1059-83-165 **Geoffrey Lovelace*** (geoffrey@astro.cornell.edu), 613 Space Sciences Bldg., Cornell University, Ithaca, NY 14853, **Stephen Lau** (lau@unm.edu), Mathematics and Statistics, University of New Mexico, Albuquerque, NM 87131, and **Harald Pfeiffer** (pfeiffer@cita.utoronto.ca), Canadian Inst. for Theoretical Astrophysics, University of Toronto, Toronto, Ontario M5S 3H8, Canada. *Implicit-explicit time-stepping in numerical simulations of black holes.* Preliminary report.

Numerical simulations of black holes generally divide the spacetime into a set of three-dimensional spatial slices. The initial slice must satisfy the Einstein constraint equation; subsequent slices are obtained by numerically solving the Einstein evolution equations. The evolutions typically use explicit time-stepping methods with the time step size subject to the Courant limit, which is often orders of magnitude smaller than the relevant physical timescales. If larger time steps could be taken stably, the computational cost of black-hole simulations could be significantly reduced. In this talk, I will discuss the application of implicit-explicit time-stepping—which can be stable for time steps significantly larger than the Courant limit—to simulations of perturbed black holes. (Received February 22, 2010)