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Pseudo-Dirac Neutrinos and Flavor Ratios at Icecube

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The phenomena of neutrino oscillations indicate that neutrinos have nonzero masses. Since then it has prompted immense interest to find out the source of production of neutrino-mass. Neutrino mass can be either Dirac or Majorana in nature. One intermediate way is to consider tiny Majorana masses as compared to the Dirac mass terms. In this particular scenario, neutrinos are called Pseudo-Dirac, basically, neutrinos are effectively Dirac fermions with very small Majorana masses.

these tiny masses induce active-sterile neutrino oscillations with almost maximal mixing along with the traditional flavor oscillations. In other words, this possibility can extend the Standard Model (SM) to include three additional sterile

neutrinos with the active ones. Since this effect is supposed to be of very small order, it can be observable through high-energy astrophysical neutrinos traveling long distances. We discuss here the different conditions that can be visible in flavor ratios due to oscillations induced by active-sterile oscillations for pseudo-Dirac neutrinos. We also provide the constraints on mass-squared differences driving these oscillations using IceCube data.

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