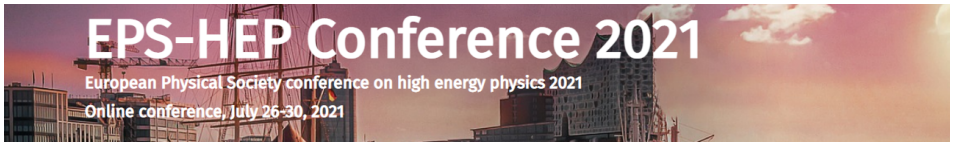

Contribution ID: **636** Type: **Parallel session talk**

Neutrino oscillation physics in JUNO

Monday, 26 July 2021 14:55 (20 minutes)

Jiangmen Underground Neutrino Observatory, or JUNO, is a future multipurpose neutrino experiment currently being built in China. The data taking with a 20 kt detector, filled with liquid scintillator, will start soon. The main physics goals include estimation of the neutrino mass ordering (NMO) with significance of 3 standard deviations and measurement of neutrino oscillation parameters Δm^2_{32}, Δm^2_{21}, $\sin^2\theta_{12}$ with sub-percent precision. Both these measurements will be done based on the observation of electron antineutrino spectrum from multiple nuclear reactors at an average distance of 53 km.

The talk covers the oscillation physics of the JUNO experiment, which is not limited to the reactor neutrino programme, owing to unprecedented energy resolution and large scale of the detector. The measurement of the solar neutrinos from ^{8}B will enable JUNO to estimate Δm^2_{21} with precision of 20\%, comparable to the current solar experiments. The atmospheric neutrino programme will provide a measurement of the mixing angle $\sin^2\theta_{23}$ and a complementary measurement of NMO. JUNO will be complemented with a satellite detector TAO located at a distance of 30 m from one of the nuclear power plants and will provide a reference measurement of reactor antineutrino spectrum with energy resolution of 2\% at 1 MeV. High energy resolution combined with a short baseline will enable TAO to provide leading constraints on sterile neutrino oscillations in a range of 10^{-2} eV$^2 \leq \Delta m^2_{41} \leq 8$ eV^2.

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Collaboration / Activity

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Session Classification: T04: Neutrino Physics

Track Classification: Neutrino Physics