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X-ARAPUCA Photon Detectors in SBND

The Short-Baseline Near Detector (SBND) is a liquid argon time projection chamber for detecting neutrinos from Fermilab's Booster Neutrino Beam. Located 110 m downstream of the beam target, SBND collects both ionization electrons and scintillation photons from particle interactions within the detector volume. The photon detection system (PDS) consists of both PMTs and X-ARAPUCAs, a novel technology featuring large area cost-effective coverage with single photo-electron resolution at cryogenic temperatures. SBND utilizes two types of X-ARAPUCAs: one sensitive to the vacuum ultra-violet (VUV) scintillation light produced in liquid argon and one sensitive to the visible light generated by the reflection of VUV light off the TPB-coated reflective foils at the cathode. SBND is the only experiment currently testing the X-ARAPUCA technology in a neutrino beam and will provide critical information for deployment in future detectors like DUNE. This poster will cover the calibration and early performance of X-ARAPUCAs in SBND.

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