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Goals and Scope of the Light-Only Liquid Xenon Project

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The Light-Only Liquid Xenon (LOLX) project aims to study the properties of light emission in liquid xenon (LXe). Investigating both the scintillation and Cherenkov light emission, LOLX will explore the abilities of single-phase liquid xenon detectors as particle detectors and in medical imaging devices. The first phase of the LOLX detector consists of 24 Hamamatsu VUV4 Silicon photomultipliers (SiPMs), giving a total of 96 channels arranged in an octagonal cylinder. Covering 92 of the channels are 225nm high pass filters which block the Xe scintillation light, allowing for independent measurements of the long-wavelength Cherenkov and VUV scintillation light. The initial goal of LOLX is to measure the Cherenkov and scintillation yields from ^{90}Sr beta-decays and ^{210}Po alpha-decays, using this to validate optical transport simulations using GEANT4 and verify measurements of the VUV light reflectivity being performed at TRIUMF. Future phases of the project will upgrade to fast waveform digitizers with 10 ps timing accuracy and 3D integrated digital SiPM (from U.Sherbrooke) to further investigate the prompt time characteristics of Xe scintillation and investigate the use of timing to separate the Cherenkov and scintillation signals. LOLX is also investigating the use of 3D printed plastics for use in vacuum and cryogenic applications. This talk will give an overview of the LOLX project and its current state.

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