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WITHDRAWN Measurement of SiPM external crosstalk in a liquid xenon detector

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Silicon photomultipliers (SiPMs) are the photo-detection technology of choice for future noble-liquid scintillator rare-event search experiments, both in neutrino-less double beta decay and dark matter. The high radio-purity and exceptional gain of SiPMs along with a high VUV detection efficiency make them ideal for these applications. The Light only Liquid Xenon (LoLX) experiment is a small-scale R&D liquid xenon (LXe) detector located at McGill University. LoLX operates 96 Hamamatsu VUV4 SiPMs in a cylindrical geometry submerged in LXe. LoLX aims to perform detailed characterization of SiPM performance in LXe, and to characterize the light emission and transport from LXe to inform future LXe detectors. When photons are detected by a SiPM, individual photodiodes undergo an avalanche process. During this avalanche, near infrared photons are emitted and can transport across the detector to other SiPMs which may produce correlated hits on other devices, a process referred to as SiPM external crosstalk (eXT). Using the LoLX detector we performed measurements of SiPM external crosstalk in LXe with similar geometric acceptance as future planned experiments. In this presentation, we will present the measurement of SiPM eXT detection within LoLX, with comparisons to GEANT4 eXT simulations informed by ex-situ measurements of SiPM photon emission characteristics.

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Keyword-2

SiPM

Keyword-3

Neutrinoless double beta decay

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