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Disruption Mitigation Experiments Carried Out on DIII-D[1]
N. COMMAUX, L.R. BAYLOR, T.C. JERNIGAN, ORNL, T.E. EVANS, D.A. HUMPHREYS, P.B. PARKS, M.A. VAN ZEELAND, J.C. WESLEY, GA, E.M. HOLLMANN, A.N. JAMES, J.H. YU, YCSD — Disruptions are an important issue for ITER. Major and vertical displacement disruptions in ITER are predicted to generate multi-MeV runaway electron beams (RE) as well as high energy flux to the plasma facing components and high halo currents in the structures that could potentially damage the machine. To mitigate these phenomena, several techniques have been studied on DIII-D: massive gas injection (MGI), external magnetic perturbation, and injection of large shattered cryogenic pellets. MGI, which is proven to mitigate heat fluxes and halo currents, has been tested on DIII-D in terms of impurity radiation toroidal symmetry and optimization of the gas pulse length. Other techniques expected to mitigate the RE have also been tested on DIII-D: deconfinement of the RE using external magnetic fields and collisionally damping the avalanche multiplication process by rapidly increasing the electron density in the core by several orders of magnitude using a new shotgun pellet injector built by ORNL.

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