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P5.1096 Simulation of turbulent plasma toroidal rotation evolution with ECR heating switch-on in tokamak

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This paper continues our research on nonlinear low-frequency turbulent convection and associated anomalous cross-field transport processes of tokamak core plasmas [1]- [4]. Numerical simulations are performed with code CONTRA-C, which is developed in the frame of simplified cylindrical model for tokamaks [2]. The dynamic of toroidal momentum in this model is governed by several processes: viscosity, Reynolds' stress and external momentum sources and sinks (e.g. neutral beam injection). Viscosity term is divergent at the plasma core region, but also includes momentum exchange between plasma core and SOL region at the simulation domain boundary. Reynolds' stress governs the kinetic energy exchange between toroidal rotation and fluctuations. This term does not change the toroidal momentum integral, but affects toroidal rotation profile. The example of interplay between viscosity and Reynolds' stress is self-consistent toroidal rotation maintenance in some tokamak ohmic regimes [4]. In this paper temporal evolution and radial profiles of toroidal momentum and plasma potential are simulated and analyzed for tokamak regimes with ECR heating switch-on. Special attention is paid to regimes with conditions for ITB formation near major rational magnetic surfaces [3].

References
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