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Global Microtearing Modes in Collisionless Large Aspect Ratio Tokamaks ADITYA KRISHNA SWAMY, RAJARAMAN GANESH, Institute for Plasma Research, JUGAL CHOWDHURY, University of Colorado, Boulder, S. BRUNNER, J. VACLAVIK, L. VILLARD, CRPP, EPFL, 1015 Lausanne, Switzerland — Microtearing Modes (MTM) are high-n electromagnetic microinstabilities in tokamak plasmas deriving their free energy from the equilibrium electron temperature gradient. The modes exhibit an even (tearing) parity in $\tilde{A}_{\|}$ and odd parity in $\tilde{\varphi}$ about the mode rational surface and rotate in electron diamagnetic direction, whereas the Kinetic Balloning modes exhibit the opposite parity. Gyrokinetic simulations have found these unstable modes in spherical tokamaks, reversed field pinch configurations as well as Standard tokamaks, typically driven by collisional mechanisms. However, recent simulations point to the existence of these modes in the absence of collisions in tokamak plasmas, with a drive coming mainly from the magnetic drift resonance of trapped electrons in spherical tokamaks. In the present work, in context of large aspect ratio tokamaks, global gyrokinetic stability studies show that MTMs are unstable in purely collisionless plasmas, driven by magnetic drift resonance of passing electrons. Trapped electrons are found to change the nature of linear growth rate spectrum. The effect of trapped electrons on the scaling with the plasma β and electron temperature gradient η_e will be presented.

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