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High-energy neutrino emission from blazars

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Active galactic nuclei (AGN) with relativistic jets are the most powerful persistent astrophysical sources of electromagnetic radiation in the Universe. Blazars are the most extreme subclass of AGN with jets directed along our line of sight and emission relativistically beamed in our direction. Their high-energy photon emission dominates the extragalactic gamma-ray sky and reaches multi-TeV energies. This demonstrates that they accelerate electrons to very high energies. It has long been suspected that blazars may also accelerate protons to very high energies and thus be cosmic neutrino sources. Being extremely rare objects in addition to being bright, blazars are among the most readily testable neutrino candidate source classes.

A number of multi-messenger monitoring campaigns have recently been triggered in response to high-energy neutrinos observed with the IceCube Neutrino Observatory from the direction of blazars. In this talk, I will discuss the theoretical interpretation of these observations and give an overview of the possible role of blazars as neutrino sources in light of the experimental results. Finally, I will discuss the prospects of confirming blazars as high-energy hadron accelerators with future neutrino observations based on theoretical expectations.

Keywords

blazars; high-energy neutrinos; leptohadronic modelling

Collaboration

other Collaboration

Subcategory

Theoretical Results

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