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MHD simulation of Taylor state merging at SSX[1] MATIWOS MEBRATU, MICHAEL BROWN, ADAM LIGHT, Swarthmore College — We present results of a resistive MHD simulation of the evolution and merging of two Taylor state plasmas. The simulation models merging experiments at SSX, where we have characterized the magnetic structure, velocity (40 km/s), density (0.5×10^{16} cm^{-3}), proton temperature (20 eV), and magnetic field (0.4 T) of relaxed helical Taylor states (see K. Gelber, *et al*, this session). We simulated the merging of both co- and counter-helicity Talyor states. We are using the Dedalus framework, and run simulations on the Bridges Supercomputer. Dedalus solves differential equations using spectral methods, written with a Python wrapper in an open-source, MPI-parallelized environment (http://dedalus-project.org/). Simulations are run on a rectangular grid (NxMxP=28x24x180). Initially we have a 2x2x10 rectangular box with two spheromaks and dense plasma regions at each end and low density regions in the middle. Perturbation is added to the structure of the spheromaks to break axisymmetry. At the boundaries we have free slip and perfectly conducting walls. The code has been verified by solving the Hartmann problem (vertical magnetic field, uniform pressure gradient) on a rectangular grid of same size with no-slip and perfectly conducting boundary conditions.

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