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Diagnose the Sources of IceCube Neutrinos with Fermi Observation

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The origin of IceCube detected diffuse neutrinos is still unknown. Searching for their sources also helps to solve the problem of the cosmic ray origin. We assume that there is connection between the neutrino and gamma-ray fluxes from the sources. It holds if both the neutrinos and gamma-rays are hadronic origin. Moreover, it should also hold in statistic sense even if the gamma-rays are leptonic origin because the ratio of the energy carried by electrons and cosmic rays may be roughly constant. By the neutrino-gamma connection, we use Fermi observations of various candidate sources to constrain the diffuse neutrino origin. We find that the Galactic diffuse neutrino emission contributes less than 10% of the IceCube flux, and point sources cannot account for the IceCube neutrinos either; as for extragalactic candidate sources, neither gamma-ray bursts nor active galactic nuclei jets contribute more than 10%, whereas starburst galaxies may be a promise source for IceCube neutrinos.

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