Abstract Submitted
for the APR12 Meeting of
The American Physical Society

Magnetized Accretion onto Inspiraling Binary Black Holes: II. Disk Dynamics SCOTT NOBLE, BRUNO MUNDIM, HIROYUKI NAKANO, Rochester Institute of Technology, JULIAN KROLIK, Johns Hopkins University, MANUELA CAMPANELLI, YOSEF ZLOCHOWER, Rochester Institute of Technology, NICOLAS YUNES, Montana State University — The coincident observation of electromagnetic and gravitational wave signals from supermassive black hole (BH) mergers would provide a bounty to physics: e.g., a new redshift-distance measurement, improved source localization, and tighter constraints on source parameters (e.g., BH masses, BH spins, disk characteristics). Previous simulation work has focused on the two extremes: very close to merger where numerical relativity is required, or at large binary separations where Newtonian gravity theory is accurate. Our work here investigates an intermediate regime, where the post-Newtonian (PN) approximation is valid yet close enough so that separation shrinkage timescale is comparable to matter inflow timescales. With our PN gravity model, we evolve a magnetized disk using a modern general relativistic magnetohydrodynamics code. We will show that many aspects of the disk follow the binary inward as its separation diminishes up until when the binary shrinkage timescale becomes smaller than the inflow timescale at the inner edge of the disk. We will also present predictions for the bolometric luminosity using our radiative cooling function as a proxy for emissivity.

Scott Noble
Rochester Institute of Technology

Date submitted: 09 Jan 2012 Electronic form version 1.4