

# PLASMA COMPRESSION EXPERIMENTS

## AT GENERAL FUSION

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EPR 2017

generalfusion

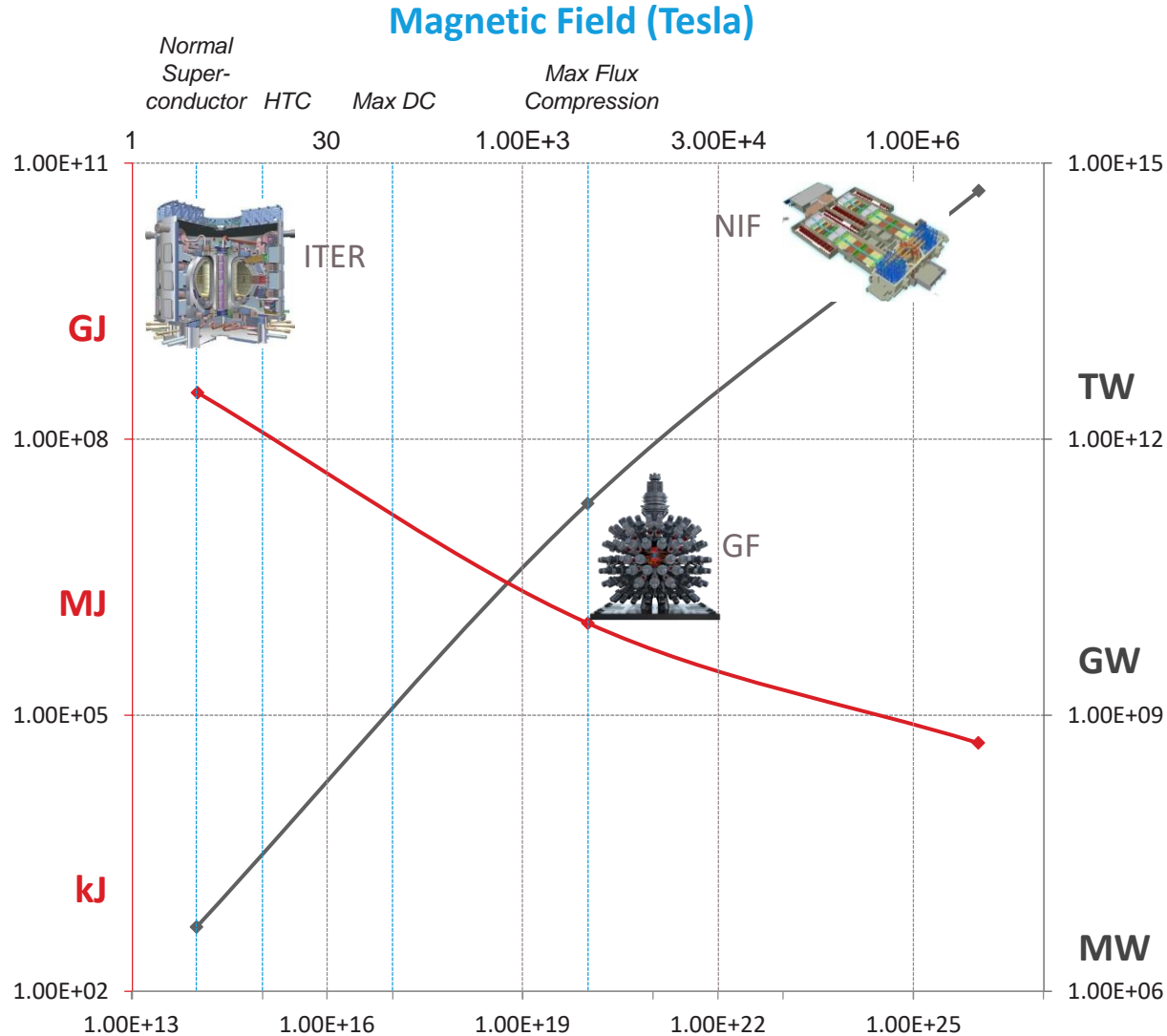
generalfusion



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# Fusion Technology Comparison

Plasma Energy

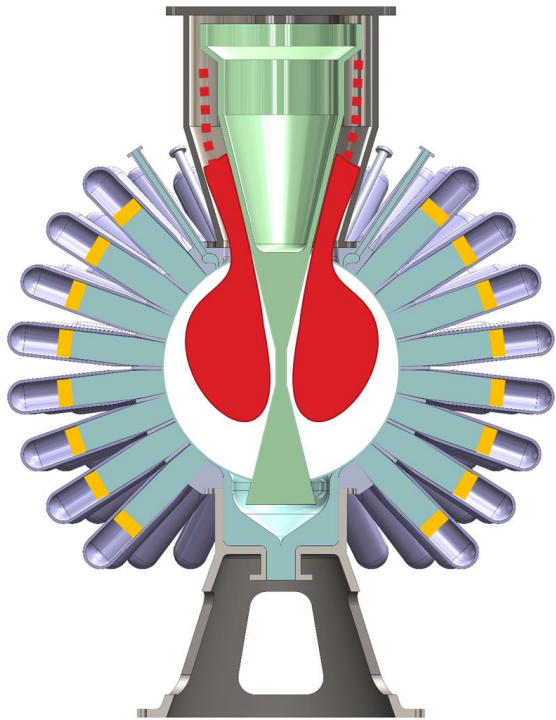


Driver Power

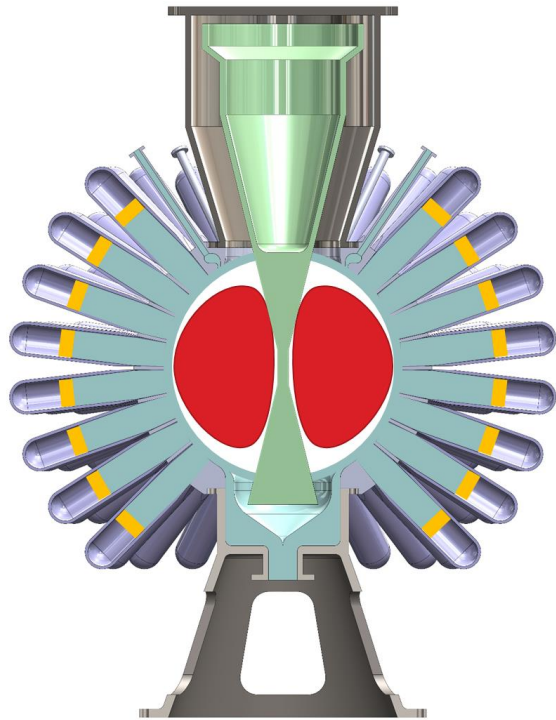


Plasma Density (cm<sup>-3</sup>)

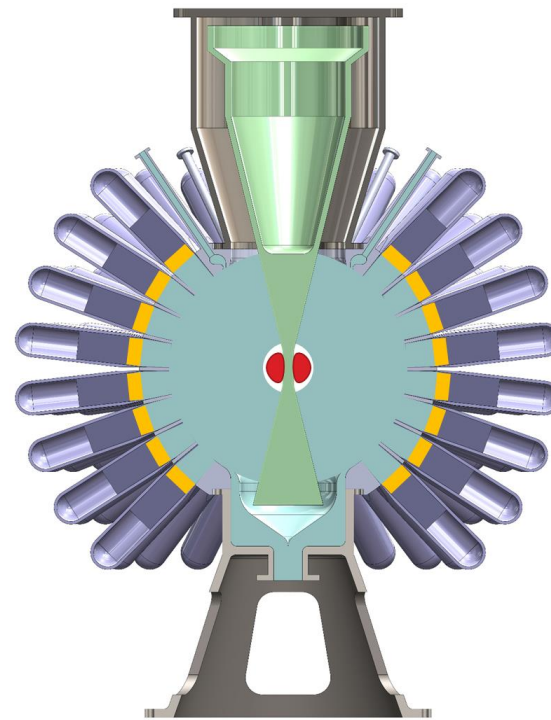
# General Fusion's Solution



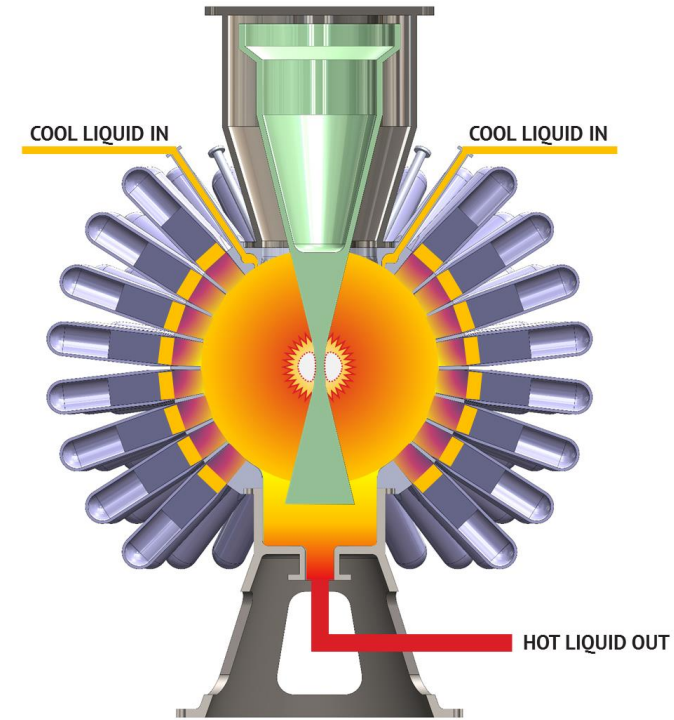
1. Inject Plasma Fuel



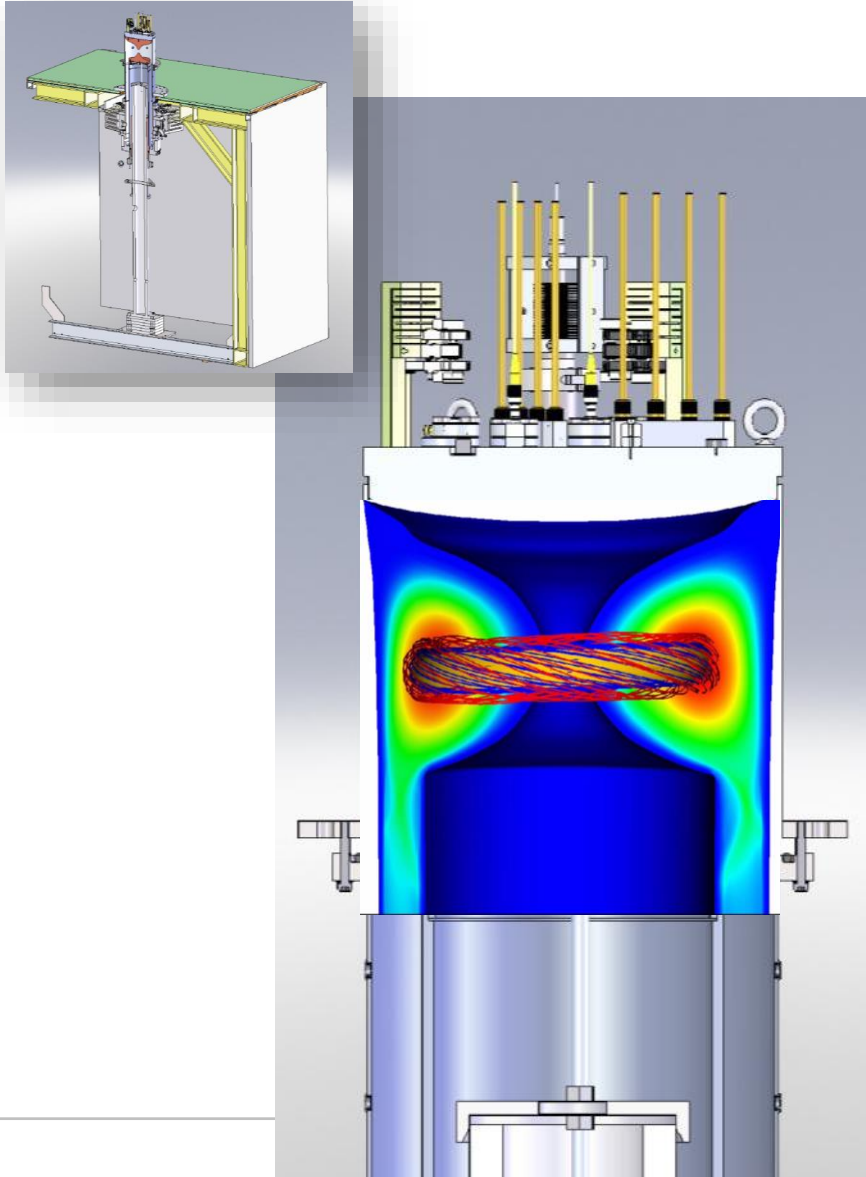
2. Compress Plasma Fuel



3. Extract Energy



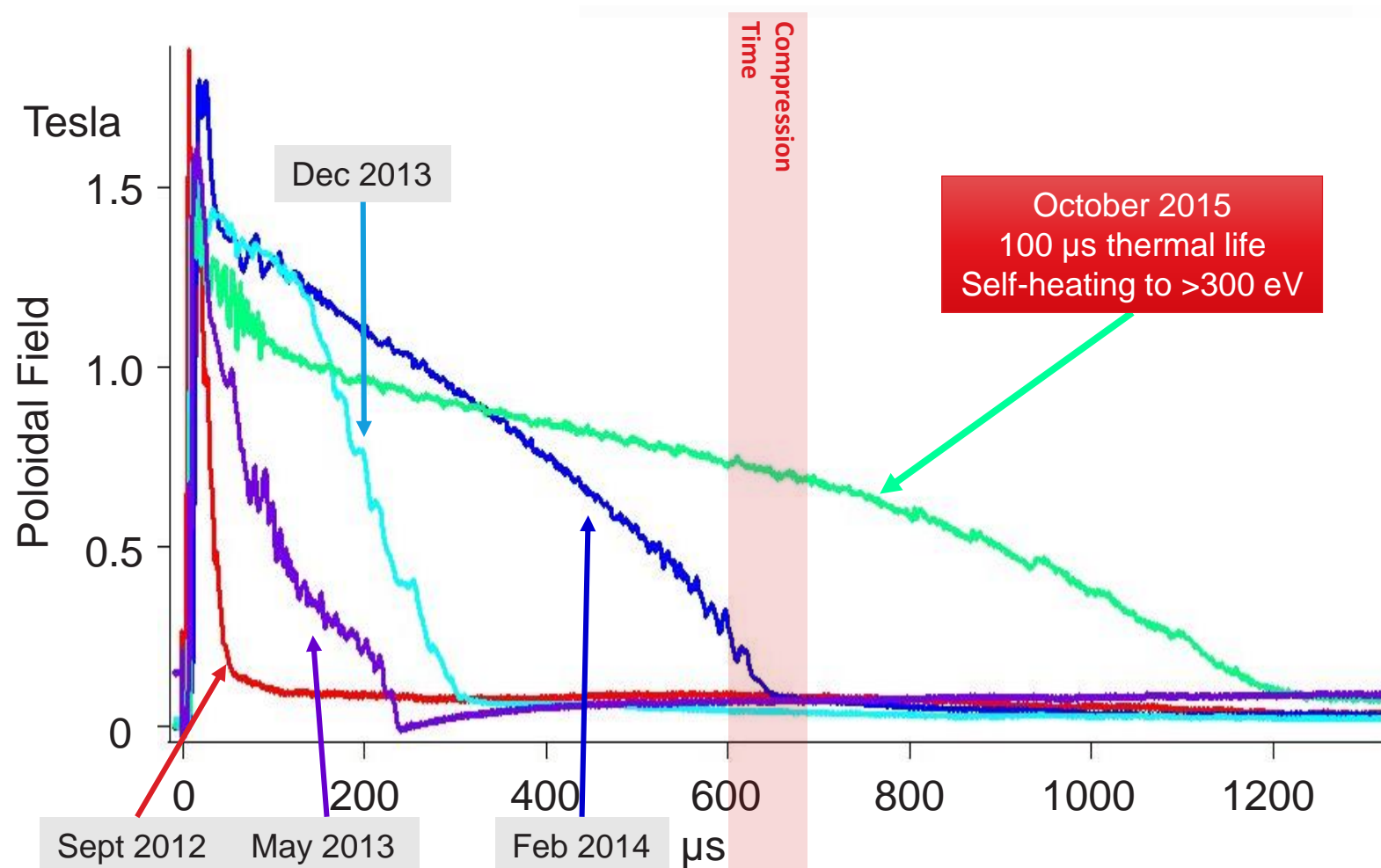
# Small Plasma Injector



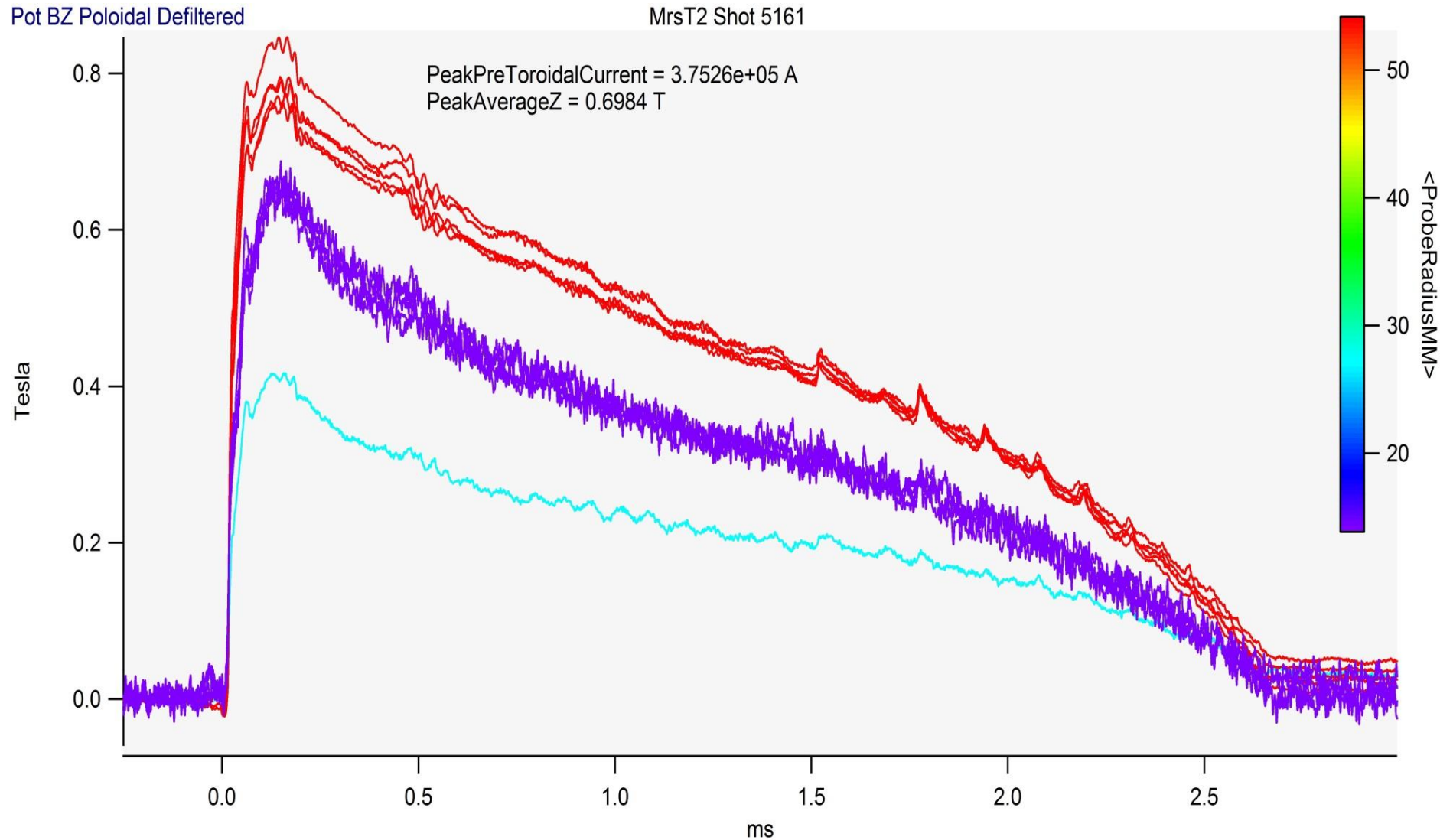
- Direct formation: no acceleration stage.
- Comparable to CTX and SSPX designs
- Lower maximum plasma density than large injectors
- Faster design iteration
- Designed for use in plasma compression experiments

# Plasma Lifetime Progress

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



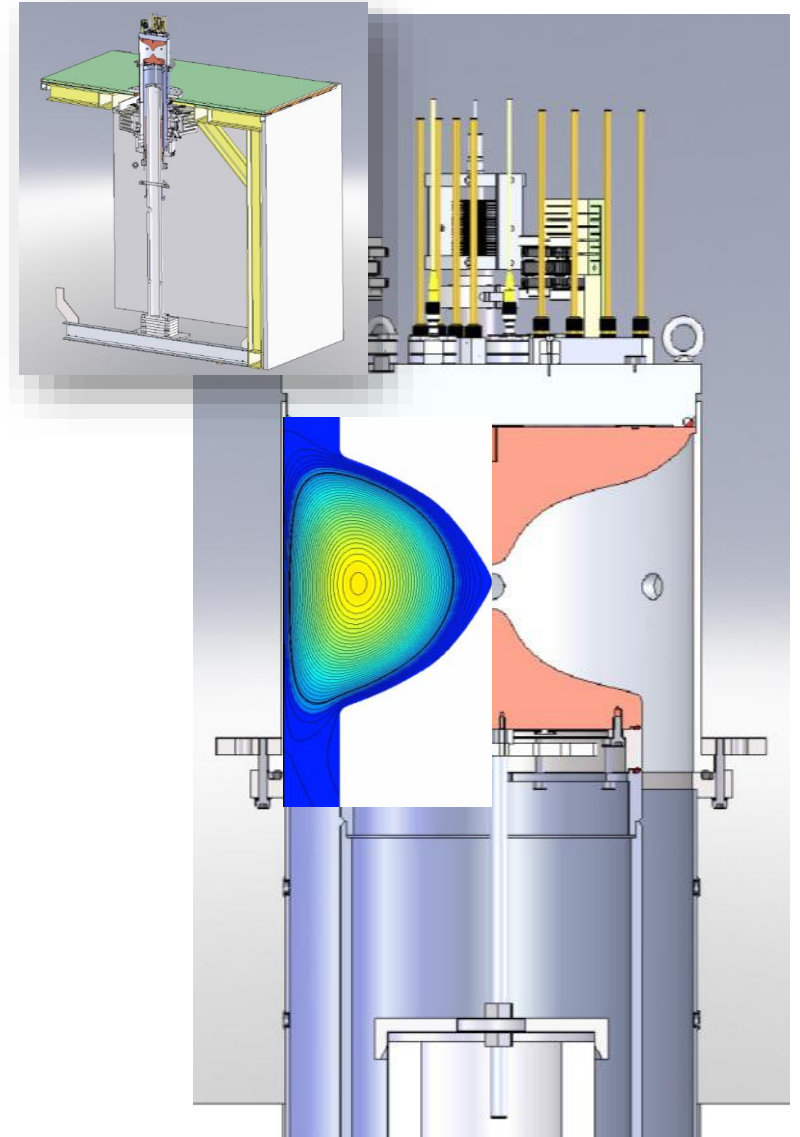
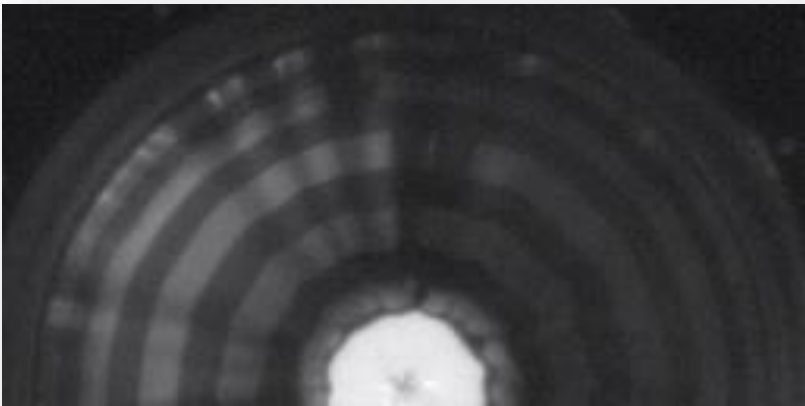
# Spherical tokamak 500 eV from TS



**2017**

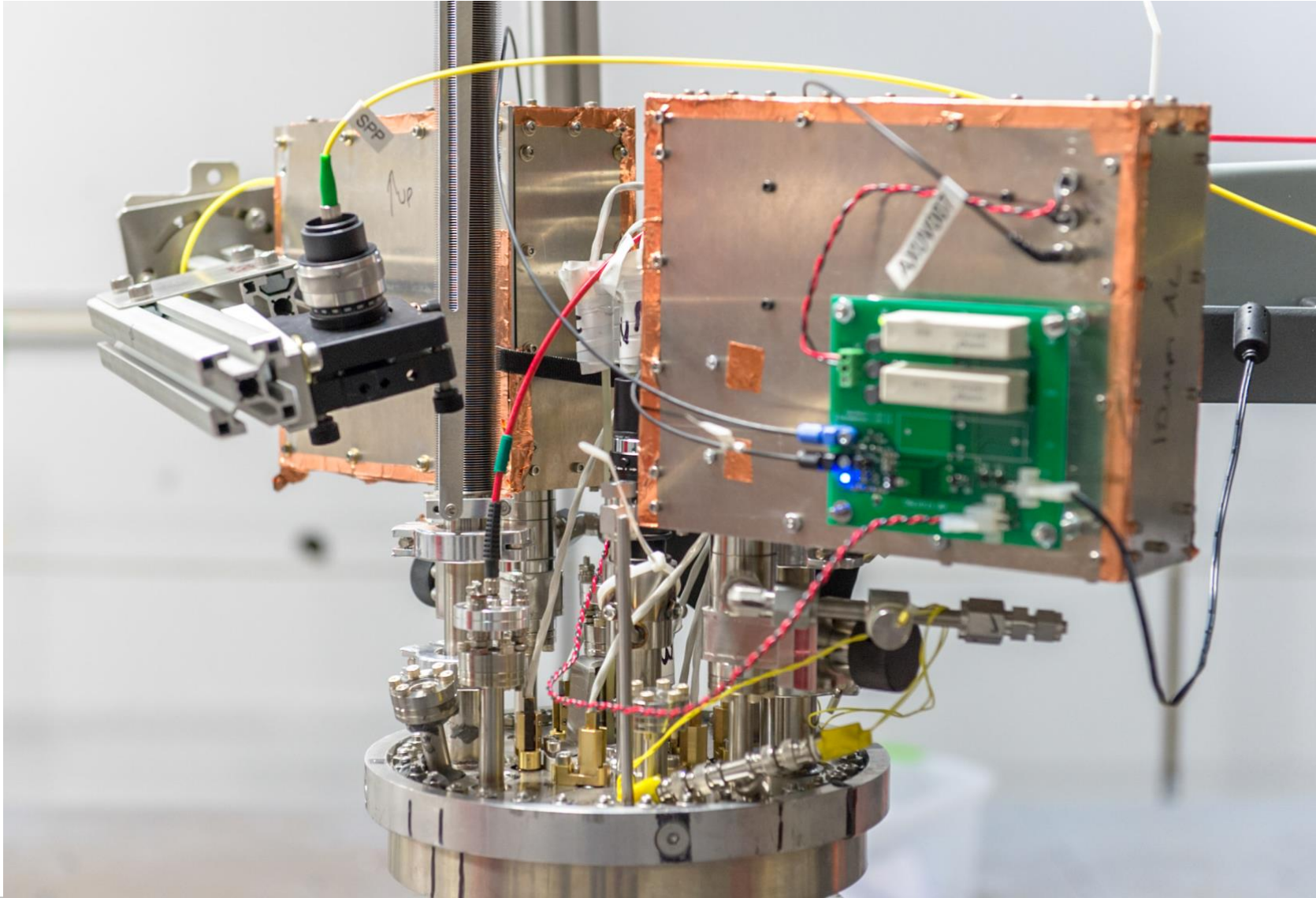
- 2500  $\mu$ s lifetimes
- 500 eV

# Plasma Compression Testing

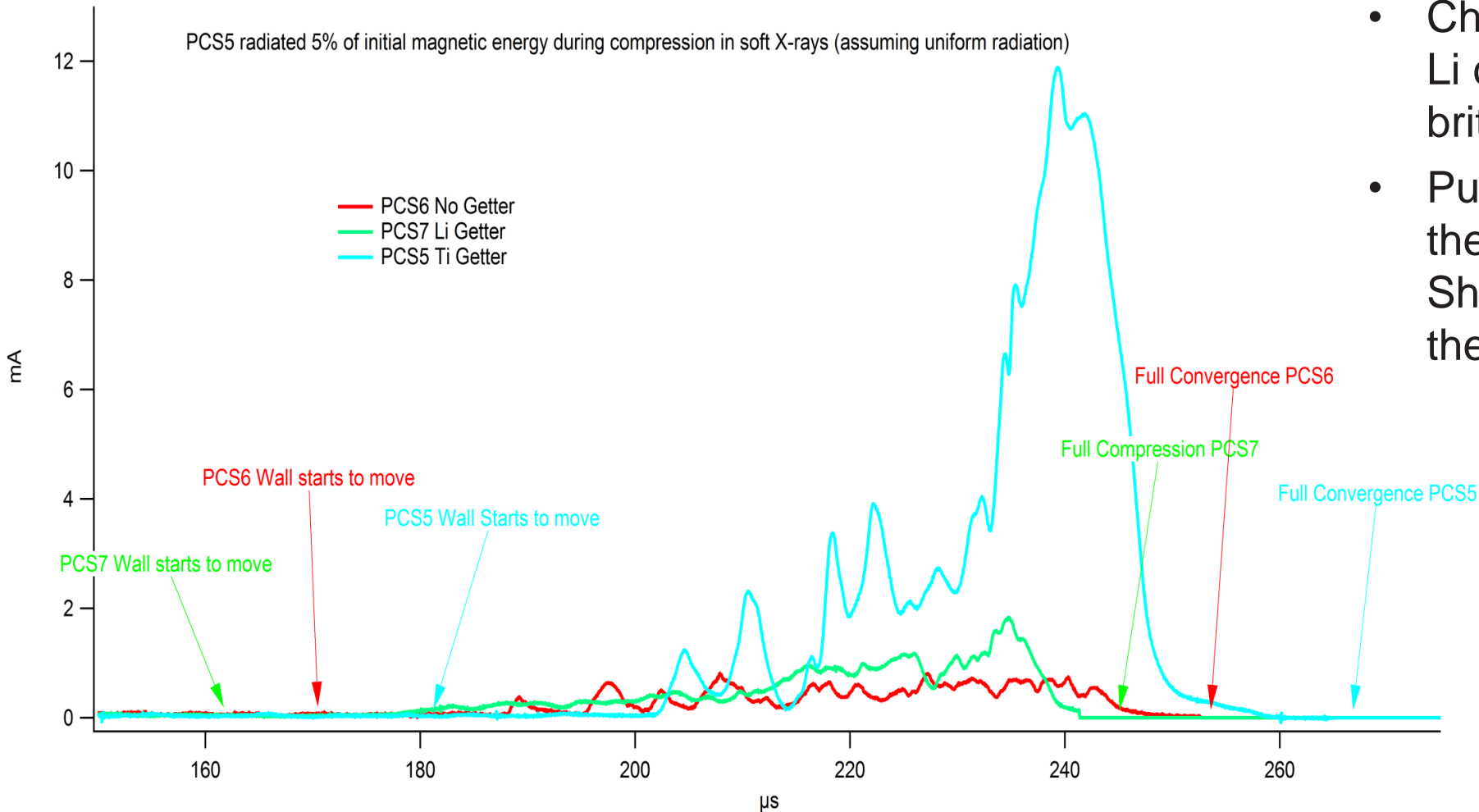




# Diagnostics



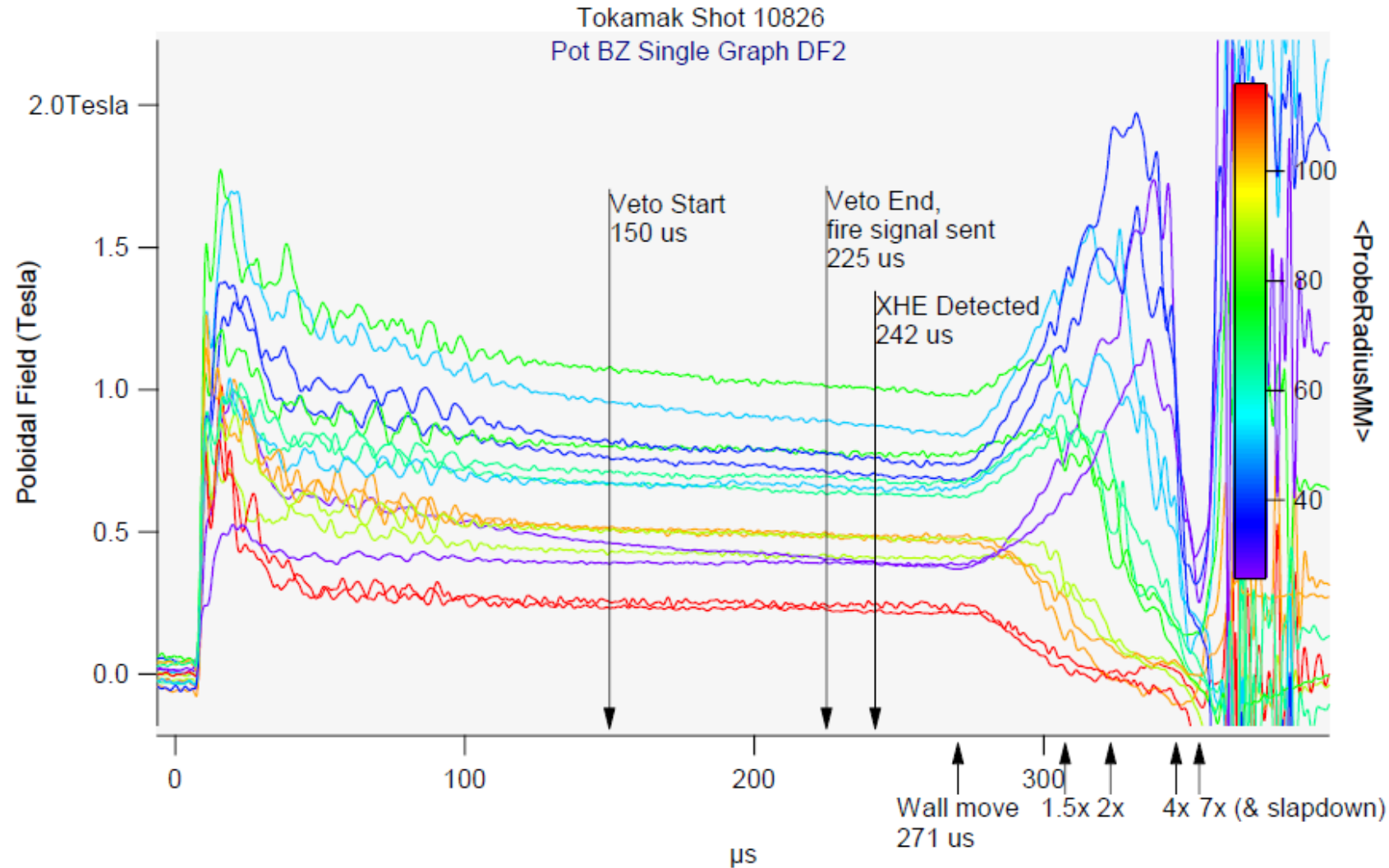
# Fixed Radiation Death



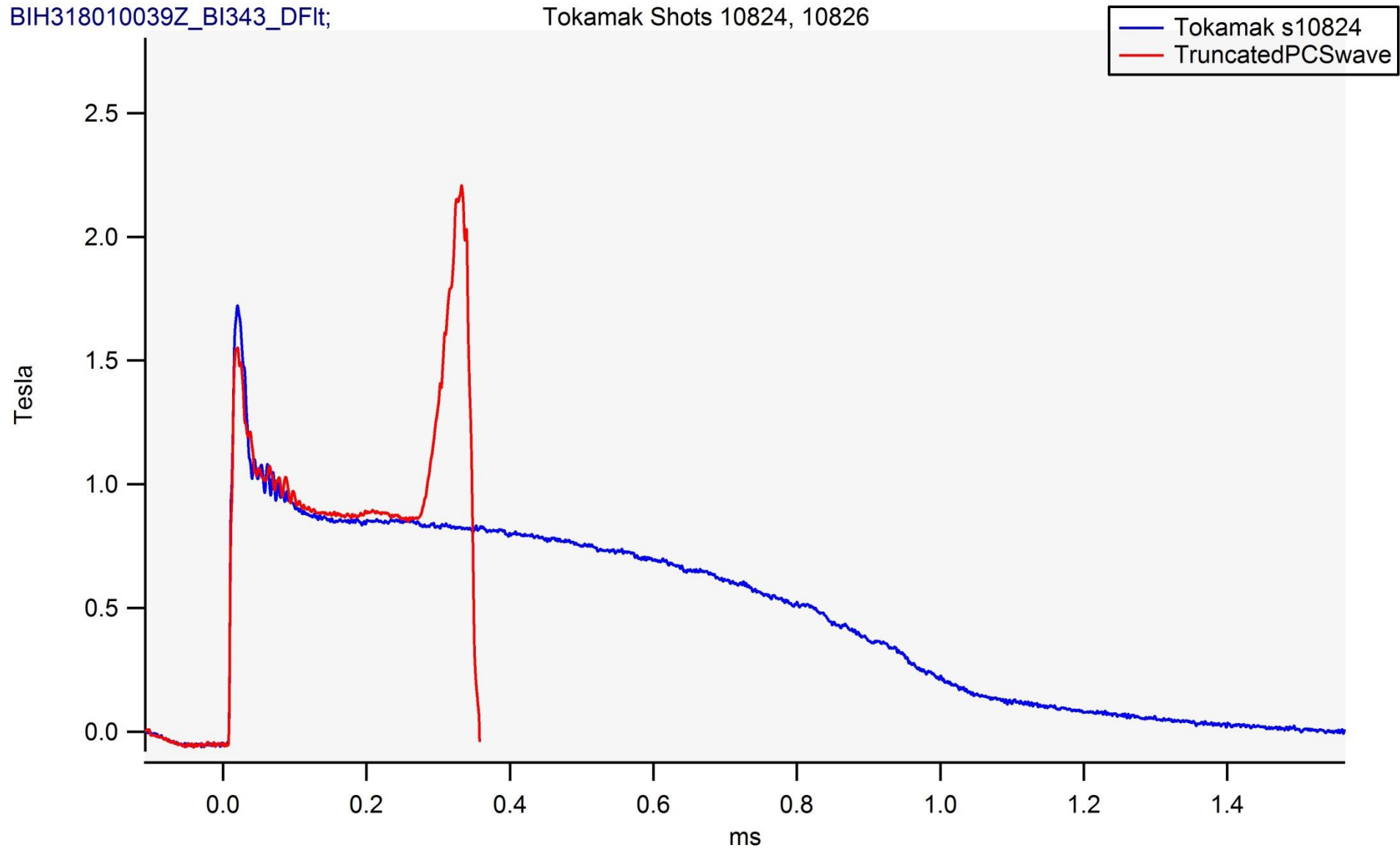
- Changed from Ti coating to Li coating. Lower Z. Less brittle coating
- Put a vacuum gap between the driver and the liner. Shockless acceleration of the liner

# Poloidal Field Compression: Compression Test #12

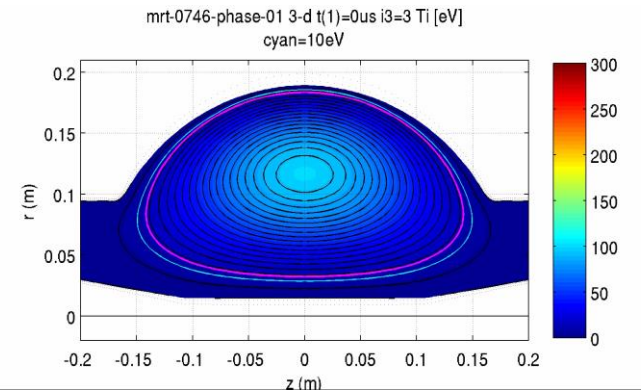
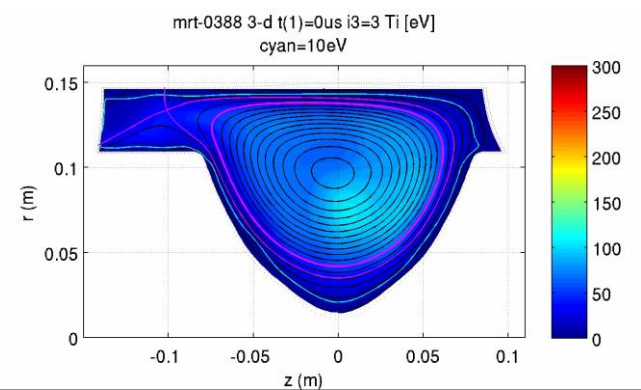
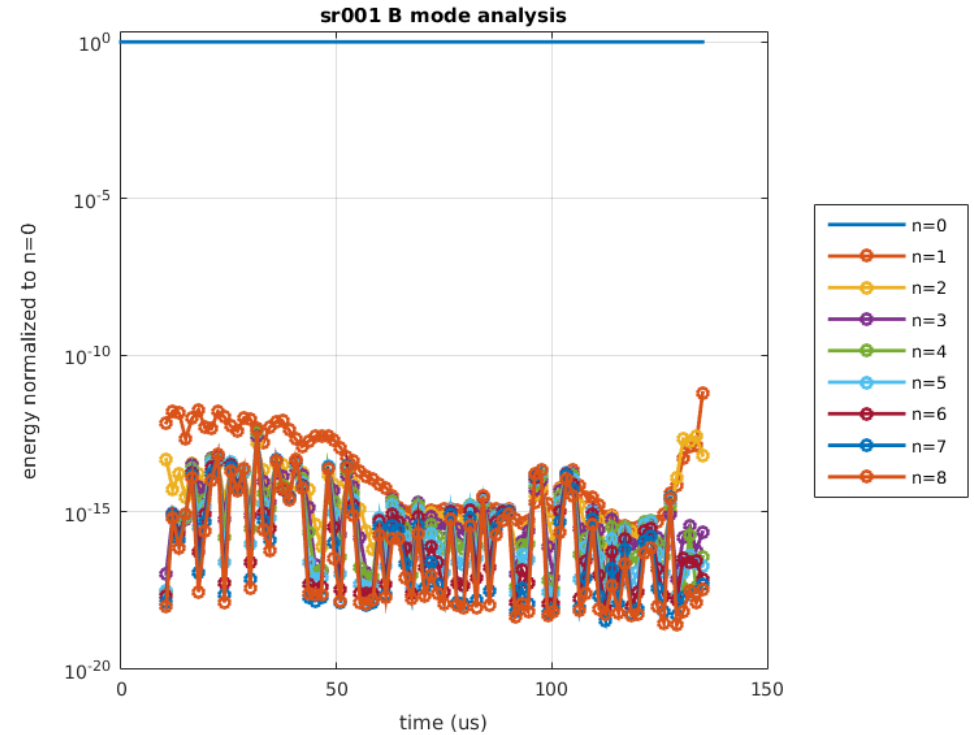
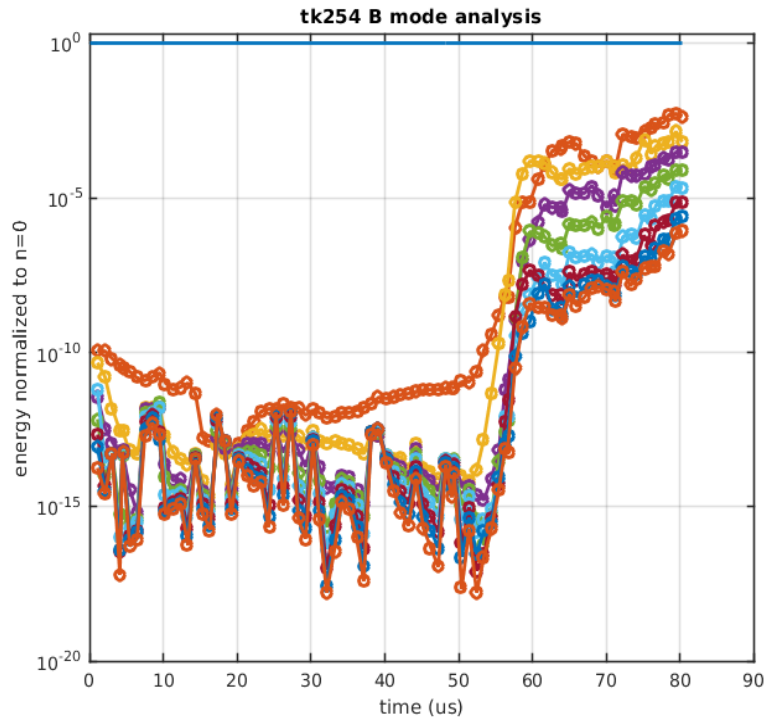
Chart of increase in magnetic field during compression



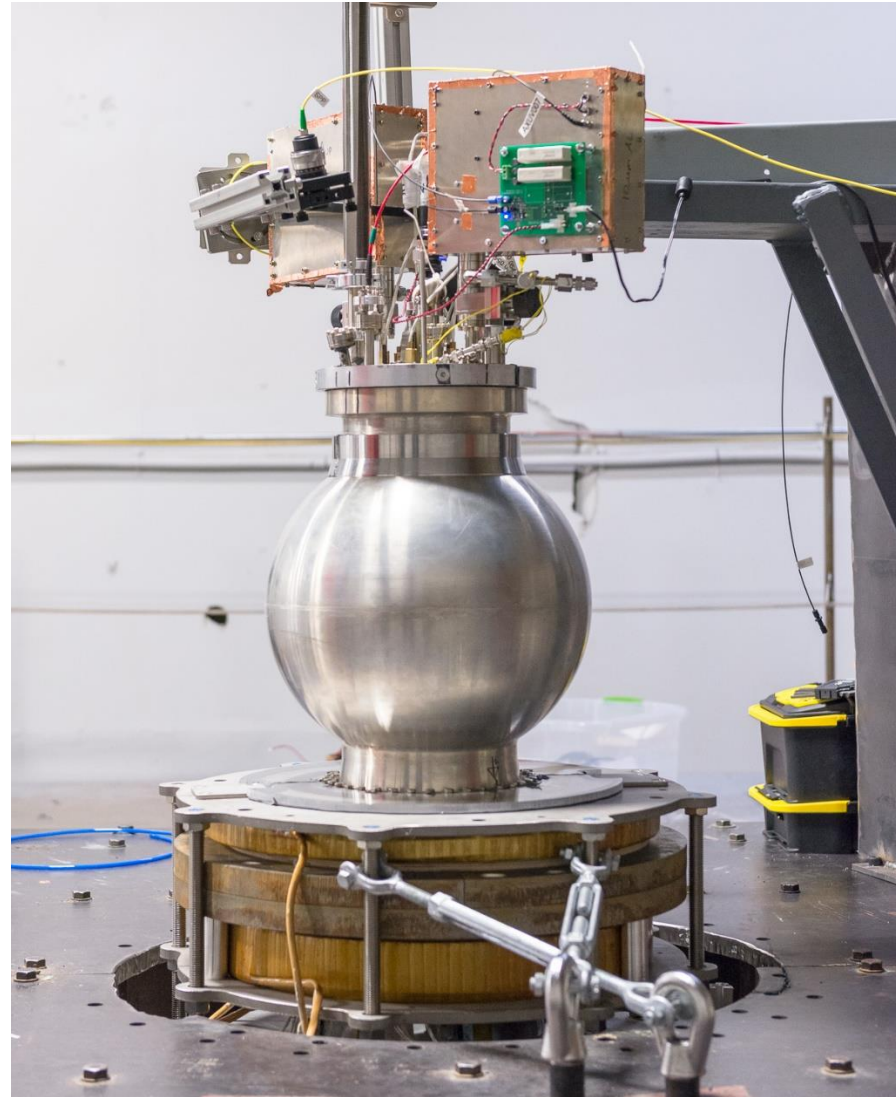
# Uncompressed (blue) compared to compressed (red)



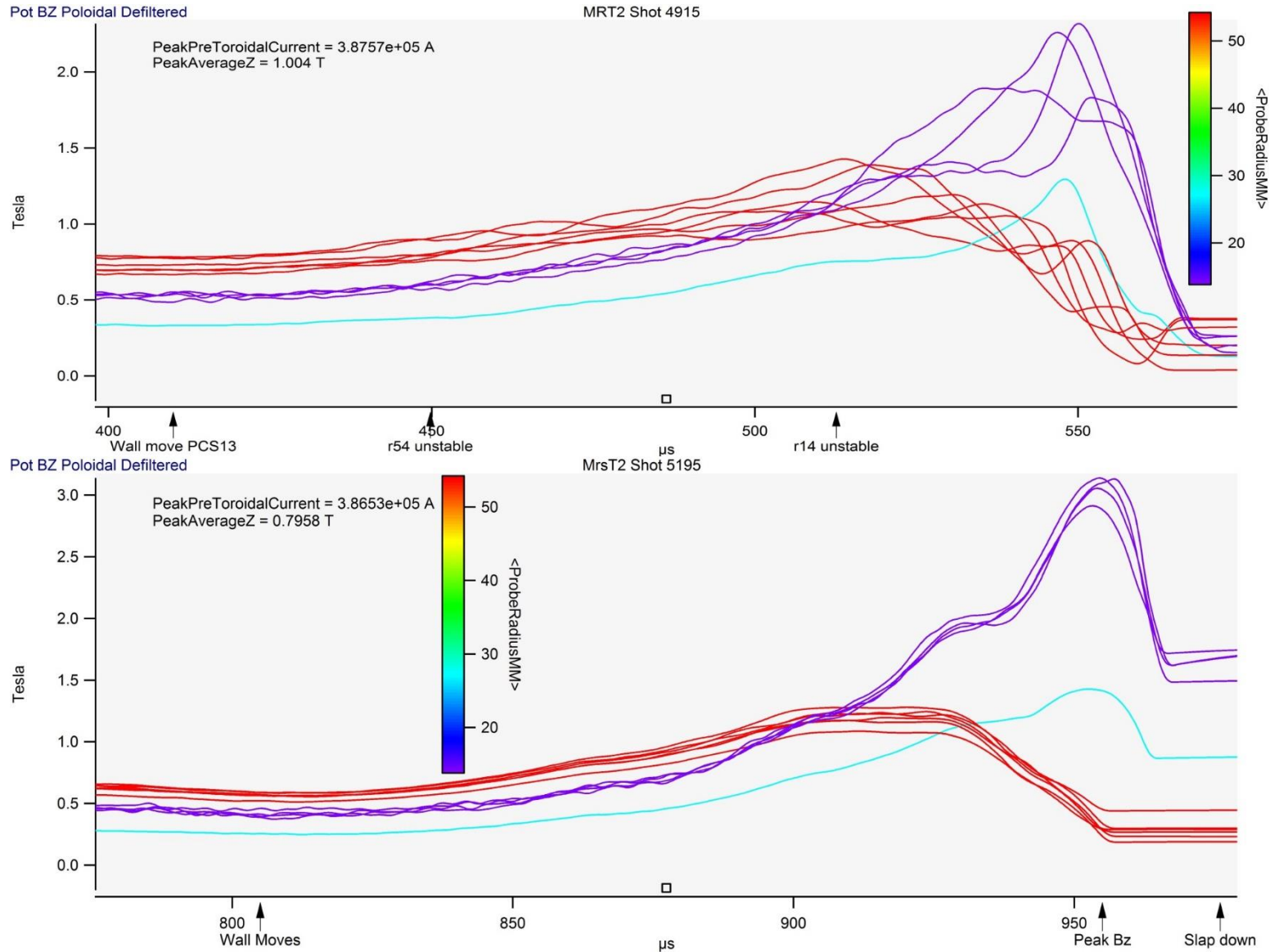
# Change in Compression Geometry



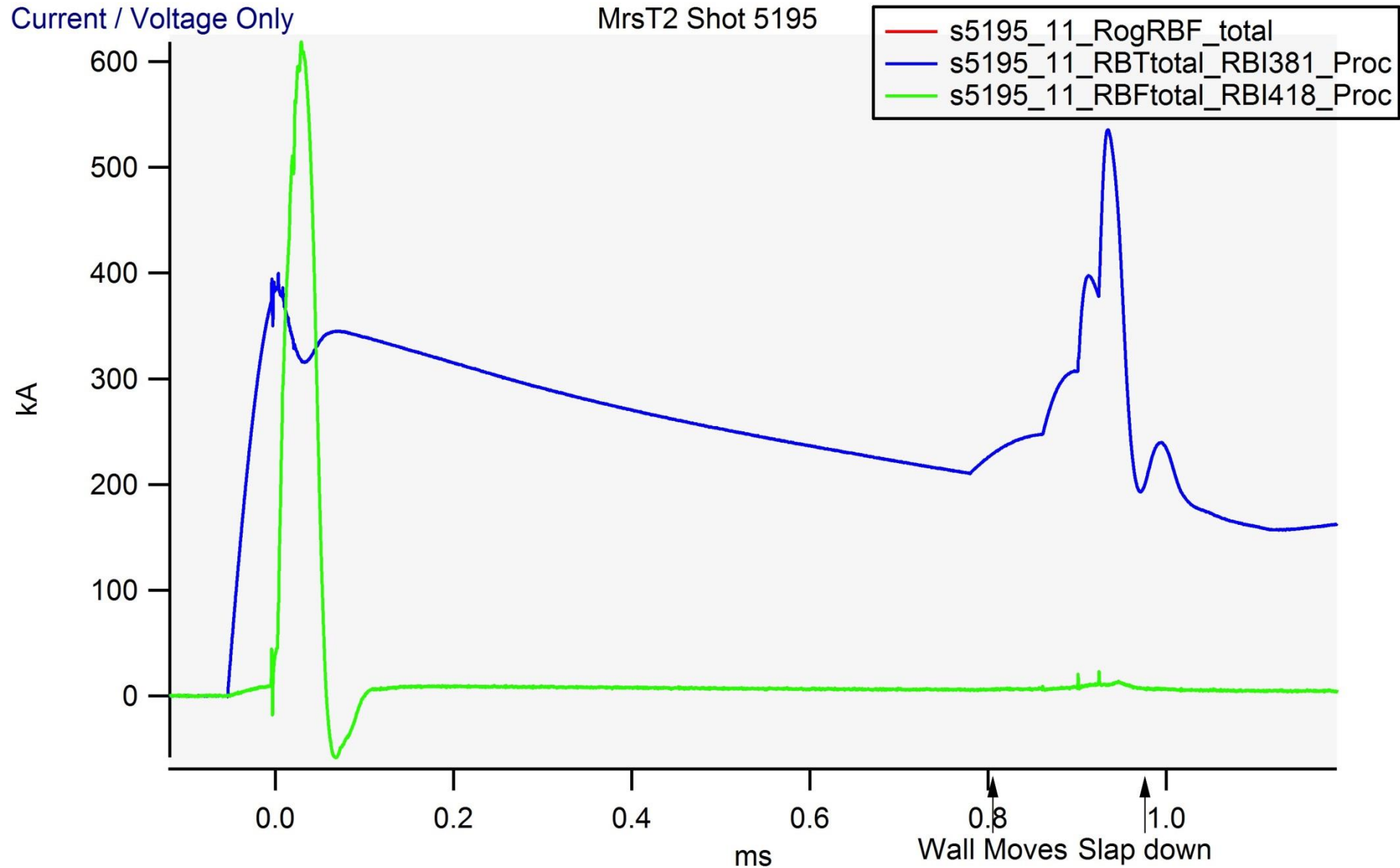
# New Spherical Shape



# Magnetic Field During Compression

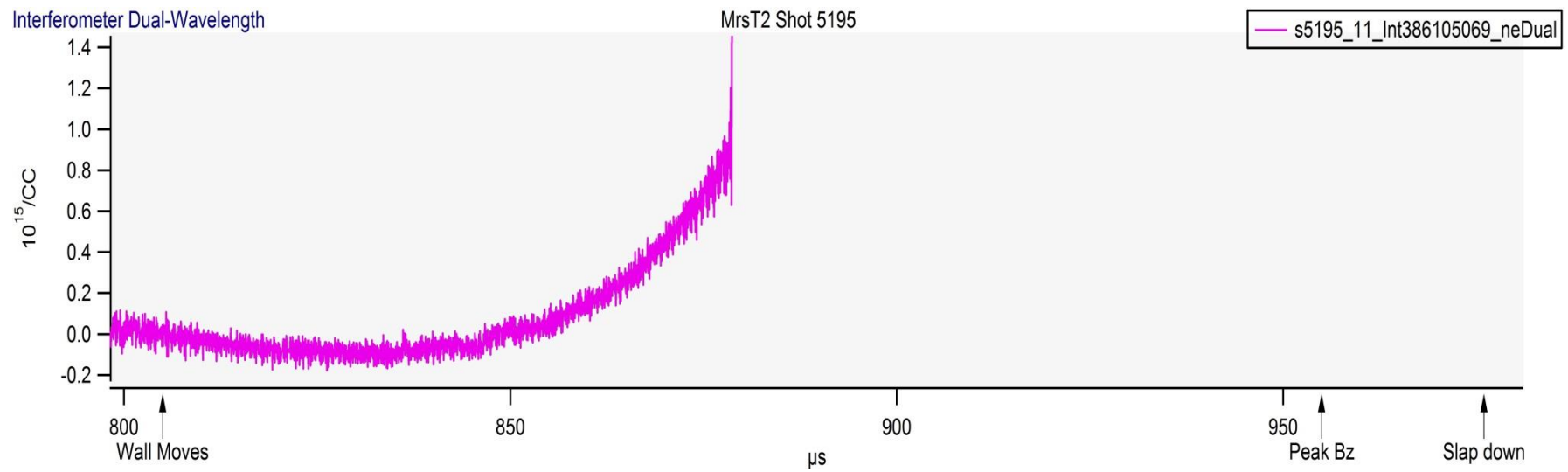
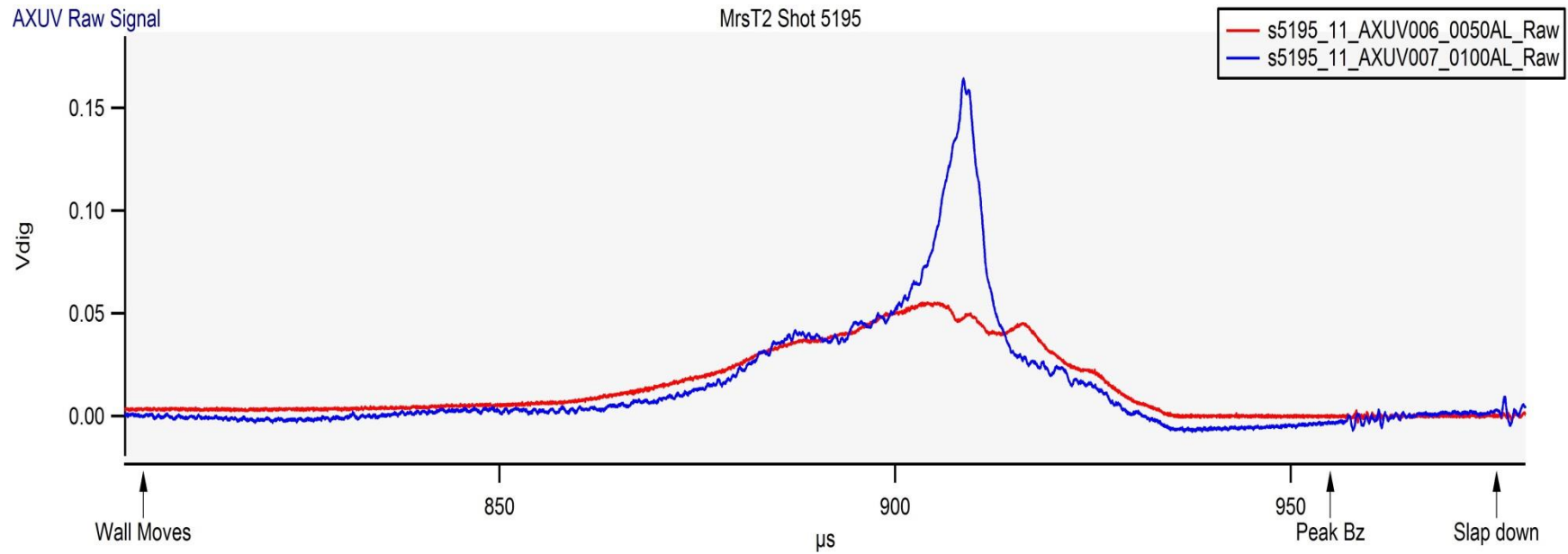


# Shaft Current And Formation Current





# X-Ray and Density



# Conclusion

- 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

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