Contribution ID: 260

Type: Plenary

## The new underground neutrino observatory opens a new page in multidisciplinary neutrino research

Saturday 5 July 2025 09:00 (30 minutes)

The completion of the Jiangmen Underground Neutrino Observatory (JUNO) construction is good news for the entire society of neutrino physics. Data taking is started in February 2025 during the water-filling phase, the operation with full liquid scintillator is expected in the second half of 2025.

The JUNO detector has a spherical ultra-low background 20 kt liquid scintillator target shielded from external background by 700 m underground location and cylindrical 30 kt ultra-pure water pool playing a role of active muon veto.

JUNO's primary goal is to determine the neutrino mass ordering with an expected significance of 3–4 sigma in about six years and to measure 3 neutrino oscillation parameters to sub-percent precision. The phenomenon will be observed by resolving of the fine structure in the energy spectrum of oscillating reactor electron antineutrinos. The spectrum is measured with the energy resolution of 3% at 1 MeV. The antineutrino flux is emitted from 8 nuclear reactors at a baseline of about 52.5 km.

To tune the reconstruction of antineutrino spectrum in JUNO, the satellite small JUNO-TAO reactor antineutrinos spectrometer will provide the reference spectrum with extremely precise resolution of 2% at 1MeV (1.5% statistical uncertainty).

JUNO assumes a rich program of scientific research with neutrinos from different natural sources, such as the atmosphere, Earth, Sun and supernova explosion.

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Session Classification: 0. Plenary

Track Classification: Section 5. Physics of neutrino and nuclear astrophysics.