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Trinity: The PeV Neutrino Observatory

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The Trinity Observatory is a proposed UHE-neutrino detector with a core-energy range of 10^6 GeV - 10^10 GeV, bridging the observational gap between IceCube and UHE radio detectors. Trinity is a system of 60x5 degree^2 wide field-of-view air-shower imaging telescopes that detect Earth-skimming tau neutrinos from mountain tops. Trinity's primary science objectives are point-sources, the diffuse astrophysical neutrino flux, and the detection of cosmogenic neutrinos. Over a ten-year observation period, Trinity will detect about 60 diffuse UHE neutrinos if the astrophysical neutrino spectrum does not turn over. Trinity will provide critical measurements to study flavor physics and neutrino cross-sections at energies that are out of reach for accelerators. I present the project's status focusing on the Trinity Demonstrator, a one-square-meter air-shower imaging telescope on Frisco Peak, Utah, to demonstrate the technology and understand potential backgrounds. In addition, I discuss the discovery potential of diffuse and source UHE neutrinos with the Demonstrator, one Trinity telescope, and the completed system.

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