



Contribution ID: 209

Type: Parallel Flash talk

Untriggered multiple flare neutrino search from a source catalog with 10 years of IceCube data

Tuesday, 23 February 2021 11:45 (5 minutes)

In a recent time-integrated investigation of a catalog of 110 gamma-ray emitters, IceCube observed a cumulative neutrino excess in the flux produced during 10 years. Such an excess, incompatible with the background at the level of 3.3σ , was mainly due to the starburst galaxy NCG 1068 and the BL Lacs TXS 0506+056, PKS 1424+240 and GB6 J1542+6129. Here we present the results of a time-dependent analysis of the same catalog. Unlike for past searches, this analysis does not only look for the most significant cluster of events but it can potentially detect multiple flares from a single direction. This analysis confirms a significant neutrino excess in the northern sky and identifies M87, hosting a very close-by black hole, as the most significant time-dependent source of the catalog. Moreover, it confirms the detection of a long flare in 2014/2015 and finds a shorter second flare, related to the time of the high-energy neutrino event in 2017, from the direction of TXS 0506+056.

Collaboration name

IceCube

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Session Classification: Multimessenger Investigations