

The ProtoDUNE Photon Detection System: technology validation and performance

DUNE is a long-baseline accelerator experiment currently in construction at Fermilab and SURF (South Dakota). The science objectives of DUNE include the search for CP violation in the leptonic sector, and the identification of the neutrino mass hierarchy, along with the observation of supernova neutrino bursts and proton decay.

The Far Detector consists of four Liquid Argon TPCs (“modules”) located deep underground and equipped with the DUNE Photon Detection System (PDS). The PDS is based on a novel light trapping technology (X-Arapuca) that greatly enhances the DUNE physics reach, improving vertex identification, energy resolution and providing the trigger for non-beam events.

Two prototypes of the Far Detector, ProtoDUNE-HD, and VD, are currently under construction at CERN for their second run of data taking, which implements the final design of the first (Horizontal Drift) and second (Vertical Drift) module. In this talk, we will present the latest results of the PDS from test facilities and the status of the installation in ProtoDUNE-HD. We will discuss the most important achievements of the Vertical Drift PDS, with emphasis on the new SiPM configuration and cold electronics, the custom wavelength shifting bars produced by Glass-to-Power, and the latest generation of the dichroic filter designed for ProtoDUNE-VD.