

Reduced critical rotation for resistive wall mode stabilization in a near-axisymmetric configuration

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Abstract. Recent DIII-D experiments with minimum non-axisymmetric perturbations of the magnetic field show a significant reduction of the toroidal plasma rotation required for the stabilization of the resistive wall mode (RWM) below the threshold values observed in experiments that apply non-axisymmetric magnetic fields to slow the plasma rotation. A toroidal rotation frequency of less than 10 krad/s at the $q = 2$ surface (measured with charge exchange recombination spectroscopy using C VI) corresponding to 0.3% of the inverse of the toroidal Alfvén time is sufficient to sustain the plasma pressure above the ideal MHD no-wall stability limit. The low rotation threshold is found to be consistent with predictions by a kinetic model of RWM damping.