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Residual Stress and Momentum Transport in Electromagnetic ITG Turbulence

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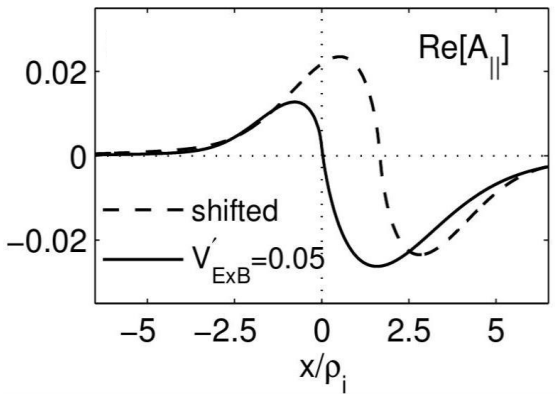
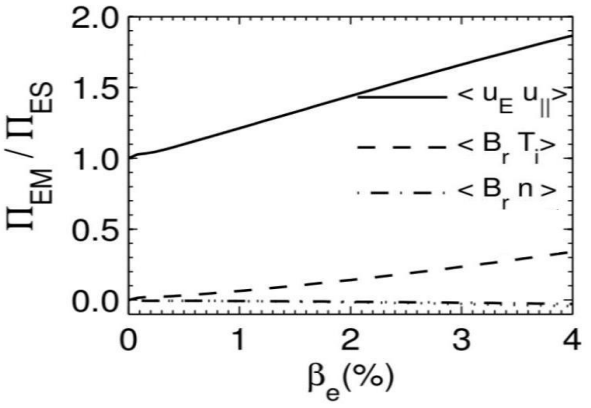
Intrinsic rotation (in QL) : $$\frac{\partial}{\partial \hat{t}}\langle \tilde{V}_{\|} \rangle = -\hat{\nabla}_r \left[\langle \tilde{u}_E \tilde{u}_{\|} \rangle + \langle \tilde{B}_r (\tilde{p}_i + \tilde{p}_e) \rangle \right]$$

Reynolds stress kinetic stress

I. Slab geometry

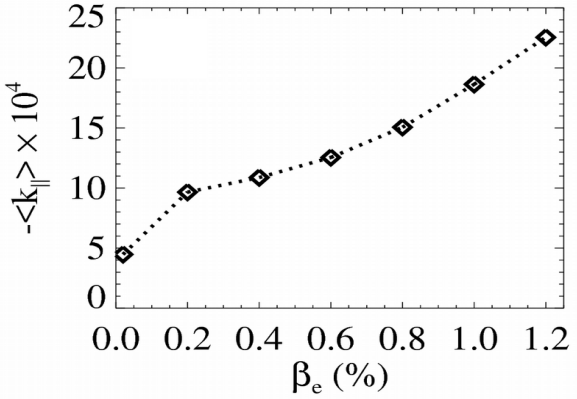


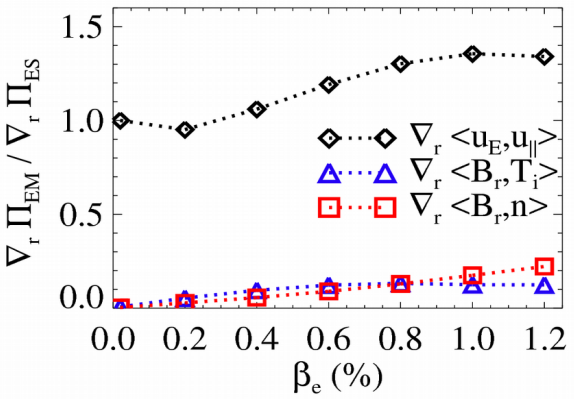


- The radial asymmetry of eigenmode $A_{\|}$ and $u_{\|}$ is enhanced due to the deformation near rational surface.

⇒ The conventional parallel Reynolds and the kinetic stress increase with β_e.

II. Tokamak geometry





- Similar to the results in slab geometry, the conventional parallel Reynolds and the kinetic torque increase with β_e.

- Contrast to the results in slab geometry, n-induced kinetic torque is not negligible. This is consistent with MST experiment result [Ding *et al.* PRL (2013)]