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Category Number and Subject:

[ ] Theory [ ] Experiment

Massive Gas Injection System for Disruption Mitigation on the DIII-D Tokamak,* T.C. Jernigan, L.A. Baylor, S.K. Combs, *ORNL*, D.A. Humphreys, P.B. Parks, J.C. Wesley, *GA,* E.M. Hollmann, *UCSD* – Massive injection of deuterium or noble gases (>10^{22} molecules) has been very effective at mitigating disruptions in DIII-D [1]. Both the divertor heat loads and the first wall forces were reduced by more than a factor of four. Total electron densities (free and bound) of ~10^{21} m^{-3} have been achieved, close to that required to prevent avalanche multiplication of runaways. Two tested configurations are described. Both use a fast solenoid valve with an orifice diameter of 4 mm with a flow rate in helium of $5x10^4$ Pa m^3/s at 7 MPa. A new valve with a 20 mm orifice will be tested on DIII-D in 2006. This valve is actually close to that required for ITER. Calculations show that a set of four such valves can reach the no-avalanche density in ITER in ~0.25 t_{co} where t_{co} is the plasma current quench time. How the gas jet interacts and mixes with the plasma is under investigation.

[1] D.G. Whyte, *et al*., Phys. Rev. Lett. ${\bf **89**}$, 55001 (2001).

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[ ] Oral [X] Poster