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## R&D of Power Over Fiber in harsh environments and its novel application for the DUNE FD-VD Photon Detection System

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The Deep Underground Neutrino Experiment (DUNE) is a next generation long-baseline neutrino experiment that will send an intense beam of neutrinos through two detector complexes: a near detector complex located at Fermilab (Chicago), and a far detector complex located ~1.5 km underground at Sanford Underground Research Facility (SURF) in South Dakota.

One of the DUNE far detector (FD) modules will employ the Vertical Drift (VD) liquid argon time projection chamber technology, which will vertically drift the ionized electrons from the cathode plane suspended at the mid-height of the active volume of the cryostat. The photon detection system (PDS) will be installed along the cathode and behind the field cage to increase the photon detection coverage. Due to the high voltage (~300 kV) present at the cathode, conventional copper cables cannot be used to power the photon detectors. Therefore, Power-over-Fiber (PoF) technology will be deployed to power the PDS based on optical power transmission over optical fibers. This talk presents the R&D campaign on different PoF components under harsh environments and its novel application in the VD PDS.

### Primary experiment

DUNE

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