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All-flavor Time-dependent Search for Transient Neutrino Sources

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Transient sources are among the preferred candidates for the sources of high-energy neutrino emission. Intriguing examples so far include blazar flares and tidal disruption events coincident with IceCube neutrinos. Here, we report the first all-flavor, all-sky time-dependent search for neutrino sources by combining IceCube throughgoing tracks, starting tracks and cascades. Throughgoing tracks provide the best sensitivity in the Northern Sky, while cascades have worse angular resolution but yield better sensitivity in the Southern Sky than tracks. The relatively new starting tracks sample has reduced contamination from atmospheric muons. This analysis takes advantage of the strengths of each of the datasets, combining them for increased statistics and obtaining the best accessible all-sky sensitivity for transient searches. In this search, we look for unbound $E^{-\gamma}$ power-law sources, as well as E^{-2} sources with low and high-energy exponential cutoffs, optimizing the sensitivity for the duration of the flares.

Collaboration(s)

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