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Impacts of Spectral Photon Sorting in Large Neutrino Detectors

Identifying Cherenkov photons produced when charged particles interact with scintillators provides additional information about the interaction, including directionality and particle identification, while maintaining the excellent energy and position resolution typical of scintillators. Dichroicons achieve this with a Winston cone made from dichroic filters, which reflects photons inconsistent with typical scintillation spectra to one PMT, and passes other photons to another PMT. A simulation model of dichroicon prototypes has been implemented in the GPU-enabled photon Monte Carlo package Chroma and compared to benchtop measurements. This model is used to evaluate the performance of a large liquid scintillator detector instrumented with dichroicons.

Mini-abstract

GPU-enabled simulation of a large liquid scintillator detector instrumented with dichroicons.

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