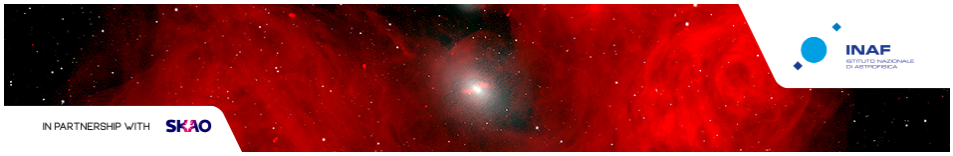

Contribution ID: **35** Type: **not specified**

HI morphology as a tracer of environmental interactions: present and future

Wednesday 29 November 2023 14:50 (20 minutes)

HI morphology continues to be a prime tracer of the interaction between galaxies and their environment. I will describe a number of recent and ongoing projects led by INAF researchers, where HI imaging is used to study galaxy quenching inside clusters. These projects include: a blind HI survey of the Coma cluster; HI imaging of jellyfish galaxies as part of GASP; blind HI observations of clusters at z~0.05 performed for the MeerKAT Galaxy Cluster Legacy Survey; ViCTORIA, a survey of Virgo with MeerKAT; and the MeerKAT Fornax Survey. These datasets can be compared with additional ones available for other clusters both from the literature and from other ongoing projects. The emerging picture is a complex one, where the efficiency of HI stripping depends on galaxy properties (mass and orbit) and on cluster properties (ICM density and substructure), and hydrodynamical forces act simultaneously with tidal forces. This leads to a broad variety of HI morphologies and quenching timescales. By combining HI and multi-wavelength data we are learning about the multi-phase properties and the star formation activity both in the disc and the gas tails of the stripped galaxies. Besides stripping, other interesting phenomena are only now starting to be studied, such as the condensation of the ICM in the wake of galaxies moving within a cluster, or the role of magnetic fields in shielding the stripped gas from their hostile environment. This line of research will continue to grow in the SKA era but some challenges will need to be addressed. With the growth of our galaxy samples, clearer criteria for HI morphological classification and/or quantitative HI morphology will need to replace the current visual approach. Furthermore, in order to exploit quantitative morphology, the effect of projection, signal-to-noise ratio and resolution will need to be studied in more detail. Finally, recent observations show that the power of HI morphology as a tracer of environmental interactions is greatly enhanced in a region of the "column density sensitivity vs. physical resolution" plane which is difficult to reach. Future SKA programs interested in this type of science will need to focus on that region.

Reasearch area

HI galaxy science

Primary author: SERRA, Paolo (Istituto Nazionale di Astrofisica (INAF))

Presenter: SERRA, Paolo (Istituto Nazionale di Astrofisica (INAF))

Session Classification: Parallel - Galaxy Evolution & AGN