



PPD Seminar

The Jiangmen Underground Neutrino Observatory (JUNO): Status and First Physics Results

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The Jiangmen Underground Neutrino Observatory (JUNO) is a 20-kton liquid-scintillator detector in southern China designed as a multi-purpose neutrino observatory with an anticipated 30-year scientific program. Located 52.5 km from the Yangjiang and Taishan reactor complexes, its primary objective is to determine the neutrino mass ordering while delivering precision measurements of neutrino oscillation parameters. Construction of the central detector was completed in December 2024, followed by liquid-scintillator filling and commissioning in 2025, and physics data taking began on 26 August 2025. Using its first data set, JUNO has reported world-leading measurements of the solar oscillation parameters $\sin^2\theta_{12}$ and Δm^2_{21} , demonstrating high-precision reactor antineutrino spectroscopy and establishing the experimental foundation for future mass-ordering sensitivity. Beyond reactor oscillation studies, JUNO's physics program includes solar, atmospheric, geo- and supernova neutrinos, as well as searches for rare processes. In this seminar, I will present the detector status, the first oscillation results and their implications, and outline the prospects for other physics programmes.

