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Physics potential of detecting B8 solar neutrinos at JUNO

The Jiangmen Underground Neutrino Observatory (JUNO) stands at the pinnacle of next-generation neutrino research, harnessing the most extensive liquid scintillator developed. Boasting a photo-cathode coverage of 77.9% and an exceptional 30.1% photo-detection efficiency via MCP-PMTs, JUNO is distinctively positioned with unmatched energy resolution.

While B^{8} solar neutrinos have been explored by the SuperKamioka, SNO, and Borexino experiments, their lowest threshold remains at 3 MeV, constrained by detector size or light yield. However, JUNO, with its grand scale and high light yield, promises to push this detection threshold to 2 MeV, thereby probing the intriguing transition region of the MSW effect into the vacuum scenario.

This presentation offers a comprehensive evaluation of JUNO's potential in detecting B^{8} solar neutrinos through the neutrino-electron elastic scattering (ES) process, as well as the charged-current (CC) and neutral-current (NC) channels on nucleus. With ten years of data, JUNO aims to improve the B^{8} neutrino flux, \Delta m_{21}^{2} and sin^{2}\theta_{12} measurements. Furthermore, JUNO's capability to measure \Delta m_{21}^{2} using B^{8} neutrinos and reactor antineutrinos lays

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