# Experimental observations of RMP induced toroidal rotation accelerations on EAST

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The neoclassical toroidal plasma viscosity (NTV) effects induced by the RMP systems are shown to efficiently drive plasma rotations in recent experiments. Theory predicts that in the low-collisionality case, where the electron fulx is dominant, the NTV effect could drive co-current plasma rotations with positive "offset" rotation values [1]. These phenomena are also observed at KSTAR. As shown in the Ref. [2], the RMP systems can drive substantial rotations before the mode lock. Recent experiments on EAST show that even with mode lock occurring, RMPs can still drive co-current plasma rotations in some situations. The toroidal MHD mode spectrum are shown in Fig. 1.

It can be seen that after RMPs coil current ramp up to a threshold value, a new pattern of about 15 kHz shows in the spectrum which corresponds to the mode lock process. After the mode lock occurs, the toroidal rotation angular frequencies $V_{tor}/2\pi R$ (dot lines) increase for approximately 1.5 kHz, which is around 17 km/s on EAST. There are remarkable rotation increments in the whole region $\rho = 0.14$ to $\rho = 0.4$. Further comparisons of the experimental observation are shown in the poster. The experimental results show that RMP-induced NTV torque can act as an efficient momentum source to drag the toroidal rotations to the positive "offset" rotation values.

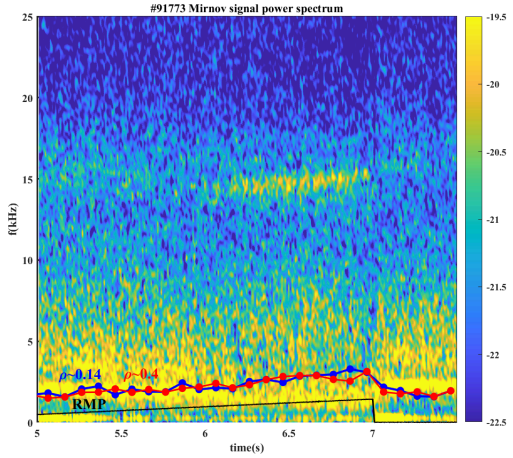


Figure 1: *Toroidal MHD mode spectrum derived from the toroidal Mirnov coils signals.*

## References

[1] Y.W. Sun, K.C. Shaing and Y. Liang, Nucl. Fusion **53**, 093010 (2013)

[2] S.M. Yang, J.-K. Park and Yong-Su Na, Phys. Rev. Lett. **123**, 095001 (2019)