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Neutrinos from Tidal Disruption Events

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Tidal Disruption Events (TDEs) are energetic optical transients that occur when stars are tidally disrupted upon approaching the tidal radius of a supermassive black hole. Three TDEs and candidates (AT2019dsg, AT2019fdr, and AT2019aalc) have been found to coincide in time and position with three IceCube astrophysical neutrino events. In this talk, I will review the multi-messenger (neutrino and multiwavelength) observations and the theoretical models, including relativistic jets, hidden winds, dust tori, and accretion disks of these neutrino-emitting TDEs. In addition to the aforementioned three TDEs, I will cover the recently identified candidates with potential neutrino counterparts, including two dust-obscured candidates and AT2021lwx, which exhibit significant similarities with AT2019dsg/fdr/aalc. The multi-messenger implications, such as constraints derived from the non-detection of accompanying electromagnetic cascades and the potential of TDEs as the origin of ultra-high-energy cosmic rays, will also be covered.

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