

Mass and angular momentum transfer in BeXBs

The current uncertainties on the predicted merger rates of double compact objects highlight the pressing need for an accurate description of the mass and angular momentum transfer mechanism in Be X-ray binaries. The strong orbital modulation induced by the eccentric orbit provide us with an invaluable testbed in order to confront accretion models to observations. While the correlation between the orbital and pular spin periods indicates an efficient angular momentum transfer, the exact amount of material accreted and the geometry of the accretion flow highly depend on the orbital parameters and on the properties of the decretion disk surrounding the Be star.

In this talk, I want to highlight how we can constrain mass transfer in Be X-ray binaries with numerical simulations covering a variety of configurations. Thanks to adaptive mesh refinement and neatly tailored 3D grids, we can follow the flow over several orders of magnitude and put to the test different accretion models. We find that type I outbursts reflect the amount of material captured from the decretion disk and the amount of time required to funnel it to the magnetic poles of the accreting pulsar. The complex interplay between the replenishment of the decretion disk, truncated at its outer edge by the tidal interactions, and its periodic tapping by the neutron star leads to a multiplicity of accretion regimes. In some configurations, non-periodic episodes of enhanced accretion are observed, suggestive of type II outbursts.