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Probing feebly interacting particles from solar nuclear reactions with JUNO

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Solar nuclear reactions can occasionally produce feebly interacting particles (FIPs) X that escape the solar interior without further interactions. In this talk, we focus on the second stage of the solar proton-proton chain and evaluate the fluxes of monochromatic 5.49 MeV FIPs produced by the $p(d,He^3)X$ reaction, analyzing the potential to detect them with the forthcoming large underground neutrino oscillation experiment Jiangmen Underground Neutrino Observatory (JUNO). In particular, we forecast the JUNO sensitivity on different combinations of the axion couplings and on hidden vectors, identifying the regions of the parameter space where current terrestrial bounds will be improved.

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