Abstract Submitted
for the DPP17 Meeting of
The American Physical Society

Observation of the Generalized Neoclassical Toroidal Viscosity Offset Rotation Profile in KSTAR* S.A. SABBAGH, Y.S. PARK, Columbia U., J. KIM, W.H. KO, S.H. HAHN, Y. IN, Y.K. OH, NFRI, K.C. SHAING, National Cheng Kung U., Y. SUN, ASIPP — A beneficial effect of Neoclassical Toroidal Viscosity [1] that may be important in slowly rotating plasmas as expected in ITER is the inherent or "offset" rotation created by an applied 3D field. Past experiments and associated theory have only considered that the NTV offset rotation can occur in the direction opposite to the plasma current. More recently, the NTV offset rotation profile, V_0^{NTV}, was directly measured and studied in the KSTAR tokamak that has shown for the first time strong, controlled rotation in the co-I_p direction at high electron temperature. This result is expected from generalized NTV theory that allows for electron and ion torques. A field with dominant n = 2 component was applied to produce V_0^{NTV}. Rotation in the plasma outer region exceeded 12 krad/s, quite significant compared to projections for ITER of approximately 2 krad/s in the pedestal region. Also, the V_0^{NTV} rotation profile shear is 15 times greater than measured in the intrinsic rotation profile (without 3D field). Experiments at higher T_e produced the strong co-rotation and rotation shear while higher density and lower T_e reduced these characteristics. [1] K.C. Shaing, K. Ida, S.A. Sabbagh, Nucl. Fusion **55** (2015) 125001. *Supported by US DOE Contracts DE-FG02-99ER54524 and DE-SC0016614.

Steven Sabbagh
Columbia U. / PPPL

Date submitted: 18 Jul 2017 Electronic form version 1.4