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# Signatures of quasi-Dirac neutrinos in the high-energy astrophysical neutrino flux

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Although the sources of astrophysical neutrinos are still unknown, they are believed to be produced by a diffuse population of sources in the distant universe. Measurements of the astrophysical flux can thus be sensitive to energy-dependent propagation effects, such as the very long baseline oscillations that would occur if neutrinos are quasi-Dirac. Assuming simple models of the source flux, we find that these oscillations can still be resolved even when integrated over wide distributions in source redshift. We use two sets of IceCube all-sky flux measurements, made with muon and all-flavor neutrino samples, to set constraints on quasi-Dirac mass-splittings between $10^{-19}$ and $10^{-18}\text{eV}^2$. To contextualize the significance of our results, we also compute the expected sensitivity of IceCube's astrophysical flux measurements from multiple realizations. Our results are not significantly impacted by alternative spectral hypotheses or redshift distributions.

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