Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

Gyrokinetic simulation of the collisional micro-tearing mode instability[1] EDWARD STARTSEV, WEI-LI LEE, WEIXING WANG, PPPL, Princeton University — An application of recently developed perturbative particle simulation scheme for finite-β plasmas in the presence of background inhomogeneities is presented. Originally [1], using similar scheme, we were able to simulate shear-Alfven waves, finite-β modified drift waves and ion temperature gradient modes using a simple gyrokinetic particle code based on realistic fusion plasma parameters. Recently, we have successfully used the scheme for simulation of linear tearing and drift-tearing modes, in both collisionless semi-collisional regimes in slab geometry with sheared magnetic field. Here, we present further development of this scheme for the simulation of linear semi-collisional micro-tearing mode driven by electron temperature gradient [2] in high-aspect ratio cylindrical cross-section tokamak using the modified 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).

[1]Research supported by the U. S. Department of Energy.

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Date submitted: 24 Jul 2015 Electronic form version 1.4