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Analysis of Rotation and Transport Data in C-Mod ITB Plasmas¹

C.L. FIORE, J.E. RICE, M.L. REINKE, Y. PODPALY, MIT-PSFC, I.O. BE-SPAMYATNOV, W.L. ROWAN, FRC-UT Austin — Internal transport barriers (ITBs) spontaneously form near the half radius of Alcator C-Mod plasmas when the EDA H-mode is sustained for several energy confinement times in either off-axis ICRF heated discharges or in purely ohmic heated plasmas. These plasmas exhibit strongly peaked density and pressure profiles, static or peaking temperature profiles, peaking impurity density profiles, and thermal transport coefficients that approach neoclassical values in the core. It has long been observed that the intrinsic central plasma rotation that is strongly co-current following the H-mode transition slows and often reverses as the density peaks as the ITB forms. Recent spatial measurements demonstrate that the rotation profile develops a well in the core region that decreases continuously as central density rises while the value outside of the core remains strongly co-current. This results in the formation of a steep potential gradient/strong electric field at the location of the foot of the ITB density profile. The resulting $E \times B$ shearing rate is also quite significant at the foot. These analyses and the implications for plasma transport and stability will be presented.

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