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Un-Beamed Tidal Disruption Events at Hard X-Rays

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Thanks to their thermal emission, Tidal Disruption Events (TDEs) were detected regularly in the soft X-rays and sometimes in the optical. Only few of them have been detected at hard X-rays: two are high redshift beamed events, one occurred at the core of a nearby galaxy and the last one is of a different nature, involving a compact object in the Milky Way.

The aims of presented work are to obtain a first sample of hard X-ray selected un-beamed TDEs, to determine their frequency and to probe if TDEs are usually or exceptionally emitting at hard X-rays.

We performed extensive search for hard X-ray flares at the positions of over 53000 galaxies up to a distance of 100 Mpc in the Swift BAT archive. Light curves were extracted and parametrized. The quiescent hard X-ray emission was used to exclude persistently active galactic nuclei. Significant flares from non-active galaxies were derived and checked for possible contamination.

We found a sample of nine TDE candidates, which translates in a rate of 2×10^{-5} galaxy⁻¹ yr⁻¹ above the BAT detection limit. This rate is consistent with these observed by XMM-Newton at soft X-rays and in the optical from SDSS observations, and expected from simulations. We conclude that hard X-ray emission should be ubiquitous in un-beamed TDEs and that electrons should be accelerated in their accretion flow.

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