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Drive Mechanisms for Peeling-Ballooning Modes and Implications for Kinetic Ballooning Modes[1] AMELIA LUNNISS, HOWARD WILSON, Univ of York, PHIL SNYDER, General Atomics — The EPED model of the H-mode pedestal in tokamak plasmas combines a kinetic ballooning mode (KBM) criterion for the critical pressure gradient with a non-local peeling-ballooning (P-B) mode stability criterion to provide an integrated picture of pedestal structure and ELMs. Employing a set of model tokamak equilibria with pedestal gradients constrained by the KBM criterion, we explore the P-B stability for different pedestal widths. The narrowest widths, corresponding to early in the ELM cycle, are stable. Once a critical width is realised, an intermediate-n P-B mode is destabilised, which we show to be driven by a combination of the kink and curvature contributions to δW, exceeding field line bending. Although formally of $O(n^{-1})$, we show that the kink term survives to very large n because of steep current density gradients in the pedestal. This kink term is not presently retained in gyro-kinetic codes, but may be important for an accurate prediction of the KBM stability criterion in realistic low collisionality tokamak pedestals.

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Amelia Lunniss
Univ of York

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