

Abstract Submitted
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Enhancement of neoclassical toroidal viscosity by bounce harmonic resonance in perturbed tokamaks KIMIN KIM, JONG-KYU PARK, GERRIT J. KRAMER, Princeton Plasma Physics Laboratory, ALLEN H. BOOZER, Columbia University, JONATHAN E. MENARD, Princeton Plasma Physics Laboratory — Demonstration of bounce harmonic resonance is reported using a newly developed delta-f code, POCA (Particle Orbit Code for Anisotropic pressures). POCA is a drift-kinetic delta-f guiding-center orbit code to calculate neoclassical transport in perturbed tokamaks. Basic features of POCA are presented with successful benchmarking tests in the axisymmetric and non-axisymmetric configurations. Bounce harmonic resonances were clearly found by POCA, which has been predicted to significantly enhance the NTV transport by the resonances between bounce motions and electric precessions. Simulation results indicate strong NTV peaks at the electric precession frequency resonating with bounce frequencies, consistently with the theory prediction. A new type of closed orbits formed by the combinations of bounce motions with precessions is observed, which prevents phase mixing of bounce orbit thus enhances the NTV transport. This work was supported by the US DOE Contract #DE-AC02-09CH11466.

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