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Intrinsic rotation study in the HL-2A ECRH plasma with GTS code*

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Toroidal rotation plays important roles in the L-H transition, formation of internal transport barriers (ITBs) and suppression of resistive wall modes (RWMs) in tokamaks. Besides the external momentum input from neutral beam injection (NBI), intrinsic toroidal rotation has been observed on many tokamaks[1]. In the ECRH+NBI experiments of KSTAR tokamak, ECRH is found to cause a counter-current rotation increment[2]. It is considered that turbulence generated residual stress drives the intrinsic rotation[3]. In the experiments with mixed heating by co-current NBI and ECRH on the HL-2A tokamak, Ion temperature and toroidal rotation decrease, and their profiles became flat. Gyrokinetic Tokamak Simulation (GTS) code[4] is used to investigate the momentum transport and intrinsic rotation. The diffusion and residual stress terms of the momentum flux are calculated, and the turbulence in the plasma is analyzed. The results are shown in the figure 1 and 2. The calculated results show that the main turbulence is the trapped electron mode (TEM), and the residual stress is comparable with diffusion.

References
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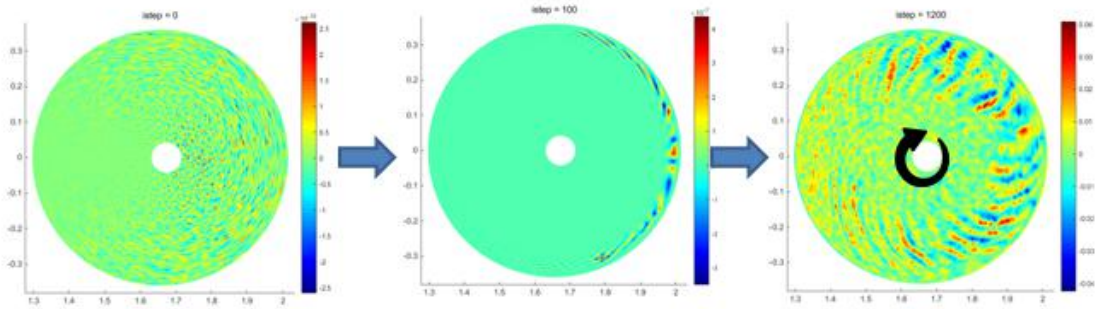

Figure 1 turbulence mode

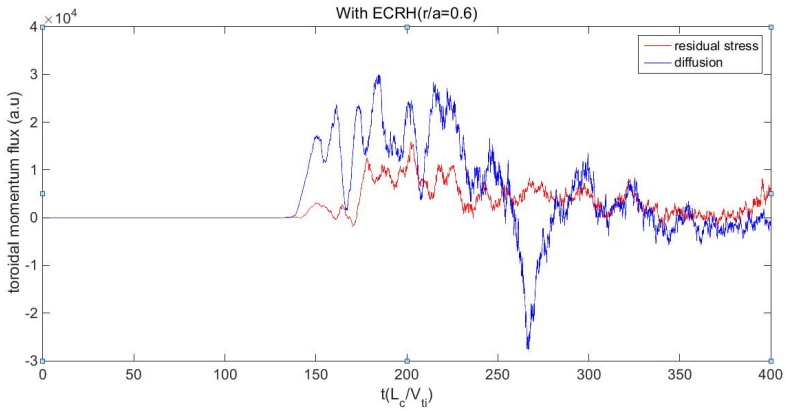

Figure 2 Toroidal momentum flux

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