

Photon Detectors for the DUNE Vertical Drift Module-0

The Deep Underground Neutrino Experiment (DUNE) will use an intense neutrino beam starting from Fermilab (Chicago) with a Near Detector to monitor the beam and a Far Detector installed in the Sanford Underground Research Facility (SURF - South Dakota), 1300 km away. The Near Detector complex at Fermilab will have three components, including Liquid Argon and high-pressure gas TPCs which can be moved off the beam axis and an on-axis detector with tracking and calorimetry to monitor the beam and measure the flux. Four 17 kt Liquid Argon Time Projection Chambers (LArTPC) located in underground will compose the Far Detector, to measure and reconstruct neutrino interactions using charge and light signals from ionizing radiation. The first of the four LArTPC modules (Horizontal Drift) is being constructed internationally and will be assembled at SURF. The second module (Vertical Drift), in the design and validation stage, uses liquid argon as the active medium and will detect photons with the X-ARAPUCA detector concept. A full-scale prototype ("Module-0") has been constructed for testing at the CERN Neutrino Platform in the coming year. The concept, construction, and expected performance of the X-ARAPUCA detectors for Module-0 will be presented.

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