



Evaluation of Neoclassical Toroidal Viscosity Torque Induced by Resonant Magnetic Perturbation on HL-2A

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Neoclassical toroidal viscosity (NTV) torque induced by plasma response to resonant magnetic perturbation (RMP) on HL-2A tokamak based on the experimental equilibrium profiles [1] is evaluated using the recently developed coupling scheme [2] between the NIMROD [3] and the NVTOK codes [4]. Both the circular-shaped and the realistic wall boundaries are considered in this study. The calculated NTV torque is mainly localized in the core region, whose profile is determined by the combined effects of both plasma response and equilibrium profiles. With the realistic wall boundary condition of HL-2A, the plasma response to RMP is composed of multiple helicities, and the resulting NTV torque is compared to the circular-shaped wall case. Using the experimental RMP amplitude, the NTV torque can reach the same order of magnitude as that from neutral beam injection. This suggests the significant role of NTV torque in the momentum transport process on HL-2A.

References:

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