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On the extragalactic jet asymmetry and composition and the production of high energy cosmic rays

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We probe the role of the directional asymmetry between relativistic outflows to kilo-parsec scale jets, in the acceleration of cosmic rays. Our sample contains powerful AGN hosting dense cluster environments where the magnetic field decreases with the distance from the centre. We have mapped the internal magnetic field to the source and the cluster magnetic field in detail using radio and X-ray data.

We also use X-ray observations to constrain the jet composition. The presence of relativistic protons or mildly relativistic electrons contributes substantially to the energy budget of the jets enabling them to heat efficiently the intracluster gas.

Primary author: Dr GIZANI, Nectaria (HOU)

Co-author: Prof. GARRETT, Mike (ASTRON)

Presenter: Dr GIZANI, Nectaria (HOU)

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