Progress in theoretical RFP studies: new stimulated helical regimes and similarities with tokamak and stellarator (TH/P3-35)

Both RFP and tokamak sawtothing saturate to helical regime [1] in 3D nonlinear $\nu\eta$–MHD with small MPs (and/or when the product $\nu\eta$ becomes large even without MP)

**RFP**

- Global helical state
- $b_z^{mp}(0.9a)/B_b(a) (%)$
- $q(0)$ vs. $t (\tau_R)$
- $\eta=S^{-1}=10^{-5}, \nu=10^{-4}$
- $(m,n)_MP=(1,6), \text{ MP amplitude } 0\% \text{ to } 12\%$

**Tokamak**

- Core-helical state
- $b_z^{l1}(0)/B_b(a) (%)$
- $q(0)$ vs. $t (\tau_R)$
- $\eta=S^{-1}=10^{-5}, \nu=3\times10^{-4}$
- $(m,n)_MP=(1,1), \text{ MP amplitude } 0\% \text{ to } 3\%$

*from Reconnection/Sawtooothing to Stimulated helical self-organization*


mail contact: daniele.bonfiglio@igi.cnr.it - CONSORZIO RFX, Padova, Italy