

Abstract Submitted  
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**Low energy nuclear recoils study in noble liquids for low-mass WIMPs**<sup>1</sup> LU WANG, DONGMING MEI, University of South Dakota, CUBED COLLABORATION — Detector response to low-energy nuclear recoils is critical to the detection of low-mass dark matter particles-WIMPs (Weakly interacting massive particles). Although the detector response to the processes of low-energy nuclear recoils is subtle and direct experimental calibration is rather difficult, many studies have been performed for noble liquids, NEST is a good example. However, the response of low-energy nuclear recoils, as a critical issue, needs more experimental data, in particular, with presence of electric field. We present a new design using time of flight to calibrate the large-volume xenon detector, such as LUX-Zeplin (LZ) and Xenon1T, energy scale for low-energy nuclear recoils. The calculation and physics models will be discussed based on the available data to predict the performance of the calibration device and set up criteria for the design of the device. A small test bench is built to verify the concepts at The University of South Dakota.

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