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Stability of Microtearing Modes and the Resulting Electron Thermal Transport in Tokamak Discharges[1] T. RAFIQ, Lehigh Univ., USA, J. WEILAND, Chalmers Univ., Sweden, L. LUO, IBM Research, USA, A. KRITZ, Lehigh Univ., USA, A. PANKIN, Tech-X Corp., USA — Microtearing modes (MTMs) have been identified as a source of significant electron thermal transport in tokamak discharges. In order to understand how MTMs affect transport, and, consequently, the evolution of electron temperature in tokamak discharges, a reduced transport model for MTMs was developed for use in integrated predictive modeling studies [T Rafiq, *et al.,* Phys. Plasmas **23**, 062507 (2016)]. A unified fluid/kinetic approach was used to derive the nonlinear dispersion relation in order to advance the kinetic description and to include the nonlinear effects due to magnetic fluctuations. The dependence of the MTM real frequency and growth rate on radial and poloidal mode numbers (k_y), electron beta, collisionality, safety factor, magnetic shear, density gradient, temperature gradient, and curvature is examined in a numerical study. The magnetic fluctuation amplitude saturation level is computed for each flux surface using the nonlinear MTMs envelope equation. This level depends upon the most unstable eigenvalue as well as on the sidebands in the k_y spectrum. The magnetic fluctuation levels are then used to compute electron thermal transport that is due to the presence of the unstable microtearing modes.

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