Contribution ID: **39** Type: **Talk**

Calibration strategy for the JUNO experiment

Friday, 5 August 2022 15:14 (18 minutes)

Jiangmen Underground Neutrino Observatory (JUNO) is a 20 kton liquid scintillator based neutrino experiment, being built in the Guangdong province in Southern China. Its construction is expected to be completed in 2023. The experimental hall is located underground, below a 700 meter rock over-burden, to reduce backgrounds from cosmic rays. JUNO will act as a multipurpose observatory for neutrinos produced by artificial and natural sources. Its primary goal consists in the determination of the neutrino mass ordering (NMO), which 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. Moreover, it will be able to the determine $\sin^2\theta_{12}$, Δm^2_{12}, Δm^2_{13} with unprecedented precision, to perform precision solar neutrino spectroscopy, to measure atmospheric neutrino and geo-neutrinos fluxes, to detect supernova neutrinos, etc.
The detector calibration is a crucial and challenging tile for the success of the JUNO rich physics programme. The calibration strategy is based on the periodical deployment of radioactive sources within the liquid scintillator. The hardware design consists of several independent and low-background subsystems able to deploy the sources in multiple positions, to optimize the energy resolution and to provide a detailed assessment of the detector energy response.
By exploiting this comprehensive calibration program, along with a dual calorimetry technique based on two independent photosensor system, the JUNO central detector will be able to achieve a better than 1% energy linearity and a 3% effective energy resolution, which are crucial requirements for the NMO determination.
This talk is dedicated to the explanation of JUNO calibration strategy and requirements, along with the system hardware design and to the simulation results.

Attendance type

In-person presentation

Primary author: Dr BASILICO, Davide (University of Milan / INFN)

Presenter: Dr BASILICO, Davide (University of Milan / INFN)

Session Classification: WG6: Detectors

Track Classification: WG6: Detectors