Abstract Submitted
for the DPP19 Meeting of
The American Physical Society

Theory-based Modeling of ITER Baseline Scenarios on DIII-D with High Power Electron Cyclotron Heating[1] KYUNGJIN KIM, J.M. PARK, ORNL, C. HOLCOMB, LLNL, F. TURCO, Columbia University, M. VAN ZEELAND, GA, DIII-D TEAM — Theory-based integrated modeling validated against DIII-D experiments predicts that the planned upgrade of high power Electron Cyclotron Heating (ECH) allows access to dominant electron heating regime with low rotation for the ITER baseline scenario (IBS) in a scaled ITER shape on DIII-D. The FASTRAN modeling in the core region with TGLF reproduces reasonably well the experimental profiles of the IBS discharges including electron density, electron and ion temperatures, toroidal rotation, and plasma current (poloidal magnetic flux) self-consistently with EPED1 for edge pedestal, EFIT for MHD equilibrium, NUBEAM and TORAY for external heating and current drives. It is predicted that at least 5 MW ECH is needed to produce an ECH-only IBS to match the normalized ITER value of I_p/aB_T and β_N. It is found that thermal energy confinement H_{98} depends strongly on the location of ECH deposition and the plasma density, indicating central heating at relatively high density is needed to achieve the target value of H_{98} =1. Preliminary simulations on the effect of heat transport caused by sawteeth will be discussed for cases with ECH inside the radial location of ρ(q=1)˜0.5.

[1]Work supported by US DOE under DE-FC02-04ER54698, DE-AC05-00OR22725, DE-SC0017992, DE-AC52-07NA27344, DE-FG02-04ER54761

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Date submitted: 03 Jul 2019 Electronic form version 1.4