Abstract Submitted
for the DPP17 Meeting of
The American Physical Society

Passive MHD Spectroscopy for Enabling Magnetic Reconstructions on Spherical Tokamak Plasmas at General Fusion Inc. PETER O'SHEA, MICHEL LABERGE, ALEX MOSSMAN, MERITT REYNOLDS, General Fusion — Magnetic reconstructions on lab based plasma injectors at General Fusion relies heavily on edge magnetic (Bdot) probes. On plasma experiments built for field compression (PCS) tests, the number and locations of Bdot probes is limited by mechanical constraints. Additional information about the q profiles near the core in our Spector plasmas is obtained using passive MHD spectroscopy. The coaxial helicity injection (CHI) formation process naturally generates hollow current profiles and reversed shear early in each discharge. Central Ohmic heating naturally peaks the current profiles as our plasmas evolve in time, simultaneously reducing the core safety factor, q(0), and reverse shear. As the central, non-monotonic q-profile crosses rational flux surfaces, we observe transient magnetic reconnection events (MREs) due to the double tearing mode. Modal analysis allows us to infer the q surfaces involved in each burst. The parametric dependence of the timing of MREs allows us to estimate the continuous time evolution of the core q profile. Combining core MHD spectroscopy with edge magnetic probe measurements greatly enhances our certainty of the overall q profile.

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Date submitted: 14 Jul 2017 Electronic form version 1.4