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Study of the Spent Fuel Contribution to the Reactor Antineutino Spectra Measured in the Daya Bay θ_{13} Experiment HO LING LI, KARSTEN HEEGER, University of Wisconsin-Madison — The Daya Bay reactor neutrino experiment is a multi-national project to study neutrino oscillation by using the antineutrinos released by Daya Bay Nuclear Power Plant and Lingao Nuclear Power Plant in China. The aim of the experiment is to make a precise measurement of the neutrino mixing angle θ_{13} with a sensitivity of 0.01 in $\sin^2(2\theta_{13})$ by measuring the flux and spectrum of electron antineutrinos. We study the variations of the nuclear fuel composition in the reactor and the resulting changes in the antineutrino flux contributed by each fissile isotope throughout the fuel burning process. Experimental data are used to determine parameterizations of the reactor antineutrino energy spectra. By using information on the varying fuel composition and the antineutrino cross-sections, we calculate the antineutrino spectra measured in the eight detectors in the Daya Bay experiment and compare them to the neutrino oscillation effect due to various values of θ_{13} . The uncertainty on the measurement of $\sin^2(2\theta_{13})$ due to spent reactor fuel is estimated.

> Ho Ling Li University of Wisconsin-Madison

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