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JUNO experiment: physics goals and current status

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Jiangmen Underground Neutrino Observatory (JUNO) is a liquid scintillator based neutrino experiment, being built in the Guangdong province in southern China. Its construction is expected to be completed in 2022. The experimental hall is located underground, below a 700 meter rock over-burden, to reduce backgrounds from cosmic rays.

The JUNO primary scientific goal consists in the determination of the neutrino mass ordering (NMO). This can be inferred by measuring the oscillation pattern of electron anti-neutrinos emitted by two nuclear power plants, located at 53 km from the experimental site. In order to reach this ambitious goal, JUNO will benefit of a large 20 kton scintillator detection mass, and will target an unprecedented 3% energy resolution at 1 MeV scale. Sensitivity studies show that a 3σ - 4σ statistical significance on NMO can be reached in six years of data-taking.

Thanks to its unique features, JUNO will also have rich astroparticle physics goals: the solar neutrino precision spectroscopy, the sub-percent determination of flavor oscillation parameters $\sin^2 \theta_{12}$, Δm_{12}^2 and Δm_{13}^2 , the measurements of atmospheric neutrinos, geo-neutrinos, supernovae neutrinos and exotic searches.

In this talk, the JUNO physics goals, the detector design and the status of the experiment will be presented.

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