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Developments in Compression of Magnetized Plasmas

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Magnetized Target Fusion (MTF) involves compressing an initial magnetically confined plasma on a timescale faster than the thermal confinement time of the plasma. If near adiabatic compression is achieved, volumetric compression of 350X or more of a 500 eV target plasma would achieve a final plasma temperature exceeding 10 keV. Power plant relevant fusion gains could be achieved provided the compressed plasma has sufficient density and dwell time.
General Fusion is developing a compression system using pneumatic pistons to collapse a cavity formed in liquid metal containing a magnetized plasma target. This approach offers a low-cost driver, straightforward heat extraction, good tritium breeding ratio and excellent neutron protection in power plant designs.
Through an active plasma and compression R&D program, General Fusion is conducting full scale and reduced scale plasma experiments and simulation of both. Although pneumatic driven compression of full scale plasmas is the end goal, present compression studies use reduced scale plasmas and chemically accelerated aluminum liners. We will review results from our plasma target development and dynamic compression program. In particular we will focus on the two most recent tests in which we have detected significant increases in fusion neutron rates.

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