

## The DUNE Photon Detection System

DUNE is an underground neutrino oscillation experiment that will be performing precision measurements of the PMNS matrix to determine unambiguously the mass ordering and the leptonic CP violation. It also comprises a rich non-accelerator physics program for the detection of supernova neutrinos, nucleon decay, and BSM physics. DUNE employs a high-power neutrino beam under construction at Fermilab together with the DUNE Near Detector, and four Liquid Argon TPCs (Far Detector) that will be installed at the Sanford Underground Research Facility in South Dakota, 1300 km away from the neutrino source.

The photon detection system (PDS) –which records the 128 nm scintillation light of argon and provides the time of interaction of the beam neutrinos in the Far Detector - is critical for studying nucleon decay and detecting Supernove Neutrino Bursts. The PDS also complements the calorimetric measurement performed by the TPC (i.e. the charge readout) and contributes to the energy calibration and time performance of the Far Detector.

In the talk, we will overview the design of the Photon Detection System for the first DUNE far detector module, with special emphasis on VUV light trapping in a cryogenic environment, its technical challenges, and the expected physics performance. We will also discuss the status of the construction of the PDS and its validation in the Run II of ProtoDUNE-SP.

### Working group

WG1

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