

Abstract Submitted
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Beta spectral measurements for improved reactor antineutrino spectra DAVID ASNER, JOHN ORRELL, KIM BURNS, BRICE GREENFIELD, MAREK KOS, MALACHI SCHRAM, BRENT VANDEVENDER, LYNN WOOD, DAVID WOOTAN, Pacific Northwest Natl Lab — Analysis of reactor-produced antineutrino oscillation data requires knowledge of the underlying flux of antineutrinos emanating from the reactor. Results from these experiments are in tension with models that have mixing only among the three active neutrino flavors of the Standard Model. Knowledge of reactor antineutrino flux is based on inversion of total reactor beta spectra measured at the Institut Laue Langevin in the 1980s. Recent reanalysis of that data has resulted in a significant 3% upward shift in the antineutrino flux with implications for the possible existence of sterile neutrinos. The potential to provide a secondary beta spectral measurement is presented with attention given to (1) activation of actinide foils using a neutron source with a energy spectrum that is tailored to ILL, reactor core, and “pure fast” neutron spectra and (2) absolute normalization of the beta emission rate per fission through ancillary measurements of gamma-ray emissions from the activated foils and post-irradiation destructive radiochemical assay. These efforts are focused on checking the systematic uncertainties associated with the underlying beta spectra that are used to infer the reactor antineutrino spectra for operational nuclear power reactors.

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