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[X] Theory [ ] Experiment

Exploration of ITER Steady-State Scenarios Using FASTRAN/IPS Integrated Transport Modeling*, M. Murakami, J.M. Park, D.B. Batchelor, S.J. Diem, W.R. Elwasif, A.C. Sontag, *ORNL*; and the DIII-D Team – ITER steady-state (SS) scenarios are examined using an iterative steady-state (d/dt=0) solution procedure using FASTRAN solver implemented in Integrated Plasma Simulator framework, self-consistently with heating and current drive (H&CD), MHD equilibrium, and transport models. The objective of the exercise is to understand the range of steady-state solutions using theory-based transport models with the ITER Day-1 H&CD and proposed upgrades (EC launcher modifications). ITER operation performances (fusion gain Q and noninductive fraction f_{NI} and steady burn duration) are compared using different transport models (TGLF, GLF23, CDBM, MMM7.1) based on the edge profiles scaled from recent DIII-D ITER Steady State Demo discharges as well as from the existing pedestal models (EPED). Sensitivities of the operation spaces are studied using different density peaking and plasma current. Reducing I_p increases achievable f_{NI} while peaking density increases Q but limited by MHD stability. Optimization of Day-1 H&CD mixes is discussed toward the ITER goal (Q=5 and f_{NI}=1 for 3000 s).

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