Abstract Submitted
for the APR09 Meeting of
The American Physical Society

Bounce-Transit and Drift Resonance and Neoclassical Toroidal Plasma Viscosity in Tokamaks K.C. SHAING, National Cheng-Kung Univ. Taiwan, M.S. CHU, General Atomics, S.A. SABBAGH, PPPL — The importance of the resonance between the bounce frequency of the trapped particles and precession drift frequency in tokamaks to the low frequency magnetohydroynamic instabilities has been recognized for a long time. The resonance is also important in the transport processes as demonstrated by Park, et al. in calculating the neoclassical toroidal plasma viscosity [1]. They found that the transport fluxes are independent of the collision frequency, i.e., a resonant plateau regime. Here, we develop a theory for neoclassical toroidal plasma viscosity to include not only the bounce and drift resonance of the trapped particles but also the transit and drift resonance the circulating particles [2]. In the resonant plateau regime, our results are similar to those obtained by Park, et al., except that bounce average over the trapped particle trajectories is not performed and that the contributions from the circulating particles are included. In the collisional limit, it is found that the resonant plateau regime is connected to the Pfirsch-Schluter regime. [1] PARK, J.-K.,. . . et al., IAEA,Fusion Energy Conference, Geneva, October 2008, Paper EX/5-3Rb. [2] SHAING, K. C., CHU, M. S., and SABBAGH, S. A., (to be submitted to Plasma Phys. Control. Fusion)

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Date submitted: 13 Jan 2009 Electronic form version 1.4