Abstract Submitted
for the DPP16 Meeting of
The American Physical Society

Anomalous Transport in High Beta Poloidal DIII-D Discharges[1]

A. PANKIN, LLNL, A. GAROFALO, General Atomics, A. KRITZ, T. RAFIQ, Lehigh U., J. WEILAND, Chalmers U. of Technology — Dominant instabilities that drive anomalous transport in high beta poloidal DIII-D discharges [A.M. Garofalo *et al*. Proc. of 25th IAEA FEC (St. Petersburg, Russia, 2014) 657] are investigated using the MMM7.1 [T. Rafiq *et al*. Phys. Plasmas 20 (2013) 032506], and TGLF models in the predictive integrated modeling TRANSP code. The ion thermal transport is found to be strongly reduced in these discharges, but turbulence driven by the ITG modes along with the neoclassical transport still play a role in determining the ion temperature profiles. The electron thermal transport driven by the ETG modes impact the electron temperature profiles. The $E \times B$ flow shear is found to have a small effect in reducing the electron thermal transport. The Shafranov shift is found to strongly reduce the anomalous transport in the high beta poloidal DIII-D discharges. The reduction of Shafranov shift can destroy the ion internal transport barrier and can result in significantly lower core temperatures. The MMM7.1 model predicts electron and ion temperature profiles reasonably well, but it fails to accurately predict the properties of electron internal transport barrier, which indicates that the ETG model in MMM7.1 needs to be improved in the high beta poloidal operational regime.

[1]Research supported by the Office of Science, US DOE.

Alexei Pankin
Lawrence Livermore National Laboratory

Date submitted: 15 Jul 2016

Electronic form version 1.4