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Magnetic Compression Experiment at General Fusion CARL DUNLEA, University of Saskatchewan and General Fusion, STEPHEN HOWARD, KELLY EPP, WADE ZAWALSKI, CHARLSON KIM, General Fusion, GENERAL FUSION TEAM — The magnetic compression experiment at General Fusion was designed as 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 hour-glass shaped inner flux conserver, and an insulating outer wall. The experiment has external coils to keep the CT off the outer wall (levitation) and then rapidly compress it inwards. Experiments used a variety of levitation/compression field profiles. The optimal configuration was seen to improve levitated CT lifetime by around 50% over that with the original design field. Suppression of impurity influx to the plasma is thought to be a significant factor in the improvement, as supported by spectrometer data. Improved levitation field may reduce the amount of edge plasma and current that intersects the insulating outer wall during the formation process. Higher formation current and stuffing field, and correspondingly higher CT flux, was possible with the improved configuration. Significant field and density compression factors were routinely observed. The level of MHD activity was reduced, and lifetime was increased further by matching the decay rate of the levitation field to that of the CT fields. Details of experimental results and comparisons to equilibrium models and MHD simulations will be presented.

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