

Local group analogues – searching for the satellites of the nearest massive galaxies

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Abstract. We have performed a search for faint companions around the nearest massive galaxies. We see a clear signature of clustering of faint objects, both in projected separation and in velocity offset. The inferred satellite luminosity functions confirm that the abundance of faint satellites seen in the Local Group is typical of other nearby systems.

Keywords. dark matter, galaxies: dwarf, Local Group

The abundance and distribution of dwarf satellites remains a critical test of LCDM on the smallest scales. Complete samples of dwarfs have been limited to the Local Group, however. Beyond 1 (10) Mpc, few galaxies fainter than $M_V \sim -10$ (-15) are known.

Of the seven unobscured massive galaxies within 10 Mpc, Cen A has a much less concentrated satellite distribution than the rest; interestingly it is also the one nearby early-type galaxy. To see if there is a connection between satellite populations and central morphology, we clearly need a larger sample of satellite systems.

To find more faint satellites, we selected isolated primaries from the Atlas3D sample of the brightest galaxies within 42 Mpc (Cappellari *et al.* 2011) and searched for possible satellites within $R_p = 1$ Mpc projected using the Sloan Digital Sky Survey DR8 (<http://skyserver.sdss3.org>). Fig. 1 shows that an over-density of objects at $R_p \leq 500$ kpc is detected at $S/N \sim 9$. Our detection corresponds to about 5.4 ± 0.6 satellites per central galaxy, in keeping with expectations from the Local Group (dashed line).

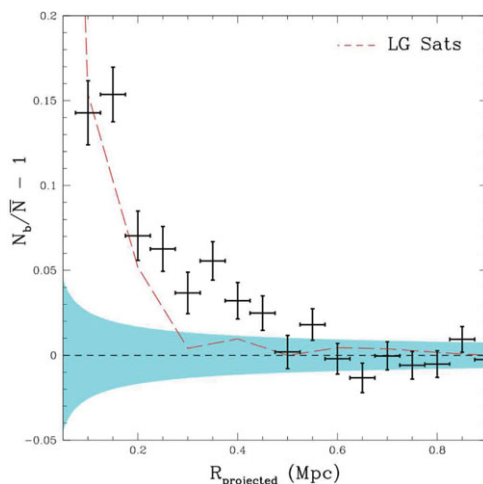


Figure 1. Excess sources detected around the nearby sample. The shading indicates the r.m.s. scatter in the background and the dashed line shows the expectation from the Local Group.