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Development of the calibration sources for the JUNO experiment

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The Jiangmen Underground Neutrino Observatory (JUNO), located in southern China, is the world's largest underground liquid scintillator-based neutrino experiment. It aims to study neutrinos from various sources, including reactors, the atmosphere, the Sun, the Earth, and supernovae. The central detector comprises a 20-kton liquid scintillator volume, equipped with over 17,000 20-inch and more than 25,000 3-inch photomultiplier tubes. To achieve JUNO's unprecedented target energy resolution of 3% at 1 MeV —critical for determining the neutrino mass ordering —as well as to support a wide range of physics goals spanning energies from several tens of keV to beyond 10 GeV, a variety of calibration sources have been developed. These include low-energy radioactive sources such as ^{226}Ra and ^{241}Am, a repeatedly regenerated ^{18}F source by irradiating fluoride with fast neutrons, as well as an optical calibration system with tunable intensity over four orders of magnitude. These sources are planned to be deployed at multiple positions within the detector using the calibration source deployment systems. In this presentation, I will discuss the design and development of these customized calibration sources for the JUNO experiment.

Collaboration you are representing

JUNO

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