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3D instabilities during the Type I bursts

When a neutron star accretes from a low mass companion, the fluid that accumulates on the surface of the compact object can burn unstably. The result of the thermonuclear runaway is the Type I bursts: X-ray flashes that last for tens to hundreds of seconds. The lightcurves of the bursts encode information about the mass and radius of the neutron star. These can be used to put constraints on the equation of state of the core, also in combination with other observations like gravitational waves.

In order to understand the emission pattern that leads to the burst lightcurves, it is fundamental to understand how the thermonuclear flame propagates across the star after ignition.

In this work, I will present the first 3D numerical simulations of the hydrodynamical instabilities that develop along the flame front and discuss their implications for the burst lightcurves.

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