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Improving PROSPECT Neutrino Measurements with Single Ended Event Reconstruction¹ XIANYI ZHANG, Lawrence Livermore Natl Lab, PROSPECT COLLABORATION — Discrepancies in the reactor antineutrino flux and spectrum between experimental measurements and models suggest possible oscillations involving a sterile neutrino, and/or misunderstanding of neutrino production in nuclear reactors. PROSPECT, the Precision Reactor Oscillation and Spectrum experiment, investigates these discrepancies by measuring antineutrino spectra at a range of short baselines from the ²³⁵U-enriched High Flux Isotope Reactor at Oak Ridge National Laboratory. PROSPECT has operated a 4-ton segmented ⁶Li-loaded liquid scintillator detector, where each end of all longitudinal segments is coupled to a photomultiplier tube (PMT). However, a subset of PMTs were unable to operate during the entire data acquisition period. Therefore, PROSPECT results to date have excluded data from some segments. In this presentation, we describe the calibration and reconstructions procedure using information from segments with a single functional PMT in the PROSPECT analysis. We will also describe the expected improvement in sensitivity of PROSPECT physics measurements that can be achieved using single ended event reconstruction.

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