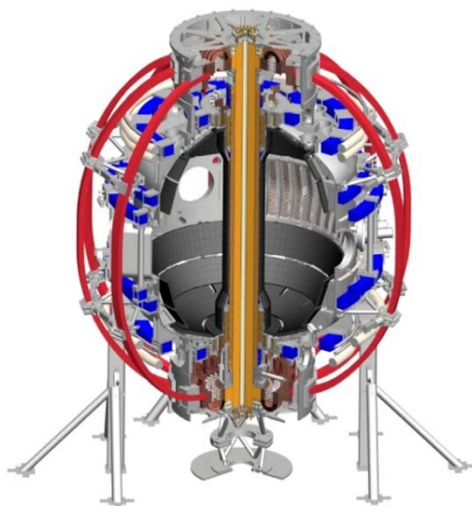


(1) Perturbative momentum transport in L&H modes (2) Influence of rotation profile on transport and turbulence

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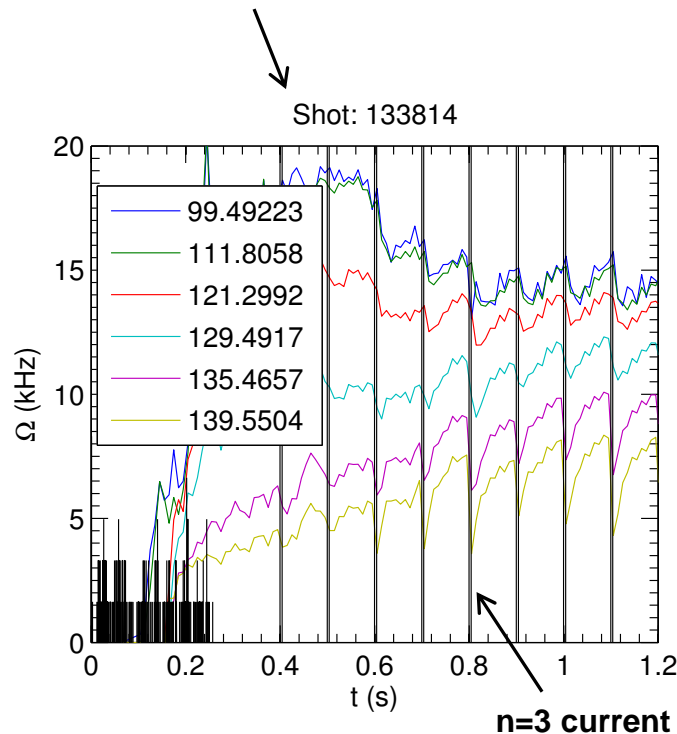


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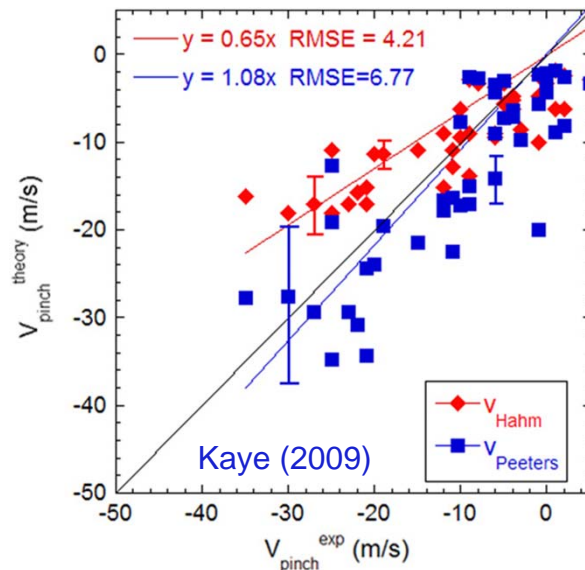
(1) Perturbative momentum transport in L & H modes

BACKGROUND

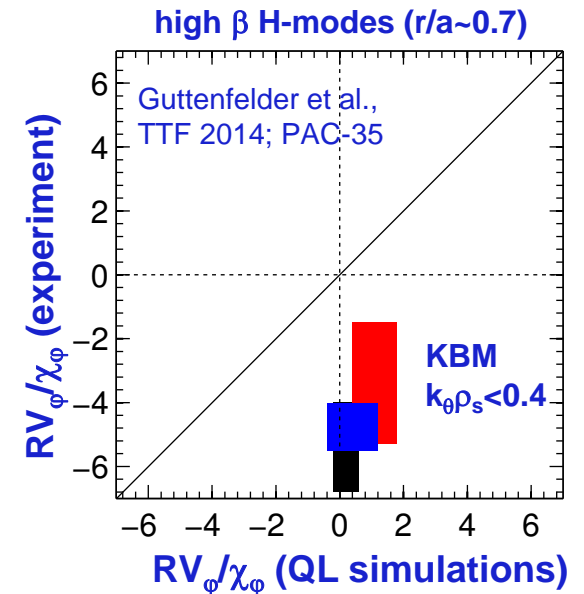
- Momentum pinch inferred from perturbative experiments in NSTX-H modes
 - Utilized NBI blips and (n=3) 3D perturbations



- Measurements in reasonable agreement with analytic theory for electrostatic microturbulence



- NEITHER agree with gyrokinetic simulations for the actual discharges
 - Complicated by high beta, EM effects



(1) Perturbative momentum transport in L & H modes

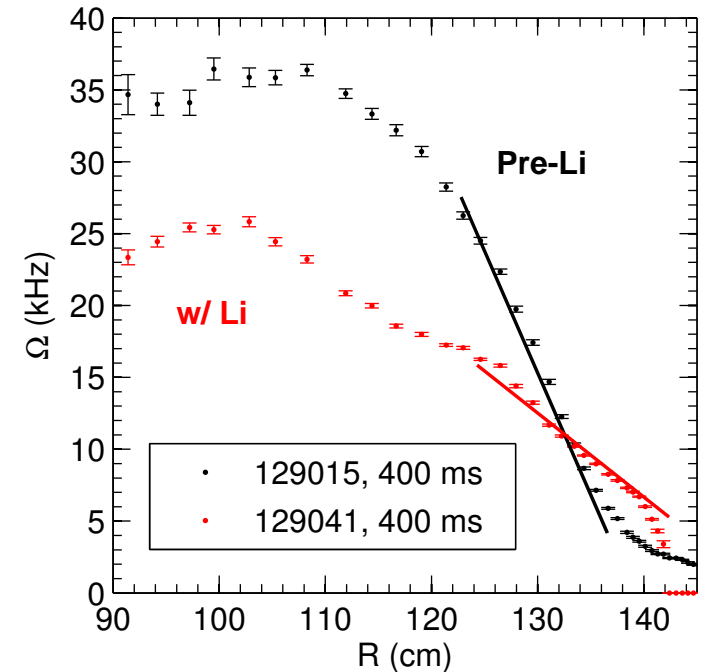
PART A – L-mode

- Goal: perturbative momentum experiment in lower beta L-mode for validation with theory, comparison with conventional aspect ratio tokamaks (T&T 5 year Thrust 2; ITPA TC-15)
- Requirements: reasonably MHD-quiescent L-mode, BES and reflectometry
- Approach: (i) apply 3D field perturbations, (ii) NBI modulation (source 1 only for CHERS) for Fourier analysis
 - Try for at least two different conditions (I_p , B_t , or n_e), depending on suitability of L-mode discharges
- Minimum 0.5 run day to try both approaches
 - Possibly perform Ne-puff for impurity transport measurement (end of shot)?
- Maybe possible to get some data joint with other L-mode XPs (Ren, ...)

(1) Perturbative momentum transport in L & H modes

PART B – H-mode

- Core rotation profiles in H-modes can vary dramatically with Li conditioning
- Goal: perturbative measurements in H-mode to measure any change in strength of momentum pinch, compare with GK theory predictions (T&T 5 year Thrust 2; ITPA TC-15)
- Requirements: H-modes at limits of Li conditioning (light vs. heavy), BES
- Requirements: H-modes at limits of Li conditioning (light vs. heavy)
- Approach: (i) 3D fields, (ii) NBI modulation
 - If time allows, aim for 2 or 3 conditions of I_p , B_t at fixed q_{95}
- 0.5 run day, depending on previously established conditions
- Could benefit from limited # of repeat shots in B->Li XP (Maingi, PED)



(2) Investigate influence of rotation profile on T&T in H-modes

- Toroidal rotation and corresponding $E \times B$ shear strongly influence macro- and micro-stability, possibly GAE/CAE structure and corresponding impact on fast ions and electron thermal transport
- Goal: utilize 2nd NBI + 3D fields (NTV torque) to generate broad variation in rotation profile, measure change in transport, turbulence for validation with gyrokinetics; also measure change in GAE/CAE activity (T&T 5 year Thrust 2)
- Requirements: higher current H-mode to minimize changes in q profile, relatively quiescent, BES
- Approach: systematic variation of NBI from on- to off-axis, add 3D NTV in each case, if time allows apply two limits of Li conditioning (light vs. heavy)
- 1 run day, but almost certainly can be joined with other XPs (Crocker GAE/CAE XP in EP; Menard, EPH XP in PED)