

Abstract Submitted
for the APR07 Meeting of
The American Physical Society

A mixed pseudospectral/finite difference code for evolving spacetimes with hydrodynamic matter MATTHEW DUEZ, LAWRENCE KIDDER, SAUL TEUKOLSKY, Cornell University — We present a code for solving the coupled Einstein-hydrodynamics equations to evolve relativistic, self-gravitating fluids. The Einstein field equations are solved in generalized harmonic coordinates on one grid using pseudospectral methods, while the fluids are evolved on another grid using shock-capturing finite difference techniques. The grids communicate by interpolation, and filtering is used to improve the behavior near stellar surfaces. We show that the code accurately evolves equilibrium stars, both nonrotating and rapidly rotating, nonmoving and boosted. Other tests are presented, and applications to compact binaries are discussed.

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Date submitted: 09 Jan 2007

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