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Design and Simulation of the Daya Bay Antineutrino Detectors
WEI WANG, University of Wisconsin-Madison, THE DAYA BAY NEUTRINO EXPERIMENT COLLABORATION — The Daya Bay reactor neutrino experiment is designed to measure $\sin^2 2\theta_{13}$ to < 0.01 by measuring the flux of reactor antineutrinos in detectors at near and far distances from the nuclear power plant. The experiment will use eight identical liquid scintillator detectors with 20-ton target mass installed at two near sites and one far site. A key concept of the experiment is the relative measurement of the reactor antineutrino flux between identical detectors. With known techniques the uncorrelated relative uncertainty of the antineutrino detectors can be controlled to within $\sim$0.38%. Ongoing R&D may further reduce the uncorrelated uncertainty down to $\sim$0.18%. In this talk we will describe the detector simulations that are used to optimize the design of the 3-zone liquid scintillator antineutrino detectors and to evaluate their systematic uncertainties. Methods for the control of the Daya Bay detector systematics are described.

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