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Latest Results from the PROSPECT Reactor Antineutrino Experiment Including Limits on Sub-GeV Boosted Dark Matter

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PROSPECT is a reactor antineutrino experiment designed to search for short-baseline sterile neutrino oscillations and to perform a precise measurement of the U-235 reactor antineutrino spectrum. The PROSPECT detector collected data at the High Flux Isotope Reactor (HFIR) at the Oak Ridge National Laboratory, with the ~4-ton volume covering a baseline range of 7 m to 9 m. To operate in this environment with tight space constraints, limited overburden, and the possibility of reactor-correlated backgrounds, the PROSPECT antineutrino detector incorporates design features that provide excellent background rejection. These include detector segmentation and the use of Li-6 doped liquid scintillator with high light yield, world-leading energy resolution, and good pulse-shape discrimination properties. This talk will describe the operations of PROSPECT at HFIR and report on the latest results from the experiment. Additionally, a flux of upscattered, sub-GeV dark matter would induce a characteristic diurnal sidereal modulation in PROSPECT. A dedicated search for this modulation is used to set new experimental constraints on sub-GeV dark matter exhibiting large interaction cross sections.

In-person participation

No

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