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Neutrino spin flavor oscillations in intergalactic medium

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The ultra-high energy cosmic neutrinos, which usually perambulate gargantuan scales in the extragalactic universe, are expected to play a crucial role in determining the origin of cosmic rays as well as probing new physics extending even up to the Planck scale. This epitomizes the selling point of several currently running or planned neutrino telescopes. If neutrinos have magnetic moment owing to new physics contributions, the phenomenon of spin flavor oscillations may get induced. Using the current limit on neutrino magnetic moment, we show that the flux of cosmic neutrinos will get reduced by half if they traverse a few Mpc through the intergalactic magnetic field in the range of microG to nanoG. Finally, we show that the reduction of cosmic neutrino flux is not possible if the current upper limit of magnetic moment is improved by a few orders of magnitude even if the neutrinos travel through the entire length of the visible universe.

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