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JUNO's Physics with Reactor Antineutrinos

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The Jiangmen Underground Neutrino Observatory (JUNO) is a 20 kton liquid scintillator detector with a 650 m overburden that is currently under construction in the southern China. The experiment has two main goals: determining the neutrino mass ordering and precisely measuring the oscillation parameters Δm^2_{31}, Δm^2_{21}, and $\sin^2\theta_{12}$. JUNO will have an energy resolution of 3% at 1 MeV, an optimized baseline of 52.5 km, and will use electron antineutrinos emitted by eight nuclear reactors. Given these features, JUNO can determine the neutrino mass ordering with a sensitivity of 3σ with an exposure of about 6.5 years × 26.6 $\mathrm{GW_{th}}$, which corresponds to about 7 years of data-taking. Additionally, it can measure the oscillation parameters with a precision better than 1% during the first two years of data taking. This talk will cover the physics results that JUNO can achieve using reactor antineutrinos.

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