

Executive Summary

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1 Coincident Neutrino and Gamma-Ray Emission from Blazars

Active galactic nuclei (AGN), and the accompanied AGN jets, are among the most fascinating and luminous objects in the observable Universe. Both their active cores and their jets are candidates for the acceleration of cosmic rays, and subsequent production of gamma rays and neutrinos. A deepened understanding of the processes related to jets will not only fuel the field of high energy cosmic rays, but will also give insights in fundamental plasma, astro, and particle physics. The physical and mathematical modeling of an AGN jet is challenging, with ambiguous signatures that need to be understood by numerical simulations of cosmic ray transport and interactions. Based on the work of Hoerbe et al. (MNRAS 2020), a simulation framework for hadronic constituents and their interactions inside of a plasmoid, propagating along the AGN jet axis, was developed. The final goal of the simulation is to give predictions in the context of multi-messenger astrophysics. This talk will present the first results and examine the scenario, where neutrino and gamma-ray flares coincide within the simulation setup, as well as limits.