

ExHaLe-Jet: An extended hadro-leptonic jet model for blazars

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Blazars –active galaxies with the jet pointing at Earth –emit across all electromagnetic wavelengths. The so-called one-zone model has described well both quiescent and flaring states, however it cannot explain the radio emission. In order to self-consistently describe the entire electromagnetic spectrum, extended jet models are necessary. Notably, kinetic descriptions of extended jets can provide the temporal and spatial evolution of the particle species and the full electromagnetic output. Here, we present the initial results of a recently developed lepto-hadronic, extended-jet code. As protons take much longer than electrons to lose their energy, they can transport energy over much larger distances than electrons and are therefore essential for the energy transport in the jet. Furthermore, protons can inject additional leptons through pion production and decay, as well as Bethe-Heitler pair production, which can explain a dominant leptonic radiation signal while still producing neutrinos. We will present a detailed parameter study and provide insights into the different blazar sub-classes.

Abstract field

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