

SiPM Reflectivity and Optics for nEXO detector

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The nEXO experiment is a TPC planned to search for neutrinoless double beta decay ($0\nu\nu\beta\beta$) in ^{136}Xe enriched liquid xenon, with a projected sensitivity sufficient to probe the neutrino mass inverted hierarchy. The isotope ^{136}Xe is the $2\nu\beta\beta$ source while the remaining xenon acts as the detection medium, using silicon photomultipliers (SiPMs) to detect scintillation light. The largest contribution to the required energy resolution of 1% at 2.45MeV is the light collection efficiency. To properly simulate photons in the detector the reflectivity and absorption of detector materials, along with SiPM efficiency must be characterized for all angles of incidence at xenon scintillation wavelengths. This talk will highlight work at TRIUMF using our VRAE setup (Vacuum ultraviolet Reflectivity, Absorption and Efficiency) which can measure reflectivity and absorption of detector materials at room temperature, or simultaneously measure SiPM efficiency and reflectivity at cryogenic temperatures.

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Author: DE ST. CROIX, Austin (TRIUMF/UBC)

Co-authors: RETIERE, Fabrice (TRIUMF); GIAMPA, Pietro; GALLINA, Giacomo (TRIUMF); MARTIN, Lars (TRIUMF); EDALATFAR, Fatemeh (TRIUMF); MASSACRET, Nicolas (TRIUMF (CA))

Presenter: DE ST. CROIX, Austin (TRIUMF/UBC)

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