

Final ^{235}U Antineutrino Spectrum, Flux and Directionality Analyses by PROSPECT-I

Friday, 21 June 2024 17:30 (2 hours)

The PROSPECT experiment, known as the Precision Reactor Oscillation and SPECTrum, aims to examine the spectrum of antineutrinos emitted by the High Flux Isotope Reactor (HFIR) and investigate potential oscillations over short distances. The most recent publication by PROSPECT showcases an improved analysis, enhancing previous findings by incorporating a method called Single Ended Event Reconstruction (SEER) to utilize previously unused segments, as well as employing careful data splitting (DS) of different time periods to maximize the available data.

The utilization of SEER and DS has resulted in a significant increase in data quantity and a higher signal to background ratio, enabling PROSPECT to achieve one of the most accurate measurements of the antineutrino spectrum emitted from a purely ^{235}U -fueled reactor.

By comparing these measurements with the Huber-Mueller conversion model, a localized excess is observed within the energy range of 5 MeV to 7 MeV. These findings are consistent with observations made by other reactor experiments. The magnitude of the excess observed by PROSPECT, relative to that reported in commercial reactor experiments, provides new insights into the origin of the discrepancy between data and model.

In this poster we will delve into PROSPECT's updated dataset and discuss the unfolding technique used to map the reconstructed energy spectrum to the antineutrino energy. PROSPECT's antineutrino spectrum will be discussed and its implications to known discrepancies with current conversion models. Furthermore, we will highlight the most recent results of PROSPECT's reactor antineutrino flux and directionality studies.

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Poster prize

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