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Theory Experiment

Halo Currents in the DIII-D Tokamak,* A. Azari, *Smith College*; N.W. Eidietis, *General Atomics* – Loss of vertical control of an elongated tokamak plasma results in a vertical displacement event (VDE) which can induce large currents on open field lines and exert high $J \times B$ forces on in-vessel components. An array of first-wall tile current monitors on DIII-D provides direct measurement of the poloidal halo currents. These measurements are analyzed to create a database of halo current magnitude and asymmetry, which are found to lie within the ranges seen by numerous other tokamaks in the ITPA Disruption Database. In addition, an analysis of halo asymmetry rotation is presented, as rotation at the resonance frequencies of in-vessel components could lead to significant amplification of the halo forces. Halo current rotation is found to be far more prevalent in old (1997-2002) DIII-D halo current data than recent data (2009), perhaps due to a change in divertor geometry over that time.

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