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Effects of 3D magnetic fields on plasma rotation in RFX-mod tokamak experiments LIDIA PIRON, PAOLO PIOVESAN, FULVIO AURIEMMA, DANIELE BONFIGLIO, LORELLA CARRARO, MARCO GOBBIN, LIONELLO MARRELLI, MARCO VALISA, MARCO VERANDA, BARBARA ZANIOL, Consorzio RFX, LUIS CHACON, ORNL, CONSORZIO RFX TEAM —
In tokamaks, plasma rotation is important to stabilize deleterious MHD instabilities, to screen resonant magnetic perturbations, but also to improve energy confinement through turbulence suppression. Rotation can be affected by external 3D magnetic fields, e.g. due to error fields or active coils. The RFX-mod device has been recently run as an Ohmic tokamak with q(a)<2 thanks to the suppression of the m=2, n=1 external kink through active control. In this work, we study plasma rotation in these plasmas in the presence of 3D magnetic fields, applied through magnetic feedback or due to MHD instabilities. In particular, in plasmas with q(a)>2 toroidal rotation braking has been observed as the 2/1 tearing mode locks. However with q(a)<2, the rotation at first decelerates as the 2/1 RWM grows in amplitude and then reverses its sign from counter to co-Ip direction. The results are interpreted by considering the various physical mechanisms playing a role on momentum transport, such as NTV, ambipolar electric fields due to residual stochasticity and the friction force due to neutrals.

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