

Mitigating Single-Electron Backgrounds in Liquid Xenon TPCs

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Many leading WIMP direct detection experiments use liquid xenon as a target to observe scattering dark matter. Currently, these detectors search for WIMPs in the GeV-TeV mass energy range, and require larger and larger detectors to gain sensitivity. An alternate analysis channel investigates the energy spectrum of individual extracted electrons. Through this channel, xenon TPCs, regardless of size, may be sensitive to MeV/c^2 dark matter. However, backgrounds from so-called electron trains make this analysis challenging. The focus of the new LBECA collaboration is to design a small xenon TPC with minimal single-electron backgrounds to search for dark matter through this analysis channel. This talk presents the progress of the LBECA Collaboration in identifying leading sources of these backgrounds and in the work to reduce them, with the goal of rapidly realizing a dedicated low-mass dark matter search experiment.

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