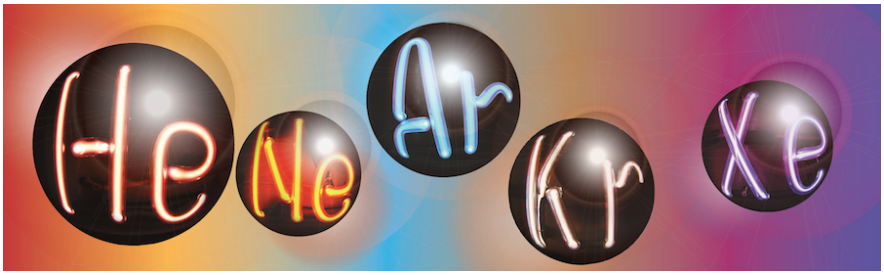

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Status of APSAIA Installation in the SBND experiment

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The Short-Baseline Near Detector (SBND) is one of three Liquid Argon Time Projection Chamber (LArTPC) neutrino detectors positioned along the axis of the Booster Neutrino Beam (BNB) at Fermilab, as part of the Short-Baseline Neutrino (SBN) Program. Located only 110 m from the BNB target, it will precisely characterize the neutrino flux before oscillations take place. The Photon Detection System in SBND integrates 120 photomultiplier tubes (PMTs) and 192 X-ARAPUCAs, each composed of a dichroic filter window on a highly internally reflective box equipped with silicon photomultipliers (SiPMs), half of which are VUV-sensitive and the other half are visible light sensitive (VIS). In terms of the readout system, 16 X-ARAPUCAs will be read by the APSAIA (Arapuca Power Supply and Input Amplifier) and 96 by the ARARA (Arapuca Analog Readout Amplifier). This presentation will discuss the current status of the APSAIA installation in the SBND experiment.

The APSAIAs, responsible for power supply the SiPMs and amplify their output signals, were installed directly on the flanges of SBND's cryostat, on the warm side. Each board includes 8 channels, each containing one amplifier and one power supply for the SiPMs. Since each APSAIA ARAPUCA has 2 outputs, each APSAIA is responsible for 4 ARAPUCAs. Serial communication allows the possibility to control the level of the SiPMs bias and the gain of the amplifiers via an RS232 serial port. The output connectors are designed to interface with the CAEN V1730 digitizer, featuring MCX connectors for each channel. The power supply input and serial port share a single RJ connector. The supply voltage for the SiPMs is adjustable remotely from 20V to 60V with a resolution of 100 mV. A microcontroller, connected to an RS232C port, manages operations and has an internal memory that retains and applies the operating conditions at startup.

This setup ensures precise control and reliable operation of the SiPMs, contributing to the overall accuracy and efficiency of the SBND's photon detection capabilities.

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