

How to observe GAMs in optimized Stellarators?

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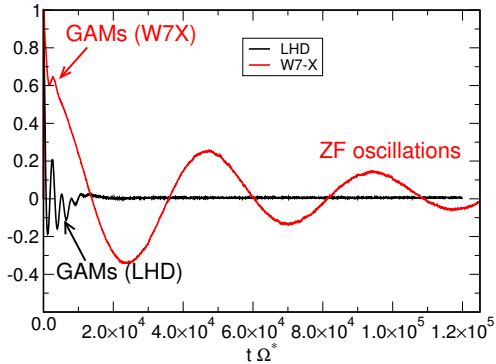
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Geodesic Acoustic Modes (GAMs) calculated for

- LHD
- HSX
- W7-X

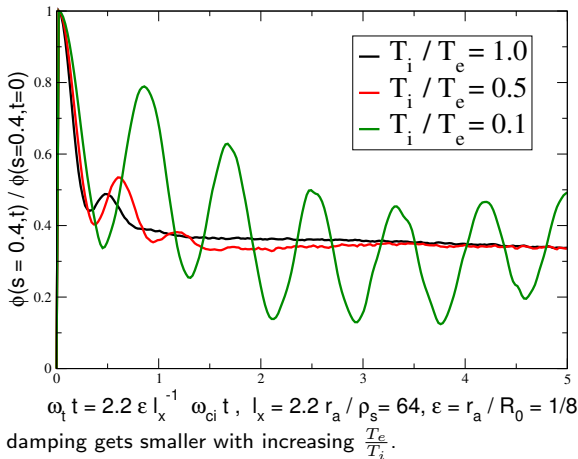


$$\gamma_{\text{GAM}} \sim \exp(-q^2 R^2 \omega_{\text{GAM}}^2 / v_{T_i}^2) \text{ with } \omega_{\text{GAM}} = v_{T_i} / R^2 (7/4 + \frac{T_e}{T_i})$$

need

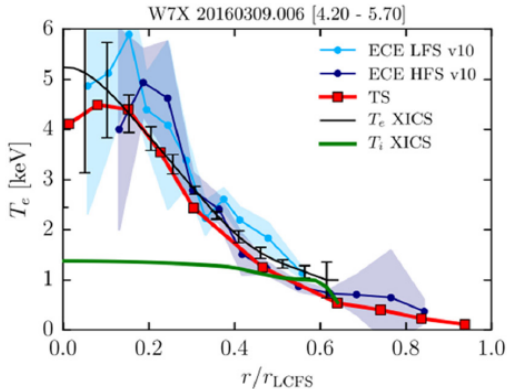
- large q (small ι)
- large $\frac{T_e}{T_i}$

to keep damping small \Rightarrow to observe GAMs



seek for available configurations

- ECRH heated plasmas in OP1.1 show T_e much higher than T_i
- Figure 3 from Wolf et al. Nucl. Fusion 2017



seek for available configurations

- on axis counter-ECCD diminishes central ι
- calculations by Turkin et. al Fusion Sci. and Techn. 2006
- W7-X OP 1.1 shows that counter-ECCD is counter-acted by the bootstrap current expectation for central $\iota \approx \frac{1}{2}$ Wolf et al. Nucl. Fusion 2017

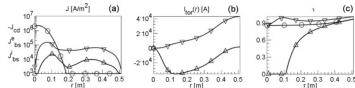
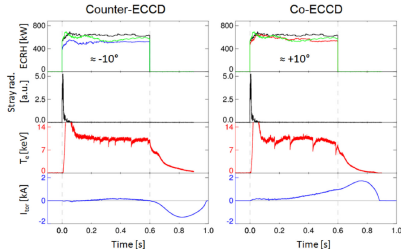
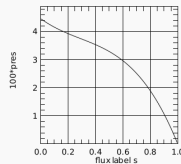
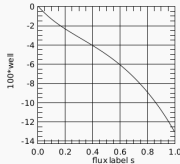
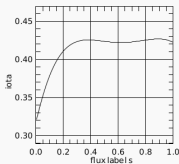
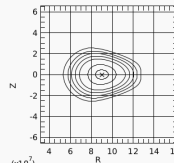
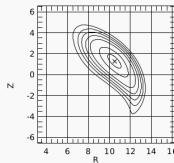
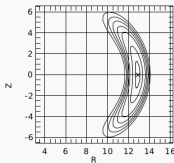


Fig. 5. (a) The electron (∇) and ion (Δ) bootstrap current densities, ECCD (\square) density; (b) the initial (∇) and final (Δ) toroidal current distributions; (c) the initial (∇), final (Δ), and current-free (\circ) rotational transforms.



quasi axially-symmetric stellarator: Stellatok

- 2 field periods
- central $\iota \approx 0.32$



chance to find experimentally relevant GAMs in optimized stellarators:
IPP Stelostatok-Project, W7-X small iota configurations,
calculations to be done, looking for EGAMs