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## Nuclear Structure Decay Studies for Reactor Antineutrino Physics

There have been two intriguing and unresolved puzzles surrounding recent measurements of reactor antineutrino spectrum in comparison with various calculated spectra, namely a deficient in the total number of measured antineutrinos and an excess of antineutrinos for energies from 5-7 MeV. While these observations could point to new physics, the beta-decay properties of fission fragments used as inputs to calculate the spectrum need to be fully understood before any solid conclusion could be reached. Particularly, with currently available data, the contribution of the decay of a few out of more than 800 total fission fragments is expected to be much more significant than the others to the energy region where the excess of antineutrinos is presented. These key isotopes include Rb-92, Cs-142, La-142 and Cs-141, which could be isotopically purified by the CARIBU facility at Argonne National Laboratory. Using the modern state-of-art gamma-ray spectrometers such as Gammasphere, we were able to study the decay properties of these purified isotopes in great detail, and to expand their decay schemes extensively. The results of these new measurements will be presented and their impact on reactor antineutrino calculations will be discussed.

**Primary authors:** ZHU, Shaofei (Brookhaven National Laboratory); MCCUTCHAN, Elizabeth (Brookhaven National Laboratory); SONZOGNI, Alejandro

**Presenter:** ZHU, Shaofei (Brookhaven National Laboratory)

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