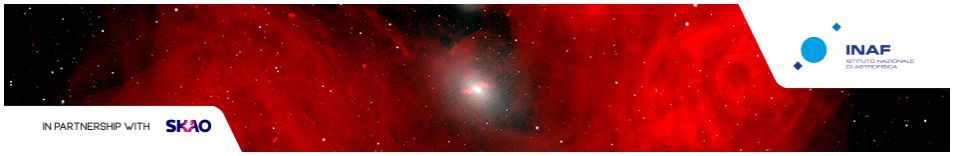

Contribution ID: **4** Type: **not specified**

Physics of the oldest phases of AGN bubbles in a galaxy group

Wednesday 29 November 2023 12:10 (20 minutes)

Jetted Active Galactic Nuclei (AGN) recurrently inflate lobes of relativistic plasma and magnetic fields, which are thought to rise buoyantly as light bubbles into the intragroup/intracluster medium, counterbalancing its spontaneous cooling. Understanding how these bubbles evolve and eventually mix with the surrounding gas on long timescales is important to constrain the impact they have on the thermal and non-thermal history of the system. Direct observations of this phenomenon have always been challenging but, thanks to the SKA precursors/pathfinders, in recent years, we are taking major steps forward.
With four distinct generations of radio lobes, the galaxy MCG+05-10-007, at the center of the group Nest200047, represents one of the clearest pieces of evidence of the recurrent nature of AGN jets and shows, for the first time, that even after hundreds of Myr the AGN jet-inflated bubbles can still be not thoroughly mixed with the intragroup medium. Instead, they can be shredded into intricate filamentary structures, whose physics is still puzzling. Here, I present a broad-band resolved spectro-polarimetric analysis of this system, performed using data from our multi-frequency campaign spanning from 53 to 1500 MHz using LOFAR, uGMRT, MeerKAT, and VLA telescopes. Through the use of techniques such as spectral index maps, color-color plots, shift-plots and Faraday Rotation, we obtain unique insights into the physics of the system including the AGN duty-cycle, the nature of the filaments, and the role of magnetic fields in the plasma evolution. The study clearly shows the power of the combined use of high-quality, new-generation radio data and anticipates the new opportunities offered by the SKA observatory.

Reasearch area

Extragalactic Continuum (galaxies/AGN, galaxy clusters)

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Session Classification: Parallel - Galaxy Clusters & Magnetism