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R&D toward next-generation LXe experiments

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As noble liquid time projection chambers grow in size, it becomes more difficult to maintain sufficiently large drift field and efficient prompt light collection, both of which are important for dark matter detector performance. I will report on first results from two new systems (XeBrA and IBEX) at Lawrence Berkeley National Laboratory, designed for investigations of high voltage and light collection. The Xenon Breakdown Apparatus (XeBrA) is a 5-liter cryogenic chamber built to characterize high voltage behavior of liquid xenon and enabling detailed, reproducible studies of dielectric breakdown and the onset of electroluminescence. IBEX is an apparatus used to measure the angular distribution of light reflected off of polytetrafluoroethylene (PTFE) samples submerged in liquid xenon, in order to investigate microphysical models of reflection in this context.

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