Sorting Category: 5.9 (Theoretical)

Full Radius Electromagnetic Gyrokinetic Turbulence Code[1] R.E. WALTZ, J. CANDY, M.N. ROSENBLUTH, F.L. HINTON, General Atomics — We have developed a nonlinear electromagnetic gyrokinetic code to simulated high-n transport in tokamaks. The nonlinear electromagnetic gyrokinetic equations reduce to those of Frieman and Chen[2] in the ballooning mode or "flux tube" cyclic boundary condition limit. Our code goes beyond the flux tube to a full radius or "wedge tube" which will allow simulations at finite ρ^* including profile shear stabilization effects. It has a mode of reduced operation in the flux tube limit and is expected to recover the $\rho^* \to 0$ gyroBohm scaled results. The code is formulated with real geometry using Miller's generalized $\hat{s} - a$ local MHD equilibrium model.[3] Continuum (fluid-like) numerical methods are used with a five-dimensional grid. Linear implicit numerical techniques allow the fast transit motion of the current carrying untrapped electrons to be passed over, thus permitting finite beta simulations up to the MHD critical beta.

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