contributions.

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Magnetic Compression Experiment at General Fusion with Simulation Results[1] CARL DUNLEA, University of Saskatchewan / General Fusion, IVAN KHALZOV, General Fusion, AKIRA HIROSE, CHIJIN XIAO, University of Saskatchewan, GENERAL FUSION TEAM, General Fusion — The magnetic compression experiment at GF was a repetitive non-destructive test to study plasma physics applicable to Magnetic Target Fusion compression. A spheromak compact torus (CT) is formed with a co-axial gun into a containment region with an hourglass shaped inner flux conserver, and an insulating outer wall. External coil currents keep the CT off the outer wall (levitation) and then rapidly compress it inwards. The optimal external coil configuration greatly improved both the levitated CT lifetime and the rate of shots with good compressional flux conservation. As confirmed by spectrometer data, the improved levitation field profile reduced plasma impurity levels by suppressing the interaction between plasma and the insulating outer wall during the formation process. We developed an energy and toroidal flux conserving finite element axisymmetric MHD code to study CT formation and compression. The Braginskii MHD equations with anisotropic heat conduction were implemented. To simulate plasma / insulating wall interaction, we couple the vacuum field solution in the insulating region to the full MHD solution in the remainder of the domain. We see good agreement between simulation and experiment results.

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