

Light only Liquid Xenon (LoLX) experiment

Tuesday, 31 August 2021 18:25 (15)

The Light only Liquid Xenon (LoLX) experiment was designed to study light production in liquid xenon during the first nanosecond and gain experience with the operation of a large number of closely spaced Silicon Photomultipliers (SiPMs) in liquid xenon. The LoLX detector is a 3D printed octagonal chamber housing 96 Hamamatsu VUV4 SiPMs, 16 on top and bottom and 8 on each side of the octagon. A β -source Sr-90 is inserted in the middle of the chamber. Most (88) SiPMs are covered by long pass filters preventing transmission of light below 225nm, and are to be used for isolating the Cerenkov light. 4 SiPMs are uncovered and 4 are covered by a band pass filter centered at the xenon scintillation wavelength. Results will be presented including a measure of the beta decays with the combined scintillation and Cerenkov channels. The focus of the current phase of the experiment is to demonstrate spectral separation of Cerenkov and scintillation which is a prerequisite for studying scintillation during the first ns. LoLX will be upgraded in 2021 to achieve about 100ps timing resolution as opposed to about 1ns currently achieved. Eventually digital SiPMs will be used in an attempt to reach 10ps single photon timing resolution. The LoLX results will also include a study of SiPM external cross-talk, where photons produced by a charge avalanche in a SiPM trigger an avalanche in another. The unique shape of the chamber offers opportunity to study external crosstalk at varying angles and distances. Not only will LoLX results help predict the performances of the nEXO experiment but also determine if early light measurement carry valuable information for better timing and possibly energy resolutions, to improve particle identification.

Reference to paper (DOI or arXiv)

Your gender (free text)

Primary author(s) : XIE, Liang (TRIUMF); Mr. AL KHARUSI, Soud (McGill University); Dr. THOMAS, Brunner (McGill University); Mr. DE ST. CROIX, Austin (Queen's University); Ms. CHANA, Bindiya (Carleton University); Dr. CHRISTOPHER, Chambers (McGill University); Mr. FRANCESCO, Marco (INFN Sezione di Pisa); Dr. GOELDI, Damian (Carleton University); Dr. GALLI, Luca (INFN Sezione di Pisa); Dr. GIAMPA, Pietro (SNOLAB); Dr. MCELROY, Thomas (McGill University); Dr. RETIERE, Fabrice (TRIUMF); Dr. SIGNORELLI, Giovanni (INFN Sezione di Pisa); Dr. STRACKA, Simone (INFN Sezione di Pisa); Prof. TETRAULT, Marc-Andre (Universite de Sherbrooke); Dr. VIEL, Simon (Carleton University)

Presenter(s) : XIE, Liang (TRIUMF)

Session Classification : Discussion Panel Neutrinos 3

Track Classification : Neutrino physics and astrophysics