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Properties and mitigation strategies of high-voltage phenomena measured at the Stanford Liquid Xenon High-Voltage Observatory

Tuesday 7 October 2025 16:30 (20 minutes)

No large-scale, noble-liquid element experiment has ever reached its design electric field configuration without first encountering high-voltage phenomena (HVPs) that either require special procedures to address, or ultimately limit the ability of the experiment to measure properties of the universe. Noble-liquid detectors will only encounter harsher high-voltage challenges as they scale in mass and physics sensitivity. This presentation will discuss the results of a 10 kg liquid xenon experiment at Stanford that has observed a variety of HVPs using multiple pairs of solid, polished, electrodes with 15 cmˆ2 area oriented in a plane-to-plane geometry with the ability to explore fields up to 60 kV/cm. The emphasis of the experiment is to explore the impact on HVP mitigation from depositing thin films of metals and insulators onto the surfaces of electrodes. A comparison of the performance of bare stainless steel, platinum, and magnesium-fluoride-coated electrodes will be presented.

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