

Spectral needs for precision (geo)neutrino science

Tuesday 8 April 2025 16:00 (45 minutes)

With the advent of large-scale neutrino detectors near reactor sources, the precision on the antineutrino spectrum shape has undergone significant evolution. Even so, current experimental campaigns using coherent neutrino scattering near reactors depend on an accurate knowledge of the energy spectrum - including below the inverse beta decay threshold. Due to the absence of direct measurements of aggregate neutrino spectra, model errors are an important limiting factor to the discovery potential of new physics using coherent scattering. We will show how model uncertainties, including nuclear shape factor uncertainties due to nuclear structure, give rise to uncertainties at the level of current generation sensitivities [1]. We will additionally show the nuclear structure dependence on theoretical predictions for geoneutrino spectra using dedicated shell model calculations and propose isotopes of interest for spectral measurements.

[1]: L. Hayen, J Phys G 10.1088/1361-6471/ad8ee2

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Session Classification: Experiments/Methods/Nuclear Data