Characterization of Aboveground Backgrounds for Reactor Antineutrino Detection with the PROSPECT Experiment[1] NATHANIEL BOWDEN, Lawrence Livermore National Laboratory, PROSPECT COLLABORATION — PROSPECT is a reactor antineutrino experiment whose primary goals are to search for short-baseline neutrino oscillations and perform a precise measurement of the U-235 reactor antineutrino energy spectrum using a 4 ton antineutrino detector at the 85MW High Flux Isotope Reactor (HFIR) at the Oak Ridge National Laboratory. Operating in this environment with limited overburden to attenuate cosmic ray backgrounds is a significant technical challenge. The PROSPECT detector uses optical segmentation and a Li-6 doped liquid scintillator to achieve excellent background rejection in a compact, space efficient system. Initial results have demonstrated the ability to detect 100s of antineutrino events per day with good signal-to-background. Here we discuss how the particle identification and event localization capabilities of PROSPECT enable these results and provide the opportunity to characterize background generation mechanisms in environments with little-to-no overburden.

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