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Analysis of CDMSlite Run 3 (G)*

Monday, 11 June 2018 17:15 (15 minutes)

The Super Cryogenic Dark Matter Search experiment (SuperCDMS) seeks direct evidence of Weakly Interacting Massive Particle (WIMP) dark matter through interactions with cryogenic germanium crystals. Particle interactions in the germanium produce phonons and electron-hole pairs. The CDMS low ionization threshold experiment (CDMSlite) is an operating mode of SuperCDMS that applies a high voltage bias of ~ 70 V across the detector. This creates a phonon amplification of the charges through the Neganov-Luke effect, and thus opens a window to search for lower mass WIMPs, though at the expense of discrimination between electron and nuclear recoils. CDMSlite Run 3 is the final iteration of the experiment, using data collected at the SuperCDMS location at the Soudan Underground laboratory in 2015. In the analysis of Run 3 we are introducing advanced techniques that we did not use in earlier analyses, with the goals to improve the sensitivity in spite of a shorter exposure compared to Run 2, and to prepare our analysis toolbox for the upcoming SuperCDMS SNOLAB experiment, where half the detectors will be operated in this high voltage mode. Examples for these improvements are modelling the background to be used in a profile likelihood analysis, and salting the dataset as a method of blinding to reduce potential bias in the analysis. My presentation will discuss how we implement these techniques, as well as the status of the analysis and the expected improvements in sensitivity.

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