

ASTRONOMY SEMINAR

Tuesday, September 18th, 2018, at 14:15

SÄ 112

Prof. Michael Rich

Dept. of Physics & Astronomy, UCLA

The Halos and Environments of Nearby Galaxies Survey

I report on low surface brightness studies using a dedicated 0.7-m f/3.2 prime focus telescope to image the halos of 123 galaxies in the Local Volume to low ($\mu_r \sim 28$ mag) surface brightness. The sample is primarily drawn from the 2MASS Large Galaxy Atlas and extended to include nearby dwarf galaxies and more distant giant ellipticals. The sample spans fully the galaxy colour-magnitude diagram including the blue cloud red sequence.

I present an initial overview, including deep images of our galaxies and diameters measured at 28 mag/sq. arcsec. Our observations reproduce previously reported low surface brightness structures, including extended plumes in M51, and a newly discovered tidally extended dwarf galaxy in NGC 7331. Low surface brightness structures, or "envelopes", exceeding 50 kpc in diameter are found only in galaxies with $M_v < -20.5$, and classic interaction signatures are relatively infrequent. Defining a halo diameter by including "smooth" extensions other than obvious shells, streams, or jets, we noted that halo diameter is correlated with total galaxy luminosity. Extended low surface brightness halos are present even in galaxies as faint as $M_v = -18$. Interactions are found throughout the galaxy colour-magnitude diagram without preference for the red or blue sequences or the green valley. While large envelopes may be found throughout the colour-magnitude diagram, the largest envelopes are preferentially found at the bright end of the red sequence. Spiral and S0 galaxies have broadly similar sizes, but ellipticals extend to notably greater diameters, reaching 100 kpc. Edge-on disks are found to have larger projected diameters than face-on disks, consistent with both a lack of present-day dust and extinction. We propose that the detected envelopes of disk galaxies reported in the literature are dominated by members of the outermost disk rather than by a classical population II halo.

Coffee, tea and cookies at the coffee room after the seminar!