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Delta Rays: A Novel Calibration for the Deep Underground Neutrino Experiment (DUNE) for Low Energy Astrophysical Neutrinos

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Future neutrino observatories, like the Deep Underground Neutrino Experiment (DUNE), will be sensitive to supernovae and solar neutrinos of low energies. These neutrinos offer a unique look inside stars and stellar explosions. Inside the DUNE liquid argon time projection chamber, low-energy electron neutrinos will produce visible electrons. In this talk, we will present a preliminary study of delta-rays that have similar energies to the electrons scattered by low-energy astrophysical neutrinos. Unlike neutrinos, delta-rays are a well understood “standard candle.” Furthermore, they provide ample statistics, a valuable feature in the otherwise quiet underground environment. We will outline how they can be used to calibrate DUNE’s response to < 30 MeV electrons in situ.

Collaboration name

Deep Underground Neutrino Experiment (DUNE)

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