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Coupled CFD/MHD Simulations of Plasma Compression by Resistive Liquid Metal[1] PARIA MAKAREMI-ESFARIANI, McGill University, PETER DE VIETIEN, General Fusion — In this work we present coupled CFD/MHD simulation results of General Fusion's prototype plasma compression system. The results are obtained from coupling two open-source solvers, both of which have been modified in-house. The first solver is an OpenFOAM hydrodynamic (compressible) solver that has been modified by adding forces from the poloidal and toroidal magnetic fields. The second solver is the Versatile Advection Code (VAC), an astrophysical magnetohydrodynamics (MHD) code that models the plasma during compression. VAC supplies OpenFOAM with the magnetic fields for the liner evolution, and OpenFOAM supplies VAC with the position of the liner during compression. We use this coupled code to simulate how various liner trajectories, different initial plasma states, and experimentally derived transport coefficients affect plasma and machine performance. In particular, we investigate how magnetic flux diffusing from the plasma to the liquid metal liner affects compression results.

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