

The head-tail radio galaxy and revived fossil plasma in Abell 1775

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Head-tail radio galaxies in clusters exhibit distinctive features where the head corresponds to an elliptical galaxy and two radio jets/tails sweep back from the head forming an extended structure behind the radio galaxy, that is moving through the intracluster medium (ICM). This morphology arises when the magnetized relativistic plasma outflowing from the host/parent galaxy is deflected and decelerated by ICM. In contrast, revived fossil plasma trace active galactic nucleus (AGN) radio plasma with a very steep spectrum that has somehow been re-energized through processes in the ICM, unrelated to the target radio galaxy itself.

In this talk, I will report on new results of a LOFAR-uGMRT analysis of the head-tail radio galaxy and revived fossil plasma in Abell 1775.

By combining LOFAR data at 144 MHz with the new follow-up observations carried out with the uGMRT at 400 and 650 MHz, we characterize the spectral properties along the tail. From the radio color-color analysis, we found evidence for particle re-acceleration in the outer region of the tail. In general, we observed a decrease of the estimated equipartition magnetic field, luminosity, and minimum pressure as moving farther from the head along the tail.

Thanks to the new highly sensitive and high-resolution images, we recovered the structure of the revived fossil plasma, which appears as thin filaments with ultra-steep spectra of > 2 .

Overall, this work demonstrates the crucial role of multi-band low-frequency observations for the study of non-thermal phenomena in galaxy clusters.

keywords

Galaxy clusters, radio galaxies, diffuse radio emission, non-thermal emission, acceleration of particles, intra-cluster medium.

In-person or online?

in-person

Career level

Student

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