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Multimessenger-Informed Characterization of High-Energy Neutrino Emission from Bright Seyfert Galaxies

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Observation of high-energy neutrinos from the direction of the nearby active galaxy, NGC 1068, was a major step in identifying the origin of high-energy neutrinos. This observation revealed that high-energy neutrinos originated at the heart of active galaxies, which are opaque to very-high-energy gamma-ray emission. This realization is further reinforced by the multimessenger picture for the observed all-sky neutrino flux in IceCube as well as the recently identified excess of neutrinos in the direction of NGC 4151, another nearby AGN. Modeling neutrino emission from the core of AGN relies on the multi-wavelength observations of the inner parts of the active galaxy and is challenging due to the uncertainties associated with the absorption of emission in these dense environments. Here, we employ the measured neutrino spectra together with the sub-GeV gamma-ray emission measured by the Fermi satellite to break the degeneracy and narrow down the parameter space of neutrino emission from the coronae of AGN. Our result will help estimate the prospects for identifying additional sources and guide future targeted analyses.

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