



Contribution ID: 23

Type: Poster

Simulating and Validating the X-ARAPUCA light sensors

Wednesday, 15 September 2021 09:00 (1 hour)

Brazil's native people have an ingenious trap to catch birds called arapuca. Our ARAPUCA is a light trap that increases the collection area of regular SiPMs by making use of wavelength shifters and a dichroic filter. Its latest iteration, the X-ARAPUCA, will be used alongside PMTs in Short-Baseline Near Detector (SBND) and as the standalone photon detector in the Deep Underground Neutrino Experiment (DUNE). The SBND is part of the three-detectors Short-Baseline Neutrino (SBN) Program, search for a possible sterile neutrino in short-baseline oscillations (with SBND located at 100m from the source), while DUNE will look for signs of CP-violation in long-baseline (1300km) oscillations, among other items in a rich physics program. Contributing with both experiments, we developed detailed simulations of each optical element, from which we highlight the dichroic filter and the wavelength shifters. While the backbone of the simulation uses Geant4, these two elements were implemented from scratch to ensure they would represent our device. The models were individually validated using dedicated characterization data and the resulting simulation reproduces the physical device behavior without the need for a back-fitting calibration. In this presentation we will elaborate on the computer models and the validation processes for each element and compare the resulting full simulation with the X-ARAPUCA's most recent tests.

Primary authors: VALDIVIESSO, Gustavo (Universidade Federal de Alfenas Unifal-MG); BEZERRA, Anibal Thiago (Universidade Federal de Alfenas Unifal-MG); MACHADO, Ana Amélia (Unicamp); SEGRETO, Ettore (Unicamp)

Presenter: VALDIVIESSO, Gustavo (Universidade Federal de Alfenas Unifal-MG)

Session Classification: Poster in Gather.Town

Track Classification: Light/charge readout (PMT, SiPM, WLS, electronics etc.)