

nEXO Photon Detection System and Read-out Electronics

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nEXO is a next-generation 5-tonne liquid xenon (LXe) time projection chamber that will search for the neutrinoless double beta decay ($0\nu\beta\beta$) of Xe-136, which is a lepton number violating process that can occur if neutrinos are massive Majorana fermions. The experiment has a projected half-life sensitivity of 1.35×10^{28} years over 10 years of livetime, which sets a design goal of 0.8% energy resolution ($\sigma E/E$) at the decay Q-value of 2.458 MeV. Achieving this goal requires stringent control of the radiopurity of detector materials while maintaining single photon resolution at the vacuum-ultraviolet scintillation wavelength of LXe of 175 nm. In this talk, I will describe the design challenges and novel solutions that have led to nEXO's photodetection design, which will instrument approximately 4.5 m^2 with VUV-sensitive silicon photomultipliers (SiPMs) that are read out with cold electronics within the LXe. This talk will describe the individual SiPM performance and discussion of the readout architecture and custom ASICs that have been tailored to meet the experiment's energy resolution goal, while achieving high pixelation to allow for background discrimination.

Do you need a VISA letter for traveling to Canada ?

No

Author: WATTS, Molly (Yale University)

Presenter: WATTS, Molly (Yale University)

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