



Contribution ID: 285

Type: **Parallel talk**

## Neutrino oscillation physics at JUNO

*Monday, August 28, 2023 5:45 PM (15 minutes)*

The Jiangmen Underground Neutrino Observatory (JUNO) is a multi-purpose neutrino observatory under construction in China. It will host a 20 kt liquid scintillator detector underground with an overburden of 700 m to study the neutrinos from different neutrino sources. With an unprecedented energy resolution of 3% at 1 MeV, JUNO is designed mainly to detect the anti-neutrinos from the nuclear power plants located  $\approx 53$  km from the detector. One of the main physics goals of the experiment is to determine the neutrino mass ordering (MO) and to precisely measure the neutrino oscillation parameters  $\Delta m_{21}^2$ ,  $\sin^2 \theta_{12}$ , and  $\Delta m_{31}^2$  using the reactor anti-neutrino flux. It is estimated that using six years of data, JUNO will determine the neutrino MO with a significance of  $3\sigma$  and also determine the parameter  $\Delta m_{31}^2$  with a precision of  $\approx 0.2\%$ . Meanwhile, the parameters  $\Delta m_{21}^2$  and  $\sin^2 \theta_{12}$  will be determined with a precision of  $\approx 0.3\%$  and  $\approx 0.5\%$  respectively. The results from JUNO are expected to improve upon the existing knowledge of precision on these three parameters by almost one order of magnitude. Additionally, JUNO can also measure neutrino oscillations using solar and atmospheric neutrinos. This talk will mainly report on the physics of neutrino oscillations with the reactor neutrinos at JUNO, and discuss the analysis strategy used in estimating these parameter sensitivities.

### Submitted on behalf of a Collaboration?

Yes

**Primary author:** Dr KARAPARAMBIL RAJAN, Rebin (IPHC, Université de Strasbourg, CNRS/IN2P3, F-67037 Strasbourg, France)

**Presenter:** Dr KARAPARAMBIL RAJAN, Rebin (IPHC, Université de Strasbourg, CNRS/IN2P3, F-67037 Strasbourg, France)

**Session Classification:** Neutrino physics and astrophysics

**Track Classification:** Neutrino physics and astrophysics