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Search for high-energy neutrino sources from the direction of IceCube alert events

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IceCube is a cubic-kilometer scale neutrino detector instrumenting a gigaton of ice at the geographic South Pole in Antarctica. On average, 8 track-like high-energy neutrino events with a high probability of being of astrophysical origin are detected per year. These events produce an extended signal in the detector that allows the events to be reconstructed with good angular precision, making them ideal for searching for neutrino sources. We present a search for the production sites of these cosmic neutrinos and hence also of the closely connected high-energy cosmic-rays. We use IceCube's high-statistics, neutrino-induced through-going muon samples to search for sources specifically in the vicinity of the arrival directions of the single most energetic events. In a time-integrated search for sources with a constant flux, we did not find a significant signal. In this contribution we explore a time-dependent analysis, and present new approaches and preliminary sensitivity studies in the search for transient neutrino sources.

Keywords

IceCube, transient neutrino sources, neutrino flares, IceCube high energy events, IceCube alert events

Collaboration

IceCube

other Collaboration

Subcategory

Experimental Methods & Instrumentation

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