Helical electric potential modulation via Zonal-Flow coupling to Resonant Magnetic Perturbations

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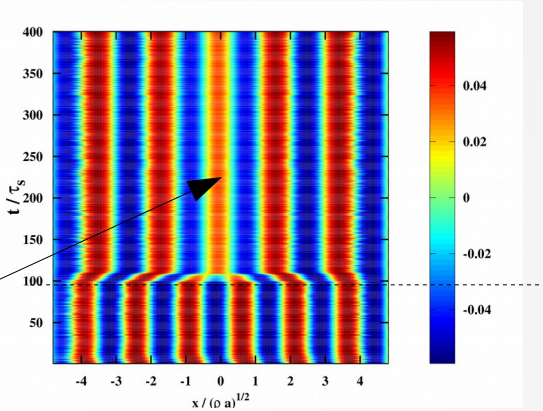
- Study of RMP impact on Zonal Flow saturation
- Based on phenomenological 1D nonlinear model

  around single resonance surface x=0
- **Key question**: given an initial saturated state of co-existing turbulence and Zonal Flows, How do RMPs modify it, and what is the final new saturated state?
- Main results:
- 1) The modification takes the form of a transport bifurcation.
- 2) new saturated state has weaker Zonal Flows
- 3) The new state has a 3D topology, with a **helical modulation** of the electrostatic potential.

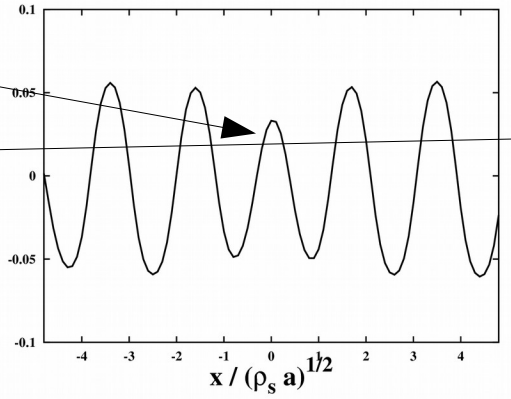
Spatiotemporal dynamics of ZF shear



RMP applied

$$\frac{\delta B_r}{B} = 10^{-4}$$

Zonal Flow shear



Helical electric potential