Abstract Submitted
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Natural magnetic island rotation frequency in the presence of plasma turbulence[1] C.C. HEGNA, University of Wisconsin — A simple model is constucted to account for the interaction of plasma turbulence with a rotating magnetic island. The theory describes the self-consistent effect the turbulence has in determining the natural rotation frequency of the island. A number of magnetic island physics theories model the effect of plasma turbulence through the addition of phenomenological enhanced cross-field diffusion coefficients. What is neglected in this formulation is a description of how the island's helically deformed fields modify the turbulence. In particular, the helical electrostatic potential and plasma profile features modulate the turbulence induced mean field forces (Reynolds-Maxwell stresses). These forces then produce helical perpendicular plasma currents that alter the plasma quasineutrality condition, and hence affect the island growth and rotation properties. Speculations on the role of turbulence induced changes in the island rotation frequency and the seeding of neoclassical tearing modes will be addressed.

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C. C. Hegna
University of Wisconsin

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