

# LZ Calibrations: MCMC tuning of electron recoil interactions

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The LUX-ZEPLIN (LZ) experiment is a 7-ton liquid xenon (LXe) direct detection dark matter experiment located a mile underground in the Sanford Underground Research Facility (SURF). The experiment looks for interaction signals of weakly interacting massive particles (WIMPs), one of the leading proposed models for dark matter. Searching for these signals requires very precise understanding of backgrounds and particle interactions in the LXe, which can be modeled with the Noble Element Simulation Technique (NEST), which models light and charge yields for particle interactions in the LXe as a function of electron recoil (ER), nuclear recoil (NR), and width parameters. Here, we demonstrate the process for tuning the NEST model to LZ's science run 2 (SR2) and 3 (SR3) wimp search data using a multi dimensional Markov Chain Monte Carlo technique.

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