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On the ρ_* Scaling of Intrinsic Rotation in C-Mod Plasmas with Edge Transport Barriers[1] JOHN RICE, JERRY HUGHES, MIT PSFC, PATRICK DIAMOND, UCSD, NORMAN CAO, MARK CHILENSKI, AMANDA HUBBARD, JAMES IRBY, MIT PSFC, YUSUKE KOSUGA, Kyushu University, YIJUN LIN, MIT PSFC, MATT REINKE, ORNL, ELIZABETH TOLMAN, STEVE WOLFE, STEVE WUKITCH, MIT PSFC — Changes in the core intrinsic toroidal rotation velocity following L- to H- and L- to I-mode transitions have been investigated in Alcator C-Mod tokamak plasmas. The magnitude of the co-current rotation increments is found to increase with the pedestal temperature gradient and q_{95}, and to decrease with toroidal magnetic field. These results are captured quantitatively by a model of fluctuation entropy balance which gives the Mach number M_i ~$\rho_*/2$ L_s/L_T ~gradT q_{95}/B_T in an ITG turbulence dominant regime. The agreement between experiment and theory gives confidence for extrapolation to future devices in similar operational regimes. Core thermal Mach numbers of ~0.07 and ~0.2 are expected for ITER and ARC, respectively.

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