Abstract Submitted
for the DPP20 Meeting of
The American Physical Society

Dimensionless Parameter Scaling of Intrinsic Torque in C-Mod Enhanced Confinement Plasmas[1] JOHN RICE, NORMAN CAO, Massachusetts Institute of Technology MIT, TUOMAS TALA, VTT, COLIN CHRYSTAL, GA, MARTIN GREENWALD, JERRY HUGHES, JIM IRBY, YIJUN LIN, EARL MARMAR, Massachusetts Institute of Technology MIT, MATT REINKE, ORNL, PABLO RODRIGUEZ-FERNANDEZ, Massachusetts Institute of Technology MIT — A dimensionless parameter dependence study of intrinsic torque has been performed on a database of H- and I-mode plasmas from the Alcator C-Mod tokamak. The torque was determined by comparing intrinsic angular momentum density profiles just before and just after L-H and L-I transitions. The intrinsic torque has been found to scale as $\beta_N^{1.5}\rho_*^{-1.0}\nu_*^{0.1}$, with the parameter ranges $0.3 < \beta_N < 1.5$, $0.004 < \rho_* < 0.011$ and $0.04 < \nu_* < 0.9$, and with the intrinsic torque varying between 0.04 and 0.6 Nm. Comparison with results from other tokamaks suggests that the intrinsic torque should be normalized by some measure of the device size. Normalizing to the major radius yields a scaling proportional to $1/\rho_*$ at fixed β_N (around 1.3), and an intrinsic torque value of 4 Nm for SPARC with R = 1.85 m and $\rho_* = 0.0027$.

[1]Work supported by DoE award DE-SC0014264.

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Date submitted: 25 Jun 2020 Electronic form version 1.4