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PROSPECT upgrade and science goals

The first phase of the Precision Reactor Oscillation and Spectrum (PROSPECT) experiment provided high-impact limits on sterile neutrino oscillations at the eV^2 scale and a high-resolution measurement of the antineutrino spectrum due purely to ^{235}U fission daughters. These goals remain well motivated by persistent discrepancies between measurement and prediction of both reactor flux and spectral shape. Leveraging this success, the PROSPECT collaboration is planning an upgraded detector that enables an expanded scientific program. An initial deployment at the High Flux Isotope Reactor will substantially enhance sensitivity to oscillation parameter space required for interpretation of long-baseline neutrino oscillation experiments and, through greatly improved statistical precision in the spectrum, provide complementary data constraining uncertainties in nuclear data for neutron rich fission daughters. A second, systematically-correlated deployment at a low-enriched-uranium reactor, would significantly improve the scientific reach of both measurements. We discuss this extended PROSPECT physics program.

Mini-abstract

PROSPECT-II, extending scientific reach through upgraded performance and multisite operation.

Experiment/Collaboration

PROSPECT

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