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Search for correlations between high-energy neutrinos and blazars with IceCube

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The IceCube Neutrino Observatory is the world largest neutrino telescope, instrumenting one cubic kilometer of Antarctic ice. IceCube started its operation in 2011 and a diffuse flux of neutrinos was discovered in 2013. To this day the sources of those neutrinos are still largely unknown. One of the most promising source candidates are blazars, Active Galactic Nuclei with jets aligned towards Earth.

In 2018 IceCube reported the first observation of a high-energy neutrino with a high probability of being astrophysical in origin (neutrino alert), IC170922A, in spatial and temporal coincidence with blazar TXS 0506+056. To determine if blazars produce high-energy neutrinos all correlations between blazars and neutrino alerts can be combined into a global p-value by performing a stacking analysis. Here we present the results obtained with 2089 blazars from the incremental version of the Fourth Catalog of Active Galactic Nuclei detected by Fermi-LAT (4LAC-DR2, for Data Release 2) and 275 neutrinos detected by IceCube between 2011 and 2020 that would have passed the neutrino alert criteria.

Collaboration name

IceCube

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