Abstract Submitted
for the DPP17 Meeting of
The American Physical Society

Eulearian approach to bounce-transit and drift resonance with magnetic drifts in tokamaks[1] KER CHUNG SHAING, National Cheng Kung University, J. SEOL, National Fusion Research Institute, Korea, M. S. CHU, Institute of Plasma Physics, China, S. A. SABBAGH, Columbia University, USA — Bounce-transit and drift resonance can be important to plasma confinement in tokamaks with broken symmetry, and can have implications on the wave-particle resonance. Usually, the resonance is either treated by integrating along the unperturbed orbits or calculated using an action-angle approach. An Eulerian approach has been developed so that momentum conservation property of the Coulomb collision operator can be taken into account. The parallel flows appear in the thermodynamic forces in the Eulerian approach. However, in the existing theory, only $\boldsymbol{E}$ x $\boldsymbol{B}$ drift is kept; the magnetic drifts are neglected by adopting the large aspect ratio assumption. Here, $\boldsymbol{E}$ is the electric field, and $\boldsymbol{B}$ is the magnetic field. The importance of the magnetic drifts in finite aspect ratio tokamaks is demonstrated in [C. G. Albert, et al., Phys. Plasmas **23**, 082515 (2016)]. Here, the Eulerian approach is extended to include the magnetic drifts to calculate neoclassical toroidal plasma viscosity in finite aspect ratio tokamaks. The relation to the nonlinear plasma viscosity in the plateau regime [K. C. Shaing, K. Ida, and S. A. Sabbagh, Nucl. Fusion **55**, 125001 (2015)] will also be discussed.

[1]This work was supported by Taiwan Ministry of Science and Technology under Grant No. 100-2112-M-006-004-MY3, and Republic of Korea MSIP (Ministry of Science, ICT and Future Planning) under KSTAR program.

Ker Chung Shaing
National Cheng Kung University

Date submitted: 18 Jul 2017 Electronic form version 1.4