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Measurement of the evolution of the reactor antineutrino flux and spectrum at Daya Bay.

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The Daya Bay experiment has utilized eight functionally identical underground detectors to sample reactor antineutrino fluxes from three pairs of nuclear reactors in South China, accruing the largest reactor antineutrino sample to date. This talk will summarize Daya Bay's most recent result, which presents observations of correlations between reactor core fuel evolution and changes in the detected reactor antineutrino flux and energy spectrum. Four antineutrino detectors in two experimental halls were used to identify 2.2 million inverse beta decays (IBDs) over 1230 days spanning multiple fuel cycles for each of Daya Bay's six 2.9 GW reactor cores. A 10σ variation in IBD yield was found to be energy-dependent, rejecting the hypothesis of a constant antineutrino energy spectrum at 5.1 standard deviations. While measurements of the linear variation with respect to the fuel content in the IBD spectrum show general agreement with predictions from recent reactor models, the measured linear variation with respect to the fuel content in the total IBD yield disagrees with recent predictions at 3.1σ. This discrepancy indicates that an overall deficit in measured flux with respect to predictions does not result from equal fractional deficits from the primary fission isotopes 235U, 239Pu, 238U, and 241Pu. A 7.8% discrepancy between the observed and predicted 235U yield suggests that this isotope may be the primary contributor to the reactor antineutrino anomaly

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