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# Neutrino and electromagnetic cascade models for tidal disruption events

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Recent observations have revealed that Tidal Disruption Events (TDEs), caused by the gravitational disruption of a massive star close to a supermassive black hole (SMBH), can produce intense flares of radiation with the duration of months to years. Notably, three TDE candidates (AT2019dsg, AT2019fdr, and AT2019aalc) are likely associated with IceCube astrophysical neutrinos. In this talk, I will review the observations and modeling of neutrino emission from these three TDEs based on the work by Winter & Lunardini (2023). I will also present new results on the EM cascade emissions by numerically solving the coupled time-dependent transport equations and discuss the implications for the radiation zones of AT2019dsg and AT2019fdr using the upper limits of gamma-ray flux from *Fermi*. We find that a multi-messenger diagnosis, incorporating the EM cascades, can provide valuable insights into the physical conditions of the particle acceleration and radiation zones, such as their magnetic fields and sizes.

**Primary author:** Dr YUAN, Chengchao (Deutsches Elektronen-Synchrotron DESY)

**Co-authors:** Dr WINTER, Walter (Deutsches Elektronen-Synchrotron DESY); Prof. LUNARDINI, Cecilia (Department of Physics, Arizona State University)

**Presenter:** Dr YUAN, Chengchao (Deutsches Elektronen-Synchrotron DESY)

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