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Towards Simulations of Accreting Black Holes including Magnetic Fields MIGUEL MEGEVAND, MATTHEW ANDERSON, LUIS LEHNER, Department of Physics and Astronomy, Louisiana State University, Baton Rouge, LA 70803, STEVEN LIEBLING, Department of Physics, Long Island University - C.W. Post Campus, Brookville, NY 11548, DAVID NEILSEN, Department of Physics and Astronomy, Brigham Young University, Provo, UT 84602 — The study of accretion disks around compact objects is an active field in astrophysics, especially in association with relativistic jet formation. Black holes surrounded by highly magnetized accreting disks are believed to be the main source of relativistic jets. Having in mind the ultimate study of jet formation, we study relativistic magnetohydrodynamic (MHD) simulations of accretion disks around a non-spinning black hole. We use adaptive mesh refinement (AMR) within the HAD parallel infrastructure. The simulations use Cartesian coordinates in three dimensions. For solving the fluid equations we use a CENO numerical scheme with a finite difference discretization. The use of finite differences (as opposed to finite volumes) simplifies the interface with the space-time evolution in the case of dynamic backgrounds. We present tests with toroidal stationary accretion disks without magnetic field and then discuss cases with magnetic field.

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