Abstract Submitted
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DIII-D Studies of Massive Gas Injection for Disruption Mitigation,[1] E.M. HOLLMANN, G. ANTAR, J.A. BOEDO, R.A. MOYER, D.L. RUDAKOV, J. YU, UCSD, T.C. JERNIGAN, S. COMBS, ORNL, T.E. EVANS, D.A. HUMPHREYS, P.B. PARKS, E.J. STRAIT, J.C. WESLEY, GA, M. GROTH, LLNL, M. BAKHTIARI, D.G. WHYTE, U. Wisc. — Experiments with massive ($\approx 3 \times 10^{22}$ particles) argon injection in the DIII- D tokamak have shown that neutral delivery rate is the crucial jet parameter. Nozzle aiming is not crucial, as the neutrals are stopped at the plasma edge. This was demonstrated over a range of plasma thermal energies from $W_{th} \approx 1.0$ MJ down to $W_{th} \approx 0.02$ MJ. Calculations suggest that magnetic field pressure is contributing to the observed neutral jet stopping. The subsequent core radiative thermal collapse is greatly accelerated by the onset of low-order ($m = 1, 2/n = 1$) MHD modes; this was demonstrated by shutting down target plasmas with different q-profiles and observing a delay in the collapse onset as the low order ($q = 1$ and 2) rational surfaces were buried deeper in the target plasma. Experiments using a new large valve with a 10x higher flow rate will also be presented.

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