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(G*) High Voltage Breakdowns in Liquid Xenon

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Liquid xenon (LXe) is frequently employed to build detectors for rare event searches due to many of its advantageous properties including high stopping power, high ionization and scintillation yields, and relatively high cryogenic operating temperature. Time projection chambers (TPC) with LXe allow for 3D event topology reconstruction and identification which is important for reducing backgrounds. Due to the high drift fields TPCs are operated at, it is crucial to model breakdown properties in LXe. Often, a high voltage (HV) discharge is able to damage the detector instrumentation, e.g. the photo-sensors array. We study the breakdown formation in the context of the EXO-200 experiment, the first generation $0\nu\beta\beta$ search experiment from the Enriched Xenon Observatory (EXO) collaboration that will be followed by a much higher sensitivity experiment called nEXO. In the EXO-200 detector, instabilities have been observed on the TPC HV line, each accompanied by scintillation VUV light which was detected by the EXO-200 Avalanche Photo Diode (APD) arrays. Using a setup designed to study LXe breakdowns we investigate the origin of the HV instabilities as well as the correlation between those HV glitches and fully formed breakdowns.

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