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Improved modeling of reactor antineutrino spectra

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Over the last decades, Inverse Beta Decay (IBD) antineutrino experiments conducted at short and long baselines from nuclear reactors have revealed significant discrepancies on both the rate and shape of the measured spectra compared to state-of-the-art predictions. No evidence for an experimental bias has been detected, and the sterile neutrino interpretation of the reactor antineutrino anomaly has been mostly excluded by recent very short baseline reactor experiments. The validity of the predictions is then questioned as the source of the observed discrepancies. This last lead has motivated a revision of reactor antineutrino spectrum modeling as a new generation of reactor experiments investigating Coherent Elastic Neutrino-Nucleus Scattering (CEνNS) will continue to rely on predictions.

In this context, a revisited prediction of reactor antineutrino spectra using the summation method has been developed, including a thorough propagation of the uncertainties associated to both the modeling and the nuclear data. In this talk, I will detail the many improvements this new prediction brings over the previous modelings. I will show a comparison of this new modeling to other state-of-the-art predictions as well as some IBD datasets collected by recent short and long baseline reactor experiments. Finally, the low energy portion of the reactor antineutrino spectrum will be discussed in regards to the current experimental effort aiming at observing CEνNS at reactors.

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