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Calorimetric neutrino expectations from bright blazars

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Blazar jets are extreme environments, in which relativistic proton interactions with a UV photon field could give rise to photopion production. High-confidence associations of individual high-energy neutrinos with blazar flares could be achieved via spatially and temporally coincident detections.
Recently, the track-like, extremely high energy neutrino event IceCube-170922A was found to coincide with increased gamma-ray emission from the blazar TXS 0506+056, leading to the identification of the most promising neutrino source candidate so far. We test the chance coincidence of such events by calculating the expected number of neutrinos that can be detected by IceCube, based on a broadband parametrization of bright short-term blazar flares that were observed in the past 8-years by Fermi/LAT. We find that the integrated keV-to-GeV fluence of most individual blazar flares is far too small to yield a substantial Poisson probability for the detection of one or more neutrinos with IceCube. We show that the association of the IC170922A neutrino with TXS 0506+056 is energetically plausible at a significance level of about 3.5 sigma and discuss strategies to search for more significant associations in future data unblindings of IceCube and KM3NeT.

Are you presenting on behalf of collaborations or institutions?

On behalf of the Fermi/LAT collaboration

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