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What can the upcoming large neutrino detectors tell us about flavor transitions of galactic supernova neutrinos?

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We present a method to verify Mikheyev-Smirnov-Wolfenstein effect during the propagation of SN neutrinos from the SN core to the Earth. The non-MSW scenarios to be distinguished from the MSW one are the incoherent flavor transition probability for neutrino propagation in the vacuum and the flavor equalization induced by fast flavor conversions. Our approach involves studying time evolution of neutrino event rates in liquid Argon, liquid scintillation and water Cherenkov detectors. Using currently available simulations for SN neutrino emissions, the time evolution of electron-neutrino capture by Argon and electron anti-neutrino inverse beta-decay event rates and the corresponding cumulative event fractions are calculated up to $t=100$ ms in DUNE, JUNO and Hyper-Kamiokande detectors, respectively. It is shown that the area under the cumulative time distribution curve from $t=0$ to $t=100$ ms in each detector and their ratio can be used to discriminate different flavor transition scenarios of SN neutrinos.

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