

## Stream crossing near the pericenter in tidal disruption events

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In tidal disruption events the stellar disrupted by massive black hole results in an elongated stream of gas that partly falls back to pericenter. If the black hole rotates around an axis misaligned with the initial stellar orbit, the first stream crossing may occur at periapse if the returning stream fail to collide itself near apocenter due to Lense-Thirring effect. In our work we study the stream crossing near pericenter by performing local hydrodynamical simulations using Athena++ code. From simulations, when the streams collide a strong radiation-pressure dominated shock forms and converts the stream's kinetic energy into thermal energy. We note that the amount of energy dissipation (converting to thermal energy) measured from simulation is equal to analytical results. At the same time, the strong downstream gas pressure accelerates the gas and causes it to expand. We show the increase of width of downstream gas with distance to BH, which likely leads to collisions in subsequent orbits and accelerating formation of an accretion disc.

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