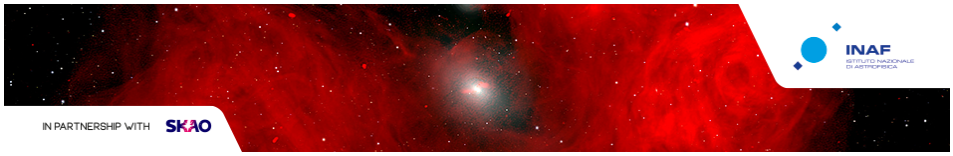

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Galaxy dynamics in the era of large HI surveys

Wednesday 29 November 2023 16:30 (20 minutes)

Radio observations of the HI emission line at 21 cm have been pivotal to establish the dark matter (DM) problem in galaxies, and remain a key tool to test LCDM models of galaxy formation as well as alternative gravitational theories. The HI disk of galaxies typically extends further out than the stellar component, so one can measure extended rotation curves out to large radii, where the DM effect becomes predominant. In this context, the SPARC (Surface Photometry and Accurate Rotation Curves) project has played a key role, collecting HI rotation curves and Spitzer NIR photometry for 175 disk galaxies at z=0.

In this talk, I will review the main results from the SPARC project, such as the dynamical scaling laws of galaxies, and discuss current limitations, such as the data heterogeneity and limited statistics. I will then introduce the SPARC-1k project, which will provide a new database of about 1000 galaxies with HI data from public archives (ASKAP, ATCA, GMRT, VLA, WSRT) and NIR photometry from WISE. SPARC-1k will increase the current sample size by a factor of about six; this is a necessary step to get ready to the orders-of-magnitude increase expected from ongoing and future HI surveys with SKA pathfinders and ultimately with SKA-mid.

Reasearch area

HI galaxy science

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