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**Fine Structure in the Antineutrino Spectrum Generated by a Nuclear Reactor**[1] ALEJANDRO SONZOGNI, National Nuclear Data Center, Brookhaven National Laboratory, MICHAEL NINO, Department of Physics and Astronomy, Hofstra University, ELIZABETH MCCUTCHAN, National Nuclear Data Center, Brookhaven National Laboratory — The antineutrino spectrum generated by a nuclear reactor is the sum of the spectra from about 800 fission products. For energies higher than the Inverse Beta Decay cross section threshold, about 100 fission products contribute about 90% of the spectrum. Therefore, we would expect deviations from the smooth Huber-Mueller shape due to (a) the contribution of a strongly populated fission product, (b) sharp cutoffs in the individual antineutrino spectra, and (c) the contribution from a small number of fission products with similar end-point energy, effectively resembling the first case. A novel way of numerically revealing these deviations was developed, which consists of plotting the ratio of adjacent points in the antineutrino spectrum. We find that with a binning interval of 0.1 MeV or less, the observation of sharp cutoffs from the individual spectra could be attained. Remarkably, even with a binning of 0.25 MeV, we detect a peak-like feature in the ratio plot, which we attribute to the decay of 4 nuclides. We also explore the possibility of revealing contributions from individual fission products in the electron spectra measured at the Institut Laue-Langevin following the neutron induced fission of $^{235}$U and $^{239,241}$Pu.

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