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The energy response model of the Daya Bay electron antineutrino detectors

Since the first observation of a non-zero $sin^2 2\theta_{13}$ with a 5.2σ significance in 2012, the Daya Bay experiment lead the precision measurement of the $sin^2 2\theta_{13}$ and presented the best $|\Delta m^2_{ee}|$ of the world. A precise measurement of the absolute neutrino flux and spectrum was also performed. Both analyses require a precise modeling of the detector energy response, which is the relationship between the reconstructed energy and the energy deposit by electron and gamma. The relationship is complex in the Daya Bay scintillator detectors. The scintillator response is non-linear primarily due to quenching of charged particles, light absorption and reemission optical photons. Additional energy non-linearity arises from the interaction of the scintillation light time profile and the charge collection of the readout electronics. This poster presents the details of the energy response modeling.

Authorship annotation

for the Daya Bay collaboration

Session and Location

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Poster included in proceedings:

no

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