First Results from the Light only Liquid Xenon experiment

Wednesday, 15 September 2021 10:45 (15 minutes)

This talk will present results from the first liquid xenon dataset of the Light only Liquid Xenon (LoLX) experiment, collected in June of 2021. LoLX aims to investigate both scintillation and Cherenkov light emission in liquid xenon for applications in rare event searches and PET. The detector consists of 24 Hamamatsu VUV4 Silicon Photomultipliers (SiPM) arranged in an octagonal cylinder. A needle holds a Strontium 90 beta source in the detector center, which produces the scintillation and Cherenkov light. Longpass optical filters are placed in front of 22 SiPMs to separate the less abundant Cherenkov light from the VUV scintillation light. In addition to studying light production in liquid xenon, LoLX also aims to characterize external cross-talk (eXT) between SiPMs at various geometries. eXT occurs when IR photons produced during a charge avalanche in one SiPM trigger avalanches in a different SiPM. This acts as correlated noise across channels, thus characterizing eXT is crucial for rare event searches using large arrays of SiPMs. Future experimental phases of LoLX will upgrade the SiPM and digitizer scheme to attain sub nanosecond timing resolution with the goal of performing temporal separation of the Cherenkov and scintillation light, which may lead to improving time-of-flight PET imaging.

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