

Multi-Messenger Tests of the IceCube Excess

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The IceCube Collaboration has recently reported evidence for an extraterrestrial neutrino flux. The flux is consistent with an isotropic diffuse emission which favors an extragalactic origin. However, it is not yet possible to rule out a quasi-diffuse or sub-dominant emission from multiple high-latitude or extended Galactic sources. I discuss the implications of gamma-ray observations for various Galactic or extragalactic candidate sources of the IceCube excess. The contribution of Galactic sources can be tested via primary TeV-PeV gamma-rays from the decay of neutral pions produced in the same cosmic ray interactions. Hadronuclear interactions of cosmic rays in extragalactic sources can be tested by secondary GeV-TeV diffuse gamma-rays observed by Fermi.

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