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Mutual interaction of binary black hole and misaligned circumbinary disk

Thursday 24 September 2020 16:15 (20 minutes)

The talk will cover the recent numerical investigation of a system composed of a Supermassive Black Hole Binary (SMBHB) and a non-self-gravitating, thin, locally isothermal, viscous disk.

The evolution of such a configuration is relevant not only for the expected gravitational-wave signal, but also for electromagnetic searches for SMBHB candidates. In 2-dimensional, Newtonian, numerical simulations, we analyze the influence of the two model parameters: q — the *mass ratio* of the binary and ι — the *inclination angle* between the binary and the disk. We found that configurations with relatively low mass ratio, composed of central mass and satellite mass, always settle down in a *quasi steady state*. On the other hand, configurations characterized by equal or comparable masses may manifest an inability to reach quasi steady state for inclinations $\iota \in (20^\circ, 55^\circ)$. This problem does not exist for moderately inclined or highly inclined configurations, i.e., inclinations $\iota \leq 20^\circ$ or $\iota \geq 55^\circ$. We try to understand the nature of these phenomena by investigating the binary and viscous torque densities which determine the disk's final density distribution and, in particular, the size of the *central gap*.

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