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Modeling of ITER scenarios with improved Multi-Mode model
T. RAFIQ, A.H. KRITZ, G. BATEMAN, A.Y. PANKIN, Lehigh U., C. KESSEL, R.V. BUDNY, D.C. MCCUNE, PPPL — The Multi-Mode transport model, including a new drift resistive inertial ballooning mode model, is used in PTRANSP simulations. Validation studies have been carried out using L-mode discharges in existing tokamaks. The time evolution of temperature, toroidal angular frequency and current density profiles is predicted in ITER hybrid and steady state discharges. External heating and current drive sources including NBI, LH, ECRH and ICRH, are computed using NUBEAM, LSC, TORAY and TORIC modules, respectively. The NCLASS module is used to compute neoclassical resistivity and bootstrap current. The sensitivity studies include the variation of the pedestal height around the value predicted by EPED1. The fusion power production and fusion Q computed with the Multi-Mode model are compared with those obtained using the GLF23 model. The dependence of heat deposition is studied with varying ICRF frequency, beam orientation and ECRH launch angles. The discharge scenarios simulated aid in understanding the conditions for optimizing fusion power production and in examining other measures of plasma performance.

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