General Fusion is developing Magnetized Target Fusion (MTF), using pneumatically driven liquid metal to compress a plasma. Prior to construction of a full scale pneumatic system, General Fusion is investigating the physics of compressing compact toroid plasmas using solid aluminium liners accelerated inward by a chemical driver to compress the plasma. Fourteen such tests have so far been conducted, and results from these experiments will be presented. The MHD code VAC (Versatile Advection Code) has been modified to work with moving boundary conditions in order to model these implosions, and simulation runs of these models will also be presented.

**INTRODUCTION**

General Fusion has created a long-lived plasma that we believe is good enough to compress.

**SHOT SELECTION AND COMPRESSION**

Spherical tokamak 500 eV from TS

In 2017 we are achieving 2500 μs lifetimes and temperatures of 500 eV

**MOVING TOWARDS SPHERICAL COMPRESSION**

Fixed radiation death
- Changed from Ti coating to Li coating. Lower Z. Less brittle coating
- Put a vacuum gap between the driver and the liner to achieve shockless acceleration of the liner

Poloidal Field Compression: Compression Test #12
Chart of increase in magnetic field during compression

Comparison of field in compressed and uncompressed plasmas
Uncompressed (blue) compared to compressed (red)

**RAMPING SHAFT CURRENT IMPROVES CONFINEMENT**

Magnetic Field During Compression
Top: No Shaft Current Ramp
Bottom: Shaft Current Ramp

**PLASMA COMPRESSION TESTING**

Poloidal Field Compression: Compression Test #12
Chart of increase in magnetic field during compression

Comparison of field in compressed and uncompressed plasmas
Uncompressed (blue) compared to compressed (red)

**CONCLUSIONS**

- We can make plasma with sufficient confinement before compression
- Radiation losses have been fixed and plasma stability is now maintained during compression
- There is some evidence of heating during compression in experiments so far
- Now aiming to get better heating and higher temperatures in future shots