

# Gyrokinetic Neoclassical Study of the effect of the X-point height on ExB Flow Structure in an H-mode edge plasma

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The X-point height relative to the divertor plates may cause difference in the neutral particle penetration into pedestal and have impact on the pedestal physics in H-mode. In the present work, we utilize the total-f global gyrokinetic neoclassical code XGCa to study the X-point height effect on the ExB flow profile in a JET-like H-mode pedestal in a realistic JET-like divertor geometry and with neutral particle recycling. The vacuum pump is not modeled in the results presented here. Effect of plasma turbulence on the Er-well depth is not considered either. The main result is that the neoclassical Er profile is sensitive to the vertical X-point location, while the plasma profile change is only minimal.

The findings here imply that, even though the change in the plasma profile may not be easily noticeable in the experiment, the hidden change in the ExB profile could cause a difference in the pedestal physics such as the ELM stability and turbulent/neoclassical transport. The change in the ExB rotation, without much change in the plasma profiles, is balanced by the change in the toroidal flow speed. The vertical X-point movement, as a result of this Er profile change, can sensitively affect high-Z impurity transport and its accumulation in the pedestal.

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