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Simulations of Binary Black Hole Mergers in Gaseous Disks

BRIAN FARRIS, YUK TUNG LIU, STUART SHAPIRO, University of Illinois Urbana-Champaign — Binary black hole mergers in the presence of gaseous accretion flows are prime candidates for simultaneous observations of both gravitational waves and electromagnetic signals. We study such systems using our fully general relativistic hydrodynamics code, focusing on potentially observable electromagnetic signatures. We outline recent developments in our study, which explores the final stages of binary black hole mergers inside an adiabatic (except for shocks), disk-like accretion flow. We discuss the dynamical response of the disk to the inspiral and merger of the black holes, treating the optically thin electromagnetic radiation as a perturbation. We identify characteristic, observable changes in the electromagnetic luminosity during the merger.

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