Abstract Submitted
for the DPP11 Meeting of
The American Physical Society

Neoclassical Toroidal Viscosity Calculations in Tokamaks using a δf Monte Carlo Simulation and Their Verifications[1] SHINSUKE SATAKE, National Institute for Fusion Science, JOHN-KYU PARK, Princeton Plasma Physics Laboratory, HIDEO SUGAMA, RYUTARO KANNO, National Institute for Fusion Science — Effect of magnetic perturbation on plasma rotation is an important issue in tokamaks, since recent studies have shown that perturbation as small as $\delta B/B_0 \sim 10^{-4}$ can induce significant rotation damping. A new simulation to calculate neoclassical toroidal viscosity (NTV) in tokamaks with weak non-axisymmetric perturbation has been developed by adopting the δf Monte Carlo method [1]. Previous benchmark has proven that in $\mathbf{E} \times \mathbf{B} \to \mathbf{0}$ limit the simulation result agrees well with the combined analytic formula by Park [2] in wide range of collision frequency [3]. In the presentation, further benchmark results of NTV calculation will be reported for the cases with finite $\mathbf{E} \times \mathbf{B}$ rotation and toroidal flow. Non-local (finite-orbit-width) effects on NTV, which may appear only in the δf simulation, will also be investigated.

[1] S. Satake et al., Plasma Phys. Controlled Fusion **53**, 054018 (2011).
[2] J.-K. Park et al., Phys. Plasmas **16**, 056115 (2009).
[3] S. Satake et al., accepted to Phys. Rev. Lett.

[1]This research was supported by JSPS Grant-in-Aid for Young Scientists (B) 23760810.

Shinsuke Satake
National Institute for Fusion Science

Date submitted: 12 Jul 2011 Electronic form version 1.4