Black hole fueling and coalescence in galaxy mergers

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Abstract

We study the gas accretion and orbital decay of super-massive black hole (SMBH) pairs in the nuclear region of galaxy merger remnants, where a large amount of gas is expected to accumulate. For that purpose, we perform numerical simulations with both smooth particle hydro-dynamics (SPH) (Gadget) and adaptive mesh refinement (AMR) (Ramses) techniques. We study the places of the highest SMBH gas accretion, finding that peaks of mass accretion rates are near pericenter passages. We also study the conditions for fast migration and coalescence of SMBHs in galactic nuclei, finding that, in the typical conditions of relatively wet mergers, the SMBHs will experience a fast shrinking, down to the scales where their final coalescence will be driven by the emission of gravitational waves, unless other processes strongly affect the distribution of the gas near the SMBH binary, such as active galactic nuclei (AGN) feedback.

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