

Access to Second Stability Region for Coupled Peeling-Ballooning Modes in Tokamaks

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Abstract

The peeling mode restricts access to the second stability region of the ideal ballooning mode at the tokamak plasma edge. Using a two-dimensional, high toroidal mode number eigenmode code employing a model tokamak equilibrium, it is shown that a window to second stability exists for a sufficiently deep magnetic well. The different mode structures of the various eigenmode branches are studied. In particular, when access to second ballooning stability exists, a ballooning mode perturbation at the first stability boundary can extend deep into the plasma core, and then instability is likely to result in large scale loss of plasma energy.

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