Sustained stabilization of the resistive wall mode by plasma rotation in the DIII-D tokamak

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Abstract. A path to sustained stable operation, at plasma pressure up to twice the ideal magnetohydrodynamic (MHD) n=1 free-boundary pressure limit, has been discovered in the DIII-D tokamak. Tuning the correction of the intrinsic magnetic field asymmetries so as to minimize plasma rotation decay during the high beta phase and increasing the angular momentum injection, have allowed maintaining the plasma rotation above that needed for stabilization of the resistive wall mode (RWM). A new method to determine the improved magnetic field correction uses feedback to sense and minimize the resonant plasma response to the non-axisymmetric field. At twice the free-boundary pressure limit, a disruption precursor is observed, which is consistent with having reached the "ideal wall" pressure limit predicted by stability calculations.