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Nonresonant pressure-driven MHD instabilities in equilibria with low magnetic shear ADELLE WRIGHT, Australian Natl Univ, NATE FERRARO, STUART HUDSON, Princeton Plasma Physics Laboratory, ROBERT DEWAR, MATTHEW HOLE, Australian Natl Univ — We present a new method for investigating nonresonant MHD instabilities that is based on exploiting the rich number-theoretic structure of the equilibrium q-profile, and use it to investigate pressure-driven instabilities and central pressure gradient accumulation in tokamak-like equilibria with low central shear in which q¿1 and no mode-rational surfaces are present. This method predicts a banded spectrum of growth rate versus toroidal mode number for these modes, which are believed to be resistive infernal modes. Parameter scans using M3D-C1 confirm this prediction. It is found that these modes have robust growth and a broad radial mode structure, which may cause central pressure profile flattening in high-beta tokamak equilibria. The banded growth rate spectrum, which has also been observed in previous studies of ideal infernal modes, leads us to suggest that some of the characteristics of infernal modes in low-shear tokamak scenarios may arise due to the nonresonant effects, rather than directly because of toroidicity. Our results also suggest a possible scenario which may enable predictions of the radial extent of temperature and pressure flattening in post-sawtooth-crash profiles.

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