

## Measurent of PDE DUNE X-ARAPUCA

DUNE is an ambitious experimental project with a wide physics program. Its goals include observing neutrino oscillation physics, studying CP violation in the leptonic sector, identification of neutrino mass hierarchy, detecting supernova and solar neutrinos and searching for proton decay. The experiment will use a liquid argon time projection chamber (LArTPC) detector with a total fiducial volume of 40kt of LAr in four independent modules. This detector will be irradiated by a neutrino flux produced 1300 km away, at the Long-Baseline Neutrino Facility (LBNF), hosted by Fermilab. The first two modules, one with horizontal charge drift (FD-HD) and the other with vertical charge drift (FD-VD), are currently under construction.

They will be equipped with a photon detection system based on X-ARAPUCA technology, designed to trap scintillation light from liquid argon in an box instrumented with SiPM photon detectors with a combination of a microic filter and two wavelength shifter materials. Different photon detectors units have been designed implementing the X-ARAPUCA concept.

Measuring the absolute Photon Detection Efficiency (PDE) of this photodevices at liquid argon temperature is essential for characterizing the photon detection system of the DUNE experiment. However, no measurements have been performed for the 60x60 cm<sup>2</sup> X-ARAPUCA unit designed for the vertical drift module of DUNE. The Naples Cryogenic Laboratory took on his task, by planning and performing a dedicated test with ultra-pure liquid argon in a big 1000 L cryostat.

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