Abstract Submitted
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Sideways Force Produced During Disruptions[1] H.R. STRAUSS, HRS Fusion, R. PACCAGNELLA, Consorzio RFX and Istituto Gas Ionizzati del CNR, J. BRESLAU, S. JARDIN, PPPL, L. SUGIYAMA, MIT — We extend previous studies [1] of vertical displacement events (VDE) which can produce disruptions. The emphasis is on the non axisymmetric "sideways" wall force F_x. Simulations are performed using the M3D [2] code. A VDE expels magnetic flux through the resistive wall until the last closed flux surface has $q < 3$. At this point the plasma is unstable to an $(m, n) = (2, 1)$ mode. A theory of sideways force produced by this mode in the presence of a VDE is presented. The wall force depends strongly on $\gamma\tau_w$, where γ is the mode growth rate and τ_w is the wall resistive penetration time. The force F_x is largest when $\gamma\tau_w$ is a constant of order unity, which depends on the initial conditions. For large values of $\gamma\tau_w$, the wall force asymptotes to a relatively smaller value, well below the critical value ITER is designed to withstand. The principle of disruption mitigation by massive gas injection is to cause a disruption with large $\gamma\tau_w$.

[1] H. R. Strauss, R. Paccagnella, and J. Breslau,Phys. Plasmas **17**, 082505 (2010)
[2] W. Park, E.V. Belova, G.Y. Fu, X. Tang, H.R. Strauss, L.E. Sugiyama, Phys. Plasmas **6**, 1796 (1999).

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