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Implications of photon-ALP oscillations in extragalactic neutrino source TXS 0506+056

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Photon-ALP oscillation results in the survival of gamma-rays from distant sources above TeV energies. Studies of CAST, Fermi-LAT, and IACT observed events that constrain the ALP parameters. We investigate the effect of photon-ALP oscillations on the gamma-ray spectra of the first extragalactic neutrino source, TXS 0506+056, for the observations of Fermi-LAT and MAGIC around the IC170922-A alert. Importantly, we studied the implications of photon-ALP oscillation on the counterpart γ -rays of the sub-PeV neutrinos observed from TXS 0506+056. We also show the diffuse γ -ray flux and their observability from the classes, FSRQs, HSP, and LISP, assuming similar gamma-ray emissions as TXS 0506+056.

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