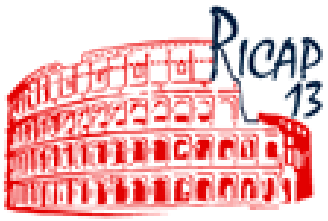

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An exploration of hadronic interactions in blazars using IceCube

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The relativistic electrons responsible for the observed broad band synchrotron / inverse Compton emission from blazars can be either directly accelerated at the source (primary electrons) or produced in result of interactions of high energy protons with surrounding medium (secondary electrons). If the observed electromagnetic emission from blazars is produced by secondary electrons, neutrino emission is also expected. Using the measurements of electromagnetic luminosity of blazars with the Fermi/LAT telescope in the GeV band, we estimate expected neutrino flux from brightest blazars. We compare this estimate to the neutrino flux upper limits imposed by IceCube (in the IC-40 configuration) to set constraints on the parameters of the spectrum of accelerated protons: the spectral index(gamma) and the high-energy cutoff(Emax). We find that if the assumption of hadronic origin of electromagnetic emission is correct, blazars should accelerate protons to very-high energy (Emax>1e18 eV) with a hard spectrum (gamma<2).

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