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Neutrinos and Tidal Disruption Events

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The Zwicky Transient Facility (ZTF) performs a systematic neutrino follow-up program, searching for optical counterparts to high-energy neutrinos with dedicated Target-of-Opportunity (ToO) observations. Since first light in March 2018, ZTF has taken prompt observations for 24 high-quality neutrino alerts from the IceCube Neutrino Observatory. From two of these campaigns, we were able to identify likely electromagnetic counterparts to the neutrinos. The first, tidal disruption event (TDE) AT2019dsg, was found during observations of neutrino IC191001A. The second, likely TDE AT2019fdr, was found during follow-up of IC200530A. The probability of finding two such objects by chance is 0.034%, favouring an astrophysical association and suggesting that TDEs therefore contribute a subdominant fraction of the astrophysical neutrino flux.

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