

Calculation of Antineutrino Spectra Generated by Nuclear Reactors Using Nuclear Databases

We calculate the Inverse Beta Decay antineutrino spectrum generated by nuclear reactors using the summation method to understand deviations from the smooth Huber-Mueller model due to the decay of individual fission products, showing that plotting the ratio of two adjacent spectra points can effectively reveal these deviations. We obtained that for binning energies of 0.1 MeV or lower, spectra changes due to the jagged nature of the individual antineutrino spectra could be observed for highly precise experiments. Surprisingly, our calculations also reveal a peak-like feature in the adjacent points ratio plot at 4.5 MeV even with a 0.25 MeV binning interval, which we find is present in the spectrum published by Daya Bay in 2016. We show that this feature is caused by the contributions of just four fission products.

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no

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