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Towards a comprehensive neutrino program: the design and progress of JUNO YUEKUN HENG, Institute of High Energy Physics, JUNO COLLABORATION — The Jiangmen Underground Neutrino Observatory (JUNO) in China is a multipurpose neutrino experiment designed to determine neutrino mass hierarchy and 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. Besides the rich physics, the design and research progresses of JUNO will be covered including the central detector, high detection-efficiency PMTs, transparent liquid scintillator (LS), calibration, muon veto system, etc. The central detector has 20 kt of LS as the target mass. The LS is contained by an acrylic sphere with the diameter of 35.4 m, which is supported by the stainless steel latticed shell, holding 18,000 20" PMTs and 25,000 3" PMTs to detect the photons from LS. The central detector is surrounded by pure water to shield the external background radiation, and to serve as medium for the muon Cherenkov veto. A muon tracker detector is additionally placed on the top of the central detector. The JUNO international collaboration was formed in 2015 and is currently composed from over 70 institutions and about 550 collaborators. JUNO plans to begin to take data in 2020.

Yuekun Heng
Institute of High Energy Physics

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