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Strategy for Precise Calibration in JUNO

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A 20 kton liquid scintillator (LS) detector was designed in the Jiangmen Underground Neutrino Observatory (JUNO) for multiple physics purposes. In order to determine the neutrino mass ordering, JUNO needs an excellent energy resolution of $3\%/\sqrt{E(\text{MeV})}$ and an accuracy of the energy scale at 1% level or better. On one hand, a comprehensive calibration system is designed, deploying multiple radioactive sources in various locations inside/outside of the central detector (CD), including Auto Calibration Unit (ACU), Cable Loop System (CLS), Guide Tube Calibration System (GTCS), and Remotely Operated Vehicle (ROV). On the other hand, the strategy of the JUNO calibration system has been developed and optimized based on Monte Carlo simulation results. Following this calibration strategy, we expect to achieve an accurate and comprehensive understanding of the energy resolution, energy non-linearity and non-uniformity responses of the JUNO detector. In this talk, the details of the JUNO calibration system design and calibration strategy will be presented.

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