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Neutrino Detection Forecasts: Numerical Estimates for the Trinity Observatory

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Neutrino astronomy has recently begun probing the PeV energy regime, yet observations remain severely limited by low event statistics. Upcoming neutrino telescopes predominantly utilize water Cherenkov and radio detection techniques, each targeting distinct portions of the neutrino spectrum and consequently leaving a critical observational gap from PeV to EeV energies. Trinity, an imaging air Cherenkov telescope designed to detect Earth-skimming neutrinos, aims to bridge this gap by providing sensitivity across these intermediate energies. Trinity's enhanced point-source sensitivity positions it as a powerful instrument in the search for astrophysical neutrino sources. Here, we present detection prospects, outlining expected event rates and highlighting Trinity's potential contributions to neutrino astrophysics.

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