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R&D program for neutrinoless double beta decay search at JUNO

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The search for neutrinoless double beta decay (0vbb) is one of the most important topics in neutrino physics. Multiple next generation ton-scale experiments are planned worldwide with sensitivities to effective Majorana neutrino mass covering the entire inverted mass ordering phase space. A multi-isotope campaign around the world is also necessary for an unambiguous discovery for this rare process. Jiangmen Underground Neutrino Observatory (JUNO) is a multipurpose neutrino observatory featuring 20 kton liquid scintillator (LS) as the target medium with the main purpose of determining the neutrino mass ordering with reactor neutrinos. The detector construction was completed at the end of 2024. It is currently being filled with liquid scintillator, and the process is expected to conclude by this summer. Thanks to its large target mass, low background and good energy resolution, JUNO has great potential to be upgraded to search for 0vbb by loading isotope to the LS. JUNO collaborators are carrying out R&D on loading 0vbb isotope to LS, developing purification methods and advanced analysis techniques for suppressing backgrounds. In this talk, we shall cover the R&D status for these aspects and the 0vbb search prospective with the JUNO upgrade.

Collaboration you are representing

JUNO

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