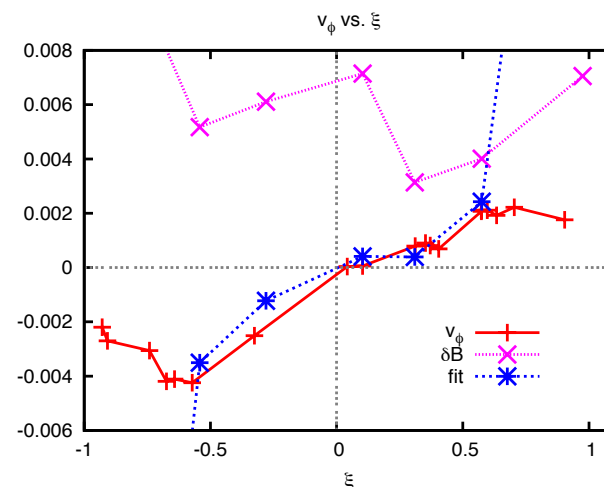


Tokamak Toroidal Rotation caused by Disruptions and ELMs

H. Strauss, R. Paccagnella, L. Sugiyama, J. Breslau and S. Jardin

Disruptions produced by Asymmetric Vertical Displacement Events (AVDEs) are a possible problem for ITER, because of sideways force on walls and other conducting structures. Recent MHD simulations and theory show that disruptions can generate toroidal rotation. The rotating wall force might be resonant with the structures surrounding the plasma. [H. Strauss, R. Paccagnella, J. Breslau, L. Sugiyama, S. Jardin, Nucl. Fusion **54**, 04317 (2014).]

The scaling of the rotation with vertical displacement amplitude was calculated in MHD disruption simulations and agrees with theory. Shown is the toroidal rotation speed V as a function of vertical displacement. Also shown is the magnetic perturbation amplitude. In these simulations, the rotation period is of order 500Hz, well above resonance. The sideways wall force is well within ITER design limits when the thermal quench time is short compared to the resistive wall penetration time. Disruption mitigation reduces the vertical displacement.



The results are favorable for ITER: the wall forces are tolerable, and rotation of the force is not resonant, even without disruption mitigation.