

Abstract Submitted
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MHD edge instabilities in toroidal plasmas¹ LINDA SUGIYAMA, M.I.T. — Different types of MHD edge instabilities in different toroidal magnetically confined plasmas are compared. Large scale numerical simulations show that the nonlinear evolution of an unstable edge mode in a shaped plasma with a single X-point and a surrounding open field line region has a number of common features in the full resistive MHD model for strongly unstable and weaker instabilities. These include the relation of the nonlinear mode structure and dominant toroidal harmonics to the linear eigenmode spectrum, the effects of the mode on reducing the edge pressure or density gradient, the inward penetration of a ballooning-type perturbation into the plasma interior, and the potential to drive a coherent axisymmetric poloidal rotation of the outer part of the plasma, exhibited at different strengths. The results can be compared to experiment to estimate the usefulness and validity of the MHD model for predicting edge stability and instability properties.

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