

The Central Detector of JUNO

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Jiangmen Underground Neutrino Observatory (JUNO) is an experiment under construction in Southern China. It aims to determine the neutrino mass hierarchy, to measure precisely the oscillation parameters by detecting reactor neutrinos from nuclear power plants, to observe supernova neutrinos, to study the atmospheric, solar neutrinos and geo-neutrinos, and to perform exotic searches.

As the core detector of JUNO, the central detector (CD) is designed to measure reactor antineutrinos via inverse beta decay. The CD system consists of an inner transparent sphere of 35.4 m in diameter and an outer support structure of 40.1 m in diameter. The inner sphere is made of acrylic which contains the 20 kilotons of liquid scintillator (LS). The outer support structure is made of stainless steel which can hold 18,000 20" PMTs and 25,000 3" PMTs to detect the photons from LS. And the goal for its energy resolution is $3\%/\sqrt{E}$ which will reach the highest level in the world.

Several challenges have been overcome for the largest liquid scintillator detector in the world, such as the compatibility of the sphere material, the mechanics of the stainless steel structure and the CD prototype.

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