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Kinetic effects in RFP plasma VLADIMIR SVIDZINSKI, HUI LI, BRIAN ALBRIGHT, LANL — Strong tearing mode activity is present at sawtooth crashes in the Madison Symmetric Torus reversed field pinch (RFP). It is believed that tearing modes are responsible for strong ion heating and change in plasma flow profile at the crash. Our results based on both linear and nonlinear resistive MHD models showed that the spatial scale of velocity, electric field and current profiles in the tearing mode near resonance surface is comparable to ion gyroradius. The ion gyroradius is relatively large in RFPs because of smaller equilibrium magnetic field. In these conditions both two fluid and kinetic effects can be significant. We study ion kinetic effects on tearing modes in RFP plasmas. We consider RFP-like equilibrium in plane geometry and solve for linear eigenmodes in resistive MHD, two fluid and fully kinetic models. In the first two models we solve an eigenvalue problem, in the last we use particle in cell code VPIC and follow linear time evolution of the fastest growing mode. We analyze how the scale of plasma flow and flow amplitude in the mode are effected by the finite ion gyroradius effect, to what plasma component (ions or electrons) the magnetic energy of initially unstable equilibrium is transfered. Results of this analysis will be presented.

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