

Abstract Submitted  
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**Optimization of Inverse Beta Decay event selection for active background reduction in PROSPECT** XIAOBIN LU, University of Tennessee, Knoxville, PROSPECT COLLABORATION — The Precision Reactor Oscillation and SPECTrum experiment is designed to perform a model-independent search for eV-scale sterile neutrino oscillation and measure electron anti-neutrino spectrum with high precision from the High Flux Isotope Reactor (HFIR) located at ORNL. The anti-neutrino detector, operating on surface level with minimal overburden, uses 4-tons of  $^6\text{Li}$ -loaded liquid scintillator optically separated into 14 by 11 segments to detect Inverse Beta Decay (IBD) interactions. Surface detection of reactor anti-neutrinos represents a significant challenge due to the large backgrounds associated with the reactor operation and cosmogenic fast neutrons. Prior background characterization at HFIR site informed the design of passive shielding. Additionally using the outermost active detector layer to veto cosmogenic multi-neutron interactions, PROSPECT observes reactor anti-neutrinos within 2 hours of on-surface data taking at  $5\sigma$  statistical significance with a signal-to-background ratio  $> 1$ . In this talk, I will discuss the various sources of backgrounds and the optimized selection process used to identify IBD events.

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