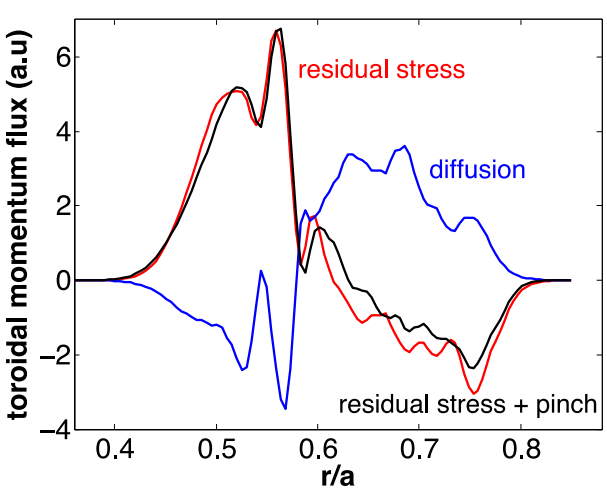
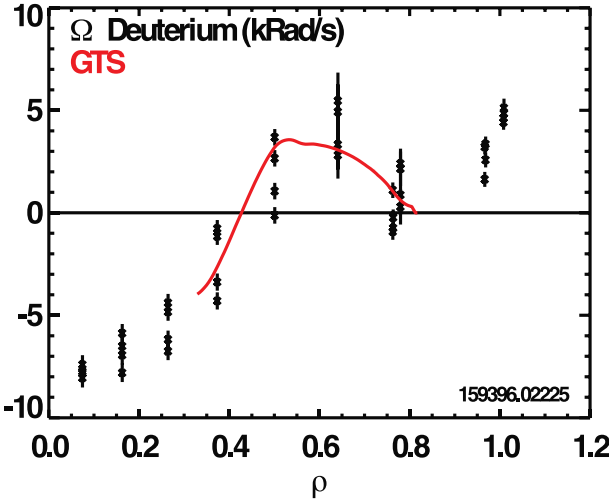
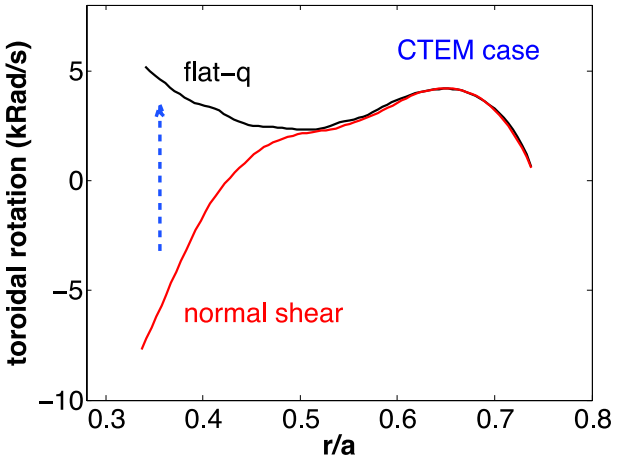
# For the first time turbulence-driven residual Reynolds stress (RRS) is shown to account for both shape and magnitude of observed intrinsic toroidal rotation profile TH-C




- First-principles-based model predictions of intrinsic rotation agree well with experiments
  - -- Direct comparison with high quality data of main ion rotation in DIII-D ECH plasmas
  - -- Substantial ITG-driven non-diffusive momentum transport dominated by residual stress
  - -- Anti-gradient, dipole structure in RRS critical for central-peaked core rotation formation
  - -- Turbulence intensity gradient and zonal flow shear are major contributors to fluctuation $k_{//}$-symmetry breaking needed for the residual stress generation
- Profile structure of residual stress and intrinsic rotation show complicated dependence on multiple physics parameters → intrinsic rotation reversal induced by
  - -- ITG-TEM transition in flat-q profile regime
  - -- change in q-profile from weak to normal shear

(Global gyrokinetic simulations for this study carried out by GTS code)