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JUNO's Quest: The Hunt for Solar Axions

We shall discuss the 5.49 MeV solar axions flux produced in the $p(d, {}^3\text{He})a$ reaction and analyze the potential to detect it with the forthcoming large underground neutrino oscillation experiment Jiangmen Underground Neutrino Observatory (JUNO). In doing so, we will consider axions through various processes such as Compton and inverse Primakoff conversion, as well as through their decay into two photons or electron-positron pairs inside the detector. In this talk, a detailed discussion to constrain the axion-electron (g_{ae}), axion-photon ($g_{a\gamma}$), and isovector axion-nucleon (g_{3aN}) couplings, using the expected JUNO data for different benchmark values of axion mass will be presented. For comparison, we shall also show bounds arising from other laboratory-based experiments.

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