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A New Method for Finding Point Sources in High-Energy Neutrino Data MARK GIOVINAZZI, Drexel Univ, KE FANG, COLEMAN MILLER, University of Maryland, ICECUBE NEUTRINO OBSERVATORY COLLABORATION — The IceCube Neutrino Observatory has not yet been able to identify an astrophysical point source from which a high-energy neutrino has originated. In this analysis, we implement a new method for finding such point sources by choosing to examine pairs of detected events rather than individual ones, noting that clusters of events are more likely to come from a single source than those from widely different parts of the sky. We wish to measure the angular distances between all possible pairs of events, scaling each by the pair's angular resolution errors summed in quadrature. Furthermore, we compare this result to statistically generated distributions of both a diffuse and a clustered set of events. Our new method is thus designed to teach us exactly how point-source-like our sample of detected events really is. We propose that our analysis should be able to determine the origins of any given clustering of events within the IceCube data, allowing us to discover the first neutrino point source in history.

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