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Particle Simulations in Relaxed Taylor States[1] D.R. DANDURAND, Swarthmore College, V.S. LUKIN, Naval Research Laboratory, M.R. BROWN, T. GRAY, X. ZHANG, Swarthmore College — Results from particle orbit simulations in force-free (Taylor state) magnetic fields in a cylindrical boundary are presented. An expansion in eigenfunctions of the curl ($\nabla \times \mathbf{B} = \lambda \mathbf{B}$) is used to represent a relaxed Taylor state in a conducting cylinder of dimensions $L = 1\ m$ and $R = 0.08\ m$. A particle-pushing code (PPC) is used to simulate collision-free ion and electron orbits in this geometry. Particle confinement results from the simulation are compared with data from experiments done at the SSX facility in a cylinder with the same dimensions. In addition, a simulation-based calibration of the SSX Mach probe is described. The effects of random electric field fluctuations and/or particle collisions on particle confinement will be presented if available.

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