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The measurement of absolute reactor neutrino flux and spectrum, and their evolution at Daya Bay

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The Daya Bay Reactor Neutrino Experiment consists of eight functionally identical detectors placed underground at different baselines from six 2.9 $\mathrm{GW_{th}}$ reactor cores. Since Dec. 2011, the experiment has collected more than 2.2 million inverse beta decay (IBD) candidates to date, enabling a precision measurement of the absolute reactor antineutrino flux and spectrum, and their fuel-dependent evolution. The comparison between measured spectrum and predictions from Huber-Mueller model revealed a 2.9 σ deviation for the whole energy region and mostly pronounced in the region around 4-6 MeV. The measurement of the evolution of the reactor antineutrino flux and spectrum showed a 2.8 σ discrepancy in the antineutrino flux variation with respect to the reactor fuel composition. The discrepancy suggests an overestimation of the predicted contribution from the ^{235}U fission isotope and indicates that this isotope could be primary contributor to the reactor antineutrino anomaly.

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