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JUNO: A Next Generation Reactor Antineutrino Experiment

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After the discovery of the large neutrino mixing angle θ_{13} , the next generation neutrino experiments focus on the measurement of the neutrino mass hierarchy and the leptonic CP violating phase. JUNO, a next generation reactor antineutrino experiment, was proposed to determine the neutrino mass hierarchy independent of the CP phase. We studied the sensitivity and found the mass hierarchy can be determined with a 3σ significance after 6 years of running using a 20 ktons detector with an energy resolution of $3\%/\sqrt{E}$ eV at a 45-60 km baseline. This is a multi-purpose experiment, which can also measure the neutrino mixing parameters $\sin^2\theta_{12}$, Δm_{21}^2 and Δm_{32}^2 with a precision better than 1%. In addition, supernova neutrinos, geo-neutrinos, sterile neutrinos as well as solar and atmospheric neutrinos can be studied with this experiment. JUNO was approved in 2013 and the R&D progress will be reported.

Summary

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