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Addressing the challenges of deep LOFAR observations of the Coma galaxy cluster

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The nearby Coma galaxy cluster is a milestone for studying magnetic fields and particle acceleration processes in the intra-cluster medium (ICM). Recent LOFAR observations at 144 MHz have revealed new features in the extended radio emission of this cluster: a bridge connecting the halo to the cluster, a sharp radio front at the halo's edge, and an intriguing "accretion relic" lying beyond the cluster virial radius.

In this talk, I will present follow-up observations of Coma at 54 MHz, performed with LOFAR Low Band Antennas (54 MHz). Our deep observations (~100 hours) of this complex field (4x4 deg² with diffuse emission and bright 3C sources) required a tailored calibration strategy and large computational resources. I will discuss how we can address these challenges today and in view of the SKA. Furthermore, I will show preliminary results obtained from the resolved spectral index study of the diffuse radio emission between 144 MHz and 54 MHz.

Research area

Extragalactic Continuum (galaxies/AGN, galaxy clusters)

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