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Search for gamma-ray emission from a sample of tidal disruption events

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Tidal disruption events (TDEs) are transient events that occur when a star approaches the vicinity of a super-massive black hole (SMBH) and the tidal forces of the latter rip the star apart. About half of the star's material is swallowed, while the other half is accreted around the black hole, generating a luminous outburst ranging from radio to X-ray wavelengths. In addition, three candidate TDEs have been associated with high-energy neutrino events observed by the IceCube Observatory. However, no gamma-ray emission originating from a TDE has been reported so far. Several models suggest gammaray emission from TDEs through magnetic dissipation in the vicinity of the hot corona (core model), in magnetized non-relativistic winds (wind model) or through interactions between the wind and the debris of the tidally disrupted star. The jetted models predict not only gamma-ray emission but are also favored as models potentially explaining the observed neutrinos. Furthermore, even years delayed gamma-ray emission is predicted through interactions between the wind and the interstellar medium or between the wind and the torus (in the latter scenario, the host galaxy is an active galactic nucleus, AGN). Understanding the lack of gamma-rays is essential to improving our TDE models and explaining the proposed neutrino production. In this framework, we search for gamma-ray emission from a sample of spectroscopically confirmed TDEs using Fermi data. I use Fermipy to create test statistic (TS) maps in order to look for gamma-ray excess at the optical position of each TDE. Thanks to the extended time windows used during the data analysis, even years delayed gamma-ray flares can be caught. In the case of a non-detection, an upper limit on the energy flux is calculated. When a gamma-ray excess is found near a TDE, the localization method of Fermipy is used to reveal the origin of the excess. In my talk, I plan to explain the results and how upper limits can constrain the TDE models and possibly reveal the absorption of gamma rays.

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