Abstract Submitted
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Gyrokinetic simulation of the tearing mode instability[1] EDWARD STARTSEV, WEIXING WANG, WEI-LI LEE, Princeton Plasma Physics Laboratory — A recently developed split-weight perturbative particle simulation scheme for finite-β plasmas in the presence of background inhomogeneities which analytically separates the additional adiabatic response of the particles associated with the quasi-static bending of the magnetic field lines [1] has been generalized to the sheared magnetic field geometry. The new scheme has been implemented in a 2D particle-in-cell code in slab geometry with drift-kinetic electrons and gyrokinetic ions. The electrons pitch-scattering collision operator has also been implemented to study collisionless as well as collisional tearing, and drift-tearing instabilities. In this paper the results of linear simulations of tearing and drift-tearing modes for realistic mass ratio $m_i/m_e = 1837$ and different values of plasma β, electron-ion collision frequency, density and temperature gradients are presented and compared to the solution of the eigenvalue equation [2]. We will also present preliminary results of collisionless tearing mode simulations in cylindrical geometry using tokamak turbulence code GTS.

[1] E. A. Startsev and W. W. Lee, Phys. Plasmas 21, 022505 (2014).
[2] J. F. Drake and Y. C. Lee, Phys. Fluids 20, 1341 (1977).

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