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Simulation of MTF experiments at General Fusion MERITT REYNOLDS, AARON FROESE, SANDRA BARSKY, PETER DEVIETIEN, General Fusion Inc., GABOR TOTH, University of Michigan, DYLAN BRENNAN, PPPL, Princeton University, BICK HOOPER, Lawrence Livermore National Laboratory (retired) — General Fusion (GF) aims to develop a magnetized target fusion (MTF) power plant based on compression of magnetically-confined plasma by liquid metal. GF is testing this compression concept by collapsing solid aluminum liners onto spheromak or tokamak plasmas. To simulate the evolution of the compressing plasma in these experiments, we integrated a moving-mesh method into a finite-volume MHD code (VAC). The single-fluid model includes temperature-dependent resistivity and anisotropic heat transport. The trajectory of the liner is based on experiments and LS-DYNA simulations. During compression the geometry remains axially symmetric, but the MHD simulation is fully 3D to capture ideal and resistive plasma instabilities. We compare simulation to experiment through the primary diagnostic of Mirnov probes embedded in the inner coaxial surface against which the magnetic flux and plasma are compressed by the imploding liner. The MHD simulation reproduces the appearance of n=1 mode activity observed in experiments performed in negative D-shape geometry (MRT and PROSPECTOR machines). The same code predicts more favorable compression in spherical tokamak geometry, having positive D-shape (SPECTOR machine).

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