

Investigation of Tidal Disruption Events through gravitational waves

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Stars tidally disrupted (TDEs, Rees 1988) by massive black holes (BHs) represent an unprecedented powerful tool to unveil the presence of otherwise quiescent compact objects in the cores of galaxies.

More recently, the scientific community has become aware also of the potential of these events as gravitational wave (GW) sources (Kobayashi et al. 2004, Stone et al. 2013, Toscani et al. 2019, 2020, 2022, Pfister et al. 2022). In particular, they generate a monochromatic burst during the disruption of the star, with typical frequencies from milli-Hertz to deci-Hertz, where LISA and future deci-Hertz observatories will work. With the detection of this burst, together with the electromagnetic counterpart produced along the circularisation of the debris, we will obtain more precise information about the dynamical properties of the BH-star system and also more accurate estimates of the BH mass, which can help us in the identification of BHs in the intermediate-mass range regime.

In this talk, I will illustrate the main features of the gravitational signal produced by TDEs and we will investigate the effects of gravitational lensing on these systems.

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