

Abstract Submitted
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Electromagnetic corrections to the zonal flow residual¹ ISTVAN PUSZTAI, Chalmers Univ. Technology, and MIT PSFC , PETER J. CATTO, MIT PSFC, FELIX I. PARRA, Oxford Univ., Physics Dept. — The axisymmetric zonal flow residual calculation in tokamak plasmas is generalized to include electromagnetic perturbations. Instead of imposing magnetic perturbations externally, we formulate and solve a description retaining the fully self-consistent temporal and spatial perturbations in the electric and magnetic fields. Simple expressions for the electrostatic, shear and compressional magnetic residual responses derived provide a fully electromagnetic test of the zonal flow residual in gyrokinetic codes. We find that at $\beta \sim \mathcal{O}(1)$ the most easily testable quantity is the compressional magnetic perturbation generated by the density perturbation corresponding to the zonal flow potential, while at small values of β , the electrostatic and shear magnetic responses to an initial compressional magnetic perturbation can also be detectable. Without collisions any initial magnetic perturbation remain completely undamped.

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