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On the jet composition of low-luminosity AGN

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Gamma rays, high-energy neutrinos and cosmic rays (CRs) impinging on Earth signal the existence of environments in the Universe that allow acceleration of particle populations into the extremely energetic regime. The general consensus of a CR–gamma-ray–neutrino connection as a basis for the search of the long-sought ultra-high-energy (UHE) CR sources has recently been weakened by the results of AUGER dipole and UHECR composition and spectrum modellings, which suggest gamma-ray dim objects in the local Universe as substantial UHECR-flux contributors.

In this work we investigate jetted low-luminosity Active Galactic Nuclei (LLAGN), with focus on Fanaroff-Riley 0 (FR0) radio galaxies, that constitute the most abundant persistent jet source population in the local Universe, as particle multi-messenger sources. Performing a comparative leptonic versus hadronic jet emission modelling, with taking into account all available multi-messenger data, our presentation assesses the jet composition of LLAGN. For this purpose we use our time-dependent heavy nuclei CR particle and photon propagation framework which takes into account all relevant secondary particle production and energy loss processes, allows for an evolving source environment and efficient treatment of transport non-linearities due to the produced particles/photons being fed back into the simulation chain.

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