Laboratoire LEPRINCE-RINGUET
Ecole polytechnique IN2P3/CNRS

Séminaire

High Precision Neutrino Oscillations Physics with JUNO

The JUNO experiment is one of the most ambitious neutrino experiments ever envisaged so far. Its liquid scintillator based neutrino detector aims to yield high precision calorimetry with the largest detector (20 kiloton) of its kind. The high precision calorimetry condition is critical to disentangle the so-called “solar” and the “atmospheric” oscillations seen for the first time in the same detector. If the energy resolution was controlled well enough (≤3% at 1MeV), the signature of Mass Ordering (or Hierarchy) could also be observed using reactor neutrinos over a baseline of ~50 km. JUNO measurement is complementary to all other measurements using longer baselines to maximise the so-called matter effects. Beyond, Mass Ordering, JUNO is expected to provide the most precise measurements in the world for about half of the parameters characterising the neutrino oscillation phenomenon. Hence, JUNO is expected to open and have an overwhelming role in the era of sub-percent precision in the leptonic mixing sector of the Standard Model. In this seminar, I shall review the novel concept of Dual Calorimetry detector design, proposed by our team, where JUNO employs two types of photo-detectors readout: 18,000x 20” and 25,000x 3” PMTs. This enables JUNO to have two simultaneous energy scales for maximal control of systematics and wider physics range. Thanks to its large volume, JUNO can do physics beyond reactor neutrinos — to be highlighted too.

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