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PTRANSP study of energy confinement associated with toroidal rotation in tokamak discharges F.D. HALPERN, A.H. KRITZ, G. BATEMAN, A.Y. PANKIN, T. RAFIQ, Lehigh U., D.C. MCCUNE, R.V. BUDNY, PPPL — PTRANSP integrated modeling simulations are carried out for existing tokamak devices and ITER in order to study the effects of toroidal rotation on the thermal energy confinement in H-mode discharges. These simulations include self-consistent computation of toroidal momentum transport, thermal transport, and particle transport. The toroidal rotation frequency is evolved by balancing momentum diffusion and convection against the source of neutral beam torque. The toroidal angular momentum diffusion coefficients are computed using the GLF23 model or the new Weiland model. Objectives of this work include examining the parametric dependence of the simulated energy and momentum confinement times as a function of the beam driven torque density. PTRANSP simulations indicate that the flow shear driven by toroidal rotation could increase the fusion performance of ITER. It is shown that the improvement in thermal energy confinement depends on the choice of the edge boundary condition for the toroidal rotation frequency.

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