Abstract Submitted
for the DPP16 Meeting of
The American Physical Society

Enhanced understanding of momentum transport barrier observed in KSTAR H. H. LEE, J SEOL, W. H. KO, L. TERZOLO, A. Y. AYDEMIR, Y. IN, National Fusion Research Institute, Y. -C. GHIME, Korea Advanced Institute of Science and Technology, S. G. LEE, National Fusion Research Institute
— It is expected that H-mode plasmas exhibit transport barriers not only for plasma particles and energy but also for toroidal angular momentum. Although density and temperature pedestals at the edge have been seen since the first observations of H-mode in tokamaks three decades ago, a toroidal rotation pedestal is not commonly observed except in some special cases such as QH-mode or is much weaker than those in the density and temperature profiles. But, in the KSTAR tokamak, H-mode plasma is always accompanied by the noticeable toroidal rotation pedestal. We show that the inherent nonaxisymmetric error fields and toroidal ripple can generate significant neoclassical toroidal viscosity (NTV), which damps the toroidal rotation at the edge and to a large extent remove the pedestal in the rotation profile. On the other hand, we demonstrate that the NTV torque induced by the intrinsic error fields and toroidal field ripple in the level of the KSTAR tokamak, which are expected to be smaller than most tokamaks by at least one order of magnitude, is negligible in determining the toroidal rotation velocity profile. Thus we conclusively show that H-mode provides a transport barrier against all three transport channels when turbulent transport is suppressed at the edge.

Hyungho Lee
National Fusion Research Institute

Date submitted: 15 Jul 2016 Electronic form version 1.4