



ID de la contribución : 1041

Tipo : Talk

## The Photon Detection System of SBND: towards the first X-ARAPUCA signals

*miércoles, 19 de noviembre de 2025 15:15 (15)*

The Short-Baseline Near Detector (SBND) is one of the three experiments in the Short-Baseline Neutrino (SBN) Program at Fermilab. Located only 110 m downstream of the Booster Neutrino Beam (BNB) target, SBND is the detector closest to the neutrino source. The detector is a Liquid Argon Time Projection Chamber (LArTPC) with a 112-ton active volume which enables unprecedented precision measurements of neutrino-nucleus interaction in liquid Argon. The detector began taking data in July 2024 and has already completed its first year of running. Its Photon Detection System (PDS) is a hybrid system consisting of 120 photomultiplier tubes (PMTs) and 192 novel X-ARAPUCA devices, accompanied by highly reflective panels coated with a wavelength-shifting compound covering the cathode and reflecting light towards the optical devices. An X-ARAPUCA functions as a light trap that captures photon emitted by the Argon, shifts their wavelength to a detectable spectrum using a coating, and then guides these photons to an array of silicon photomultipliers (SiPMs) for detection. The X-ARAPUCA system represents an R&D opportunity to demonstrate the performance of this novel technology in a LArTPC exposed to a neutrino beam over several years. There are two types of X-ARAPUCA installed: one sensitive to vacuum ultraviolet (VUV) argon scintillation light and another sensitive to visible light. This talk presents an overview of the SBND detector, focusing on its X-ARAPUCA system and the path towards detecting the first X-ARAPUCA signals.

### Abstract

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**Clasificación de la sesión :** RENATA (Red Nacional Temática de Astropartículas)

**Clasificación de temáticas :** Red Temática de Astropartículas (RENATA)