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Visible Decay of Astrophysical Neutrinos at IceCube

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Neutrino decay modifies neutrino propagation in a unique way; not only is there flavor changing as there is in neutrino oscillations, there is also energy transport from initial to final neutrinos. The most sensitive direct probe of neutrino decay is currently IceCube which can measure the energy and flavor of neutrinos traveling over extragalactic distances. For the first time, we calculate the flavor transition probability for the cases of visible and invisible neutrino decay, including the effects of the expansion of the Universe, and consider the implications for IceCube. As an example, we demonstrate how neutrino decay addresses a tension in the IceCube data.

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