

Forming off-centered massive black hole binaries with core stalling

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Mergers of massive black hole binaries are one of the main sources of gravitational waves that should be detected by LISA and pulsar timing arrays in the future. Dynamical friction is the major mechanism allowing black holes to form a bound binary in galaxies. While it was thought until recently that massive black holes systematically fall into the center of galaxies to merge, some simulations indicate a stalling phenomenon in the presence of a cored density profile and observations show the existence of off-centered massive black hole binaries. We study the consequences of this stalling process for black hole mergers in dwarf galaxies using numerical simulations. We track down the conditions that allow the formation of an off-centered bound binary from the orbital evolution of two black holes in an external potential starting from different initial conditions. We discuss the implications of such black hole evolution for the formation of high redshift galaxies and future detections of gravitational waves.