Contribution ID: **163** Type: **Parallel session talk**

Measurements of Spectral Photon Sorting Using Dichroicons in Large Optical Neutrino Detectors

Thursday 9 October 2025 14:20 (20 minutes)

Many neutrino detectors use photons as their primary event detection method, typically through photon counting and determining their arrival times. Photons also carry information about an event through their wavelength, polarization, and direction, but often little to none of this information is utilized. The "dichroicon," a Winston-style light concentrator comprised of dichroic filters, allows detectors to use the wavelength information encoded in photons. This talk will discuss measurements of the performance of the dichroicon in the CHESS detector, focusing on the dichroicon's scintillation and Cherenkov photon detection and sorting efficiency. The results will include measurements from two types of dichroicons paired with water based and liquid scintillators exposed to radioactive and cosmogenic sources. In addition to the benchtop results, the talk will discuss the deployment of dichroicons in Eos, a 20-ton hybrid Cherenkov-scintillation detector. The Eos detector is a demonstrator for very large scale neutrino detectors, including Theia, and features the first deployment of 12 large-scale monolithic dichroicons. The talk will dicuss the ongoing measurements of the performance of dichroicons at Eos, as well as priliminary results that have so far shwon good data/MC agreement. The talk will also include predictions of the performance of dichroicons in future detectors like Theia. These results will include studies of the collection efficiency and discrimination between Cherenkov and scintillation light, new handles on particle ID, and novel reconstruction techniques that leverage the advantages of both Cherenkov and scintillation light.

Author: SHEN, Jieran (University of Pennsylvania (US))

Presenter: SHEN, Jieran (University of Pennsylvania (US))

Session Classification: RDC 2 Photodectors

Track Classification: RDC 2 Photodectors