Abstract Submitted
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Characteristics of turbulence nonlinearly driven plasma flow and origins of empirical scalings of intrinsic rotation in experiments[1] W.X. WANG, PPPL, P.H. DIAMOND, UCSD, T.S. HAHM, S. ETHIER, W.M. TANG, PPPL — Recent progress made by our global gyrokinetic simulations in understanding the origin of intrinsic rotation and plasma flow formation in tokamaks is reported. Critical issues to be addressed are closely coupled to experimental and theoretical studies. We focus our discussion on: i) nonlinear mechanism for turbulence driving plasma flow; ii) underlying physics governing experimental empirical scalings of the intrinsic rotation with respect to plasma gradients, current and magnetic shear; iii) machine size scaling of the intrinsic rotation; iv) coupling of core rotation to edge (namely, very outer core region) flow via turbulence. Our nonlinear simulation studies are carried out for electrostatic turbulence with emphasis placed on electron transport dominated regimes. Also discussed are possible experimental tests of simulation predictions.

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