

Abstract Submitted
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Simulations of Water-Cherenkov Events with a Sr90 Source for the Calibration of NuDot Experiment¹ JUNIOR PENA, University of Southern California, NUDOT COLLABORATION — In searching for neutrinoless double-beta decay, it is crucial to understand backgrounds in liquid scintillator detectors for these rare events before the next generation of experiments at the kiloton-scale. With sufficient timing resolution to separate scintillation light from Cherenkov radiation, it is feasible to use directionality from Cherenkov light for identifying backgrounds like ^8B solar neutrino scattering, which are otherwise irreducible. NuDot is a preliminary 1-ton experiment aiming to demonstrate this technique of separation and event reconstruction with 1 to 2 MeV beta particles. Simulations for NuDot are important for determining the calibration conditions, the amount of source positions needed, and the duration of runs at each position in order to obtain the precise timing calibration for Cherenkov separation. For calibrating, we use water-Cherenkov events from a Sr90 source, and the difficulty lies in simulating the model for how Cherenkov light is produced, how the PMTs behave, and how light propagates through the detector. To aid this issue we use RAT to simulate our experimental setup and calibration runs as closely as possible. A simulation of a timing calibration and how it compares to data collected when running in the same conditions will be shown.

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