

Connecting IceCube neutrinos to Galactic TeV photons

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A signal of high-energy extraterrestrial neutrinos from unknown source(s) was recently discovered by the IceCube experiment. Neutrinos are always produced together with γ -rays, but the γ -ray flux from extragalactic sources is suppressed due to attenuation in the intergalactic medium. We report a γ -ray excess at high Galactic latitudes starting at energies 300 GeV in the data of the Fermi telescope. We show that the multi-TeV γ -ray diffuse emission has spectral characteristics at both low and high Galactic latitudes compatible with those of the IceCube high neutrino signal in the same sky regions. This suggests that these γ -rays are the counterpart of the IceCube neutrino signal, implying that a sizable part of the IceCube neutrino flux originates from the Milky Way. We argue that the diffuse neutrino and γ -ray signal at high Galactic latitudes originates either from previously unknown nearby cosmic ray “PeVatron” source(s), an extended Galactic CR halo or from decays of heavy dark matter particles.

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