Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

Rotation effects in MHD simulations of disruption mitigation[1]
V.A. IZZO, E. HOLLMANN, UCSD, D. SHIRAKI, N. COMMAUX, ORNL, N. EIDIETIS, P.B. PARKS, GA — DIII-D experiments with massive gas injection (MGI) for disruption mitigation have confirmed results from MHD simulations predicting the n=1 mode as the primary source of radiation asymmetry during the thermal quench (TQ), and have shown that the n=1 mode phase is controllable with external coils when the target plasma has very low initial rotation. New MHD simulations including rotation help to address several open questions concerning the role of plasma rotation during an MGI shutdown. First, the edge plasma rotation is found to strongly influence the toroidal spreading of impurities. Second, the slowing of the core plasma rotation is found to depend less on direct penetration of the massive impurities deep into the core than on interaction between large islands in the edge and core. Finally, the simulations support the observation that the n=1 phase can rotate by a significant fraction of 2π between its appearance and the end of the TQ, thus decoupling the radiation peak location from the injection location.

[1]Supported by US DOE DE-FG02-95ER54309, DE-AC05-00OR22725, DEFC02-04ER56498

V.A. Izzo
University of California, San Diego

Date submitted: 20 Jul 2015 Electronic form version 1.4