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Physics Potential of the Jiangmen Underground Neutrino Observatory

The Jiangmen Underground Neutrino Observatory (JUNO) is designed as a 20 kt liquid scintillator detector with unprecedented energy resolution (3%/sqrt{E}) and sited in an underground lab with 700 meters rock overburden. Primary goals are to determine the neutrino mass hierarchy and measure three oscillation parameters (theta_{12}, Delta m^2_{21}, Delta m^2_{31}) to better than 1%.

We review the physics potential of JUNO for 1) the neutrino mass hierarchy, 2) precision measurements, 3) supernova neutrinos, 4 solar neutrinos, 5) geo-neutrinos, and other applications. Capabilities for the measurement of fundamental oscillation parameters and observation of the neutrino events from the astrophysical and geophysical environment are reviewed with suitable statistical assessments. Finally, the requirements on the detector design parameters for different physics goals will be presented.

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