (Williams et al. 1996) in view of the investigation of evolutionary effects of galaxies.

A first step toward such a local reference sample was performed by Kraan-Korteweg & Tammann (1979) who published a list with 179 galaxies with corrected radial velocities $V_{\rm LG} \leq 500$ km s^{-1} with respect to the Local Group centroid. Lateron this sample was updated by Huchtmeier & Richter (1988, 1989), Schmidt et al. (1993), and Karachentsev (1994) to 215 galaxies. In the following years the number of known nearby galaxies increased by a number of different activities like HI line surveys of the Milky Way (Henning et al. 1998), as well as a 'blind' HI survey of the southern sky with the Parkes radio telescope (the HI-Parkes Sky Survey = HIPASS ,Kilborn et al. 1999, Banks et al. 1999). The publication of the Second Palomar Observatory Sky Survey (POSS-II) stimulated searches for so far unknown nearby galaxies. The modern photographic emulsions used for this survey permitted the confidential detection and classification of objects of small angular diameter, especially of low surface brightness (LSB) galaxies. Binggeli et al. (1990), Schombert et al. (1992), and Impey et al. (1996) found a great number of LSB galaxies on POSS-II plates. Karachentseva et al. (1998, 1999, 2000) and Karachentsev et al. (2000, 2001) performed an all sky search for candidates for nearby LSB galaxies on POSS-II and ESO/SERC films. As a result they listed about 600 galaxies with angular diameters a $\geq 0.5'$ and blue apparent magnitudes brighter than 19. Most of these galaxies have been searched for HI by now involving the 100-m radio telescope at Effelsberg, the Nançay radio telescope, the compact array of the Australia telescope (ATCA) (Huchtmeier et al. 1997, 2000; Karachentsev et al. 2001), and the HIPASS data cube[1]. About 60 galaxies from the Karachentsev catalogs fall within 10 Mpc and are added to the local sample of galaxies which increased to 380 galaxies. Distance measurements are available for about two thirds of these galaxies, the distances of one third of the galaxies were taken from radial velocities assuming a Hubble contant of 75 km s^{-1} Mpc^{-1}. The increase in number by a factor of two is mostly due to many dwarf galaxies especially in the absolute magnitude range -15 to -9. This corresponds to an increase in luminosity by 19% and an increase of 25% for the integrated HI in the Local Volume.

In this poster paper we present the distribution of all known galaxies of the Local Volume (i.e. within 10 Mpc) by plotting these galaxies in supergalactic coordinates projected onto the

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Figure 1: All known galaxies within 10 Mpc are plotted onto the SGX-SGY plane. Symbol sizes are a measure of their linear extent.

SGX-SGY plane (Fig. 1), onto the SGX-SGZ plane (Fig. 2), and onto the SXZ-SGY plane (Fig. 3). Galaxies are printed as circles, the size of which is a measure of the log of their optical diameter (D_{25}). A few galaxies in each figure are identified with their common name in order to facilitate the identification of well known nearby groups. The distribution of galaxies in the supergalactic plane is seen from above in Fig. 1. The distribution of these galaxies is seen 'edge-on' in Figures 2 and 3.

The distribution of nearby galaxies is well structured showing strong concentrations (the well known groups) and empty areas of different size. A comparison of Figs. 1, 2, and 3 demonstrates the oblate shape of the distribution of the galaxies of this sample. The Local Void is the empty area in Figure 2 above the concentration of galaxies in the centre of this figure. The Centaurus group (NGC 5128 et al.) seems relatively isolated. Other groups seem to form sheet like structures with loose boundaries, if any, like Sculptor, Local Group, Maffei group, M81 group, and Canes Venatici groups. The following hints for evolution of galaxies in groups are within this database.

We observe morphological segregation in the sense that most early-type galaxies, dE and dSph, are concentrated toward the mass centres of the Local Group (MW and M31), the M81 group, and

Figure 2: All known galaxies within 10 Mpc are plotted onto the SGX-SGZ plane. Symbol sizes are a measure of their linear extent. The empty region in the upper part is the Local Void.

the Centaurus group. In addition to this trend the relative HI content ($M_{\rm HI}/L_B$) is lowest in the inner part of the groups increasing outwards.

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Figure 3: All known galaxies within 10 Mpc are plotted onto the SGZ-SGY plane. Symbol sizes are a measure of their linear extent.

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