

A comprehensive optical characterization of JUNO liquid scintillator

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In the field of neutrino physics, with its 20 000 ton of organic liquid scintillator, JUNO (Jiangmen Underground Neutrino Observatory) will be the largest detector built of its kind. The JUNO detection medium will be a mixture of linear alkyl benzene (LAB), 2.5 g/L of PPO and 3 mg/L of bis-MSB. The main goal of JUNO is to determine the neutrino mass ordering in six years of data taking at 3σ level. This thanks to its high energy resolution given by the knowledge of the detection medium and an excellent optical coverage $\sim 78\%$.

For this reason during these years of detector construction, there was a big effort from the collaboration to obtain the best characterisation of the JUNO liquid scintillator possible.

In this poster we want to summarise the whole measurements that will be used in the official JUNO Monte Carlo representing our best knowledge on the liquid scintillator. This is crucial for all the analysis task and in particular for the Monte Carlo based analysis for solar neutrinos.

In particular we present our measurements on the refractive index, which impacts on the light propagation and the Cherenkov light emission, crucial in the energy resolution model. We will also show our results on fluorescence time profiles which will help JUNO to identify the incident particle and to reconstruct the position of an event. The absorption length measurements, which are crucial since the huge dimension of the detector (40 meter of diameter) for the energy and position reconstruction. In the end we will show the emission spectrum measurements which strongly impact on the energy resolution.

Poster prize

Yes

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Collaboration (if any)

JUNO collaboration

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