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LIXO2: an upgraded system to study reflectivity of materials and PDE of SiPMs in liquid xenon. ALYSSE HOELMER, University of Alabama — Next generation dark matter and neutrinoless double-beta decay experiments, e.g. nEXO and DARWIN, will use multi-ton liquid xenon (LXe) detectors. LXe emits vacuum ultraviolet (VUV) light. Little is known about reflective properties of materials and photon detectors, like Silicon Photomultipliers (SiPMs), in the VUV, which complicates optimization of these experiments. LIXO is a setup built at the University of Alabama to measure reflectivity of materials and photon detection efficiency (PDE) of SiPMs in LXe. LIXO has provided, for the first time, data on angular dependence of PDE and reflectivity of Hamamatsu SiPMs in LXe. This information is used by nEXO and DARWIN to understand light collection in their detectors. A downside of LIXO is that it takes long to measure a sample because one cannot change angle of incidence while in LXe. This talk describes the solution that will allow changing angular positions of the light source and detector in LXe, while still satisfying the stringent constraints due to the high-purity, cold environment. The upgraded system, LIXO2, will allow faster measurements with smaller systematics, wider angular range, and the ability to measure transparency of thin samples. Details of the design choices and the prototyping process is also presented.

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