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Microtearing Simulations in the Madison Symmetric Torus DANIEL CARMODY, M.J. PUESCHEL, P.W. TERRY, University of Wisconsin - Madison — Recent studies of improved confinement discharges in reversed field pinch (RFP) plasmas have revealed the need for greater understanding of the role that microinstabilities may be playing in these devices. In this work, the gyrokinetic codes GYRO and GENE are used to investigate the characteristics of these instabilities in an RFP-type equilibrium. Microtearing is found to have large growth rates across a range of scales for the parameter regime of the Madison Symmetric Torus and may be especially relevant to high-beta PPCD discharges, where large scale tearing mode activity is suppressed and microturbulence is believed to play a greater role in transport. Important features of the mode, such as critical values for beta and electron temperature gradient, are studied for a number of geometric parameters, including flux surface radius and RFP Θ . The dependence on collisionality, which plays an important role in this instability, is explored using a Lorentz operator. We find that the RFP microtearing mode is unstable across a range of collisional frequency, and parameter scans show different responses at low versus moderate/high collisionality, possible evidence for different physical drive mechanisms. The source of these drives is explored and compared with existing theory.

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