Comparing resistive MHD simulations and experiments of Coaxial Helicity Injection (CHI) in NSTX[1] E.B. HOOPER, LLNL, C.R. SOVINEC, U. Wisconsin, R. RAMAN, U. Washington, J.E. MENARD, PPPL — NSTX generates CHI plasmas with current, density, and temperature appropriate for ST startup.[2] Whole-device simulations of CHI using the NIMROD MHD code[3] extend the HIT-II model.[4] A model power supply generates time-dependent voltage and current at the injection gap. Absorber gap voltage maintains a constant vacuum toroidal flux. Simulation physics includes ohmic heating and thermal conductivity along and across the magnetic field and generation of nonaxisymmetric fields and flows. A flux bubble expands in the simulation with current and plasma temperature similar to experiment; an n=1 mode is observed to generate an helical ribbon of current and velocity vortices on the flux bubble surface. Time-dependent poloidal-field boundary conditions for interesting NSTX discharges are used for quantitative comparisons with experiments.

[2]R. Raman, et al., PRL **104**, 095003 (2010).
[3]C.R. Sovinec, et al., J. Comp. Phys **195**, 355 (2004).
[4]A. Bayliss, et al., submitted for publication.

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