Abstract Submitted
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Size Scaling of Intrinsic Rotation in DIII-D[1] J.S. DEGRASSIE, GA, W.M. SOLOMON, PPPL — Despite the richness in the variety of the profiles of intrinsic rotation in axisymmetric tokamaks, a common feature is a co-Ip directed toroidal velocity on the outboard midplane in the region of $\rho \sim 0.8$ in DIII-D. This feature showed a "Rice scaling" (RS) in DIII-D and led to similarity experiments with C-Mod [1]. RS correlates toroidal velocity with W/Ip, where W is the total plasma kinetic energy and Ip the plasma current. Subsequent analysis from DIII-D shows a clear $\rho*$ dimensionless scaling of this intrinsic velocity in DIII-D, where $\rho* \sim \sqrt{T_i}/aB$, multiplying the βq scaling indicative of RS [1]. The DIII-D scaling is $M_A \sim \beta_N \rho*$, where M_A is the Alfvén "Mach" value and β_N is normalized β. In machine parameters it is very similar to the theoretical "Parra scaling," [2] which emphasizes the correlation of toroidal velocity with ion temperature as seen experimentally, but in this DIII-D scaling having an additional critical dependence on $\sqrt{\beta}$. Published data from C-Mod and low power ICRF in JET also fit with this DIII-D scaling. The relation to the RS will be described.

[1] J.S. deGrassie et al., Phys. Plasmas 14, 056115 (2007).
[2] F. Parra et al, Phys. Rev. Lett. 108, 095001 (2012)

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