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[ ] Theory [X] Experiment

**Toroidal Flow in Tokamak Plasmas,*** J.D. Callen, A.J. Cole, C.C. Hegna, *U. Wisc-Madison* – Many effects influence toroidal flow evolution in tokamak plasmas. Momentum sources and radial diffusion due to axisymmetric neoclassical, paleoclassical and anomalous transport are usually considered. In addition, the toroidal flow can be affected by field errors. Small, non-axisymmetric field errors arise from coil irregularities, active control coils and collective plasma magnetic distortions (e.g., NTMs, RWMs). Resonant field errors cause localized electromagnetic torques near rational surfaces in the plasma, which can lock the plasma to the wall leading to magnetic islands and reduced confinement or disruptions. Their penetration into the plasma is limited by flow-shielding effects; but they can be amplified by the plasma response at high beta. Non-resonant field errors cause magnetic pumping and radial banana drifts, and lead to toroidal flow damping over the entire plasma. Many of these processes can also produce momentum pinch and intrinsic flow effects. This poster will seek to present a coherent picture of all these effects and suggest ways they could be tested and distinguished experimentally.

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