

Abstract Submitted
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Time-domain 2+1D Lorenz gauge self force and orbital evolution for EMRIs: progress report KRISTEN A. LACKEOS, University of Alabama in Huntsville, LEOR BARACK, University of Southampton, GAURAV KHANNA, University of Massachusetts Dartmouth, LIOR M. BURKO, University of Alabama in Huntsville — We report on progress made in the calculation of the self force taking the approach of time-domain evolutions in 2+1D in the Lorenz gauge. We encounter several kinds of numerical instabilities: (a) dynamical instability near the black hole's event horizon that comes about because of the inadequacy of Boyer–Lindquist coordinates, and (b) uncontrolled growth of Lorenz gauge violating modes. We address type (a) instabilities with a transformation to a different coordinate system that cures the dynamical problem, and type (b) instability by the introduction of Lorenz gauge damping terms in the evolution equations. We also use previous results for the self force to drive the orbital evolution, and compare with the counterpart evolution obtained by monitoring fluxes and updating the orbit based on global conservation laws.

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