Abstract Submitted
for the DPP20 Meeting of
The American Physical Society

Disruption Mitigation by Core Impurity Deposition Using Dispersive Shell Pellets on DIII-D[1] N.W. EIDIETIS, X. DU, General Atomics, E.M. HOLLMANN, UCSD, P.B. PARKS, General Atomics, J.L. HERFINDAL, ORNL, A. LVOVSKIY, General Atomics, R.A. MOYER, UCSD, D. SHIRAKI, ORNL — Experiments injecting boron-filled diamond shell pellets into DIII-D are building the physics basis for disruption mitigation through core impurity deposition [1]. This technique is being developed as a possible alternative to shattered pellet injection (SPI) as a mitigation technique on ITER and/or CFPP. As predicted [2], comparison of the measured neutron rate evolution during shell transit with 0-D calculations derived from measured line-integrated density were consistent with plasma cooling dominated by dilution, indicating that measured radiated power spikes were highly localized near the shell (with minimal energy loss) and that the injection process represents a reasonable approximation of ideal core deposition. Total impurity assimilation fraction was fairly insensitive to pellet injection velocity, and hence final pellet deposition depth. Energetic particles from the beamline intersecting the pellet trajectory were found to alter pellet penetration, indicating they should be accounted in ablation models. These results form an early basis for determining if mitigation by core impurity deposition can provide qualitatively better mitigation than existing methods. [1] E.M. Hollmann et al., Phys. Rev Lett. 122, 065001 (2019) [2] V. A. Izzo, Nucl. Fusion 60, 066023 (2020)

[1]Work supported by US DOE under DE-FC02-04ER54698, DE-FG02-07ER54917, DE-AC05-00OR22725.

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Date submitted: 28 Jun 2020 Electronic form version 1.4