



Contribution ID: 11

Type: **Presentation**

## Measurement of SiPM external cross-talk in a liquid xenon detector

*Thursday, 22 September 2022 11:55 (15 minutes)*

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. Of particular importance, is the characterization of SiPM external cross-talk in a LXe detector with similar geometric acceptance as future planned experiments. During the SiPM avalanche process photon detection, NIR photons are emitted and can transport to other SiPMs and may produce correlated hits on other devices [1], this process is called SiPM external cross-talk (eXT). In this talk, 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.

1 - McLaughlin JB, et al., Characterisation of SiPM Photon Emission in the Dark. Sensors (Basel). 2021 Sep 4/21 (17):5947, doi: 10.3390/s21175947

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**Session Classification:** Photosensors

**Track Classification:** Signal reconstruction and identification (analysis methods, simulations)