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Correlated Single- and Few-Electron Backgrounds in Xenon Detectors ABIGAIL KOPEC, Purdue University — Dual-phase liquid xenon time projection chambers are world-leading dark matter detectors. Currently, their detection sensitivity to light dark matter particles, such as WIMPs with masses below 3GeV, is limited by a high background of small (<5 electrons) ionization signals. The rates of these backgrounds decrease according to power laws for milliseconds after energetic interactions and their apparent positions in the detector correlate to the location of the preceding energy deposition. I present work using Purdue University's experimental detector to investigate how these backgrounds behave under different detector conditions. We measured how these backgrounds depend on extraction field, drift field, and measured depth of the initial interaction. We also explored the effect of shining 1 Watt of infrared (1550nm) light in the detector. I present our new understanding of these backgrounds as a step toward mitigating them in future dark matter detectors.

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