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PROSPECT- a precision short baseline reactor antineutrino experiment

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Comparison of reactor antineutrino flux and spectrum measurements to model predictions have revealed an apparent deficit in the reactor antineutrino interaction rate and an unexpected spectral deviation. PROSPECT, the Precision Reactor Oscillation and Spectrum experiment, is designed to make a precision measurement of the antineutrino spectrum from a research reactor and search for signs of sterile neutrinos. PROSPECT will be located near the High Flux Isotope Reactor (HFIR) at the Oak Ridge National Laboratory. The Highly Enriched Uranium fuel used by HFIR will allow a measurement of the pure U-235 antineutrino spectrum providing constraints on reactor models and improving our understanding of the reactor antineutrino spectrum predictions. Additionally, the planned 2-ton ${}^6\text{Li}$ -doped liquid scintillator detector is ideally suited to perform a search for sterile neutrinos on the eV-scale. This talk will focus on the sensitivity and discovery potential of PROSPECT and describe the current R&D efforts and the detector design needed to achieve these goals.

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