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Radiation hydrodynamical simulations of super-Eddington mass-transfer in close BH binaries

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Radiation-driven outflows play a crucial role in extracting mass and angular momentum from binary systems undergoing rapid mass transfer at super-Eddington rates. We study this process by conducting threedimensional radiation hydrodynamical simulations of mass-transferring BH binary systems. Our simulations show that super-Eddignton mass transfer leads to a significant mass loss from the binary system due to radiation-driven outflows. The mass and angular momentum loss rates are high enough to make the mass transfer unstable, indicating a new pathway for driving the common envelope evolution. Thus, our simulation results provide an important implication for the formation of close binary BHs that merge within the Hubble time.

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