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The LBECA Experiment

Energy depositions of particles interacting in dual-phase xenon detectors, such as XENON1T and LUX, create measurable scintillation and ionization signals. These current detectors observe few-electron ionization signals trailing for hundreds of milliseconds after high-energy interactions. Low-energy interactions, such as from sub-GeV dark matter, would only be detectable through an ionization signal of a few electrons. This means that the trailing electron background significantly inhibits a dual-phase xenon detector's sensitivity to low-mass dark matter. The Low Background Electron Counting Apparatus (LBECA) Experiment endeavors to understand and reduce all possible electron backgrounds and commission a dedicated experiment for measuring few-electron signals from potential low-mass dark matter particles. I present the research and development that the collaboration is currently undertaking toward the finalized design of such a low background detector.

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