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Mass Distribution in Galaxies using Multi-Wavelength 3D Spectroscopy

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Spiral and dwarf galaxies are known to present an important mass discrepancy between their dynamical and visible masses. The commonly accepted hypothesis is to assume a more or less spherical halo of unseen matter in addition to the stars and gas. To study properly this mass discrepancy, different observational techniques at different wavelengths need to be combined in order to probe as best as possible the gravitational potential at all radii and different theoretical tools are necessary to sort out which distribution law represents best the dark matter component.

This Multi-wavelength approach will be illustrated by discussing the radio HI aperture synthesis observations of our Local Group neighbours, M31 (Andromeda) and M33 and the optical Ha Fabry-Perot interferometric observations of the SINGS sample of galaxies. As an example, it will be showed how important it is to model properly velocity perturbations, such as those produced by bars, before using the kinematics to derive the gravitational potential as a tracer of both the luminous and the dark matter components.

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