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Plasma Studies in the SPECTOR Experiment as Target Development for MTF RUSS IVANOV[1], WILLIAM YOUNG, General Fusion Inc., THE GENERAL FUSION TEAM — General Fusion (GF) is developing a Magnetized Target Fusion (MTF) concept in which magnetized plasmas are adiabatically compressed to fusion conditions by the collapse of a liquid metal vortex. To study and optimize the plasma compression process, GF has a field test program in which subscale plasma targets are rapidly compressed with a moving flux conserver. GF has done many field tests to date on plasmas with sufficient thermal confinement but with a compression geometry that is not nearly self-similar. GF has a new design for our subscale plasma injectors called SPECTOR (for SPhErical Compact TORoid) capable of generating and compressing plasmas with a more spherical form factor. SPECTOR forms spherical tokamak plasmas by coaxial helicity injection into a flux conserver (a= 9 cm, R= 19 cm) with a pre-existing toroidal field created by ˜0.5 MA current in an axial shaft. The toroidal plasma current of 100 - 300 kA resistively decays over a time period of ˜1.5 msec. SPECTOR1 has an extensive set of plasma diagnostics including Thomson scattering and polarimetry. MHD stability and lifetime of the plasma was explored in different magnetic configurations with a variable safety factor q(Ψ). Relatively hot ($T_e \geq 350$ eV) and dense (˜10^{20} m^{-3}) plasmas have achieved energy confinement times $\tau_E \geq 100\mu$sec and are now ready for field compression tests.

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