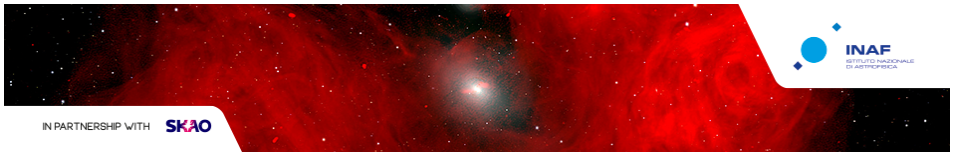

Contribution ID: **1** Type: **not specified**

Radio observations of ram-pressure-stripped tails: a new window into galaxy evolution

Wednesday, 29 November 2023 14:30 (20 minutes)

Deep, wide-field radio continuum observations of galaxy clusters are revealing an increasing number of spiral galaxies hosting tens of kiloparsec-long radio tails produced by the displacement of the nonthermal interstellar medium (ISM) by ram pressure. In this context, I will present a semi-empirical model for the multifrequency radio continuum emission from ram-pressure-stripped tails based on the pure synchrotron cooling of a radio plasma moving along the stripping direction with a uniform velocity. Thanks to this model, for the first time, we can indirectly measure the stripped ISM velocity, get insights into the evolution of the stripped clouds, and constrain the 3D velocity of the galaxies in the cluster.

I will showcase the results of the exploratory study on seven galaxies in Abell 2255 (z=0.08012) thanks to deep LOFAR and uGMRT observations at 144 and 400 MHz. Our model reproduces the observed properties of the ram-pressure-stripped radio tails with a projected radio plasma bulk velocity of between 160 and 430 km s−1. These measurements yield the 3D velocity of the galaxies in the cluster to be 300−1300 km s−1, and the estimated ram pressure affecting these galaxies to be between 0.1 and 2.9 × 10−11 erg cm−3.

This semi-empirical model can be now used to expand the applications of radio observations of ram-pressure-stripped galaxies in clusters and groups, whose availability is destined to increase over the coming years with the advent of SKA. By combining deep radio, X-ray, and optical observations we will be able to quantitatively characterize the ram pressure stripping effects on the evolution of galaxies in dense environments.

[Based on Ignesti et al., 2023, A&A, Volume 675, id.A118]

Reasearch area

Extragalactic Continuum (galaxies/AGN, galaxy clusters)

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