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(G*) (POS-42) Simulating nEXO's Outer Detector with Chroma

Tuesday, 7 June 2022 18:00 (2 minutes)

The nEXO experiment is a proposed neutrinoless double beta decay ($0\nu\beta\beta$) search in the isotope ^{136}Xe . Anticipated to be located at SNOLAB, nEXO aims to observe the Majorana nature of neutrinos with a sensitivity that will exclude up to a 1.35×10^{28} year half life (at 90% confidence level) and probe the entire inverted mass hierarchy parameter space for almost all nuclear matrix elements. nEXO's stringent low-background requirements necessitate a water shield in order to reduce contributions from external radiation. Photomultiplier tubes (PMTs) inside the water will measure Cherenkov light from passing muons which will allow the vetoing of cosmogenic backgrounds from the $0\nu\beta\beta$ search; this active shield is referred to as the Outer Detector.

This talk will present the status of GPU-accelerated Chroma simulations of Cherenkov photons in the water tank. Chroma allowed us to rapidly develop the instrumentation plan for the PMTs based on nEXO sensitivity requirements and assess the overall veto capabilities of the Outer Detector.

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