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Improved measurements of timing and optical properties of the JUNO liquid scintillator with SHELDON

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JUNO (Jiangmen Underground Neutrino Observatory) is a 20 kton scintillation detector aimed to study fundamental properties of neutrinos such as neutrino mass ordering and oscillation parameters. The experiment is currently under construction in Kaiping, China and is expected to be commissioned next year. To reach its goals, JUNO will strongly rely on the accurate description of the scintillator. This includes the emission spectrum of the scintillator, the contribution of Cherenkov light and the characteristic times and weights of the fluorescence components.

SHELDON (Separation of cHERenkov Light for Directionality Of Neutrinos) is a small-scale setup developed to determine the contribution of Cherenkov light in the scintillator cocktail used in JUNO, as well as to measure its fluorescence parameters more accurately than ever before.

I will report on the accurate measurement of the characteristic times and weights included in the description of the fluorescence process, emphasizing the impact of Cherenkov light separation and of a thorough characterization of the setup on the accuracy of the results. Moreover, I will present the next steps that will enable the evaluation of the Cherenkov contribution as well as the separation of Cherenkov light and its possible use to determine the direction of neutrinos interacting in JUNO.

In-person participation

Yes

Primary authors: FERRARO, Federico (Istituto Nazionale di Fisica Nucleare); Mr BERETTA, Marco

Presenter: FERRARO, Federico (Istituto Nazionale di Fisica Nucleare)

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