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Searching for High-Energy Neutrinos from Ultra-Luminous Infrared Galaxies with IceCube

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This work presents an IceCube search for high-energy neutrinos from Ultra-Luminous Infrared Galaxies (ULIRGs). ULIRGs are the most luminous infrared objects on the sky, with infrared luminosities exceeding 10^{12} solar luminosities. They are mainly powered by starbursts that exhibit star-formation rates larger than 100 solar masses per year. In addition, an active galactic nucleus (AGN) can also contribute significantly to the ULIRG luminosity output. The acceleration of hadrons, and consequently the production of neutrinos, can occur both in starburst and AGN environments. As such, ULIRGs form a source population that could be responsible for a significant fraction of the diffuse neutrino flux observed by IceCube. In this study we perform a stacking analysis on a representative sample of 75 ULIRGs with redshift $z \leq 0.13$ using 7.5 years of IceCube data. We find no evidence for astrophysical neutrinos correlated with our selection of ULIRGs. We therefore compute upper limits on the contribution of the ULIRG source population to the diffuse neutrino observations, and also use these limits to constrain model predictions.

Reference to paper (DOI or arXiv)

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