Abstract Submitted
for the DPP17 Meeting of
The American Physical Society

Parallel Transport with Sheath and Collisional Effects in Global Electrostatic Turbulent Transport in FRCs JIAN BAO, CALVIN LAU, ANIMESH KULEY, ZHIHONG LIN, Univ of California - Irvine, DANIEL FULTON, Tri Alpha Energy, Inc., TOSHIKI TAJIMA, Univ of California - Irvine, TRI ALPHA ENERGY, INC. TEAM — Collisional and turbulent transport in a field reversed configuration (FRC) is studied in global particle simulation by using GTC (gyrokinetic toroidal code). The global FRC geometry is incorporated in GTC by using a field-aligned mesh in cylindrical coordinates, which enables global simulation coupling core and scrape-off layer (SOL) across the separatrix. Furthermore, fully kinetic ions are implemented in GTC to treat magnetic-null point in FRC core. Both global simulation coupling core and SOL regions and independent SOL region simulation have been carried out to study turbulence [1-3]. In this work, the logical sheath boundary condition [4] is implemented to study parallel transport in the SOL. This method helps to relax time and spatial steps without resolving electron plasma frequency and Debye length, which enables turbulent transports simulation with sheath effects. We will study collisional and turbulent SOL parallel transport with mirror geometry and sheath boundary condition in C2-W divertor. [1] D. Fulton et al, Phys. Plasmas 23, 012509 (2016); Phys. Plasmas 23, 056111 (2016). [2] L. Schmitz et al, Nat. Communications 7, 13860 (2016). [3] C. Lau et al, Phys. Plasmas 24, in press (2017). [4] S. Parker et al, J. Comput. Phys. 104, 41-49 (1993).

Jian Bao
Univ of California - Irvine

Date submitted: 13 Jul 2017 Electronic form version 1.4