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Steady state toroidal rotation profile in tokamak edge pedestal in presence of resonant magnetic perturbations[1] X.-T. YAN, University of Science and Technology of China, P. ZHU, Huazhong University of Science and Technology, Y.-W. SUN, CAS Institute of Plasma Physics — Steady state toroidal rotation can significantly influence the transport and stability in tokamak edge pedestal, as well as the edge plasma response to resonant magnetic perturbation (RMP). Neoclassical toroidal viscosity (NTV) torque induced by RMP has been found significant in tokamak edge pedestal due to large diamagnetic drifts [1]. In this work, we calculate the edge steady state toroidal rotation in presence of RMP, based on a coupling scheme developed between the NIMROD and the NTVTOK codes. In presence of the NTV torque alone, toroidal rotation would relax to the neoclassical offset rotation in steady state. In general, other toroidal momentum sources in addition to NTV torque may pull the rotation away from the neoclassical offset rotation. However, as the RMP amplitude increases and the NTV torque dominates, the steady state toroidal rotation would eventually evolve towards the neoclassical offset rotation, which is found peaked at the center of edge pedestal. Of particular interest is a location where the rotation remains unchanged as RMP amplitude increases, which happens to be the natural offset rotation in absence of RMP.
[1] X.-T. Yan, P. Zhu, and Y.-W. Sun, Phys. Plasmas 24, 082510 (2017).

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