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Distortion of neutrino oscillations by dark photon dark matter

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A weakly coupled and light dark photon coupling to lepton charges $L_\mu - L_\tau$ is an intriguing dark matter candidate that could modify the dynamics of neutrino flavor conversions. By analyzing data from the T2K, SNO, and Super-Kamiokande experiments, limits are obtained on the dark photon gauge coupling for masses below $\sim 10^{-11}$ eV. Degeneracies between shifts in the neutrino mass-squared differences and mixing angles and the new physics effect significantly relax the current constraints on the neutrino vacuum oscillation parameters.

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