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Out with a bang: Simulating the impact of thermonuclear explosions on accretion disks and jets

Matter accreting onto the surface of a neutron star can ignite in a thermonuclear explosion visible as a ~1-min long bright flash of X-ray emission. Such thermonuclear X-ray bursts radiate a total energy of ~E39 erg and can recur on a timescale of hours. Every time an explosion goes off, a strong radiation field suddenly floods the direct environment of the neutron star and observations have revealed a detectable response in both the accretion flow (disk, corona) and jet. This opens up the exciting opportunity to use thermonuclear explosions as repeating, dynamical probes to study the physics of accretion inflows and outflows. Recent observational discoveries align well with steady advances in numerical modeling, which now make it possible to simulate the impact of an X-ray explosion to the accretion disk, corona and jet. This talk will show initial results of GRMHD simulations and provide an outlook for future research, including how we can connect simulations to observations.

Contribution

Oral talk

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