PROPERTIES OF LOW SURFACE BRIGHTNESS GALAXIES

W.J.G. DE BLOK AND J.M. VAN DER HULST
Kapteyn Astronomical Institute, Groningen, The Netherlands
AND
S.S. MCGAUGH
Institute of Astronomy, Cambridge, United Kingdom

We have been working on multiband surface photometry, spectrophotometry and HI synthesis data for 20 Low Surface Brightness (LSB) galaxies. LSB galaxies are well described by disks with an average central surface brightness of $\sim 23.4B$-mag arcsec^{-2}. They have scale lengths typical for high surface brightness (HSB) galaxies, though a large range of sizes is present. Their colours are blue, especially at the red side of the spectrum, where they are significantly bluer than HSB galaxies (de Blok et al. 1995a). Modelling and measurements of gas abundances (McGaugh 1994) suggests a low, stochastic star formation rate, and a lack of a large old population. The HI surface densities are a factor of three lower than those in HSB galaxies (de Blok et al 1995b). However the difference is not as large as in the optical. The HI disks are considerably larger, relative to the optical disks, than in HSB galaxies. The gas mass fraction is higher, indicating slow evolution. Star formation is inhibited by the low surface densities which are typically below the critical treshold as stipulated by Toomre's gravitational instability criterion. The rotation curves rise gradually, and are observed to flatten out only in a few cases. Often they still rise at the last measured point, or remain solid body through-out. Preliminary mass models suggest extended low density dark matter halos, with baryon dominated inner regions. The inferred evolution for LSB galaxies shows mass *and density* are fundamental parameters in determining a galaxy's evolutionary fate.

References

de Blok W.J.G., McGaugh S.S., van der Hulst J.M., 1995a, submitted
de Blok W.J.G., van der Hulst J.M., Bothun G.D., 1995b, MNRAS, 274, 235
McGaugh S.S., 1994, ApJ, 426, 135