Preoposed NSTX contributions to ITPA Pedestal edge physics group (PEP)

R. Maingi

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NSTX participating in 4 existing PEP joint experiments

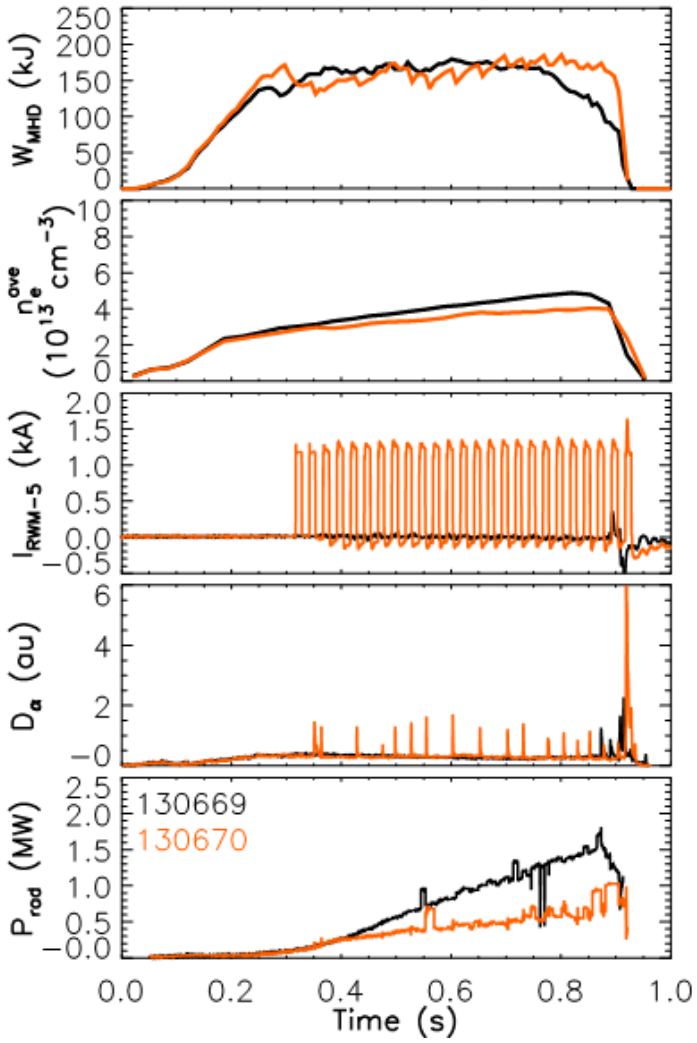
- PEP-6: dependence of L-H threshold and ELMs on drsep
  - Status: L-H data obtained in 2005 in XP 505 (EPS 2006 paper), and ELMs data obtained in XP 609 in 2008 (no writeup yet)
  - Additional data not needed, although XP 609 had confusing results in power balance are which could be clarified
- PEP-9: dependence of pedestal structure on R/a
  - Status: data obtained on DIII-D, MAST, and NSTX (IAEA 2006 paper)
  - No evidence of higher P' in STs at pedestal ν_e^* ~ 0.5; analysis of NSTX needs a little more resolution; no new data needed
- PEP-16: comparison of small ELM regimes
  - Status: data obtained on C-Mod, MAST, and NSTX (IAEA 2008 paper)
  - Stability analysis about to commence; no new data needed yet
- PEP-22: structure of Type II ELMs
  - Status: no participation yet

NSTX should focus ITPA PEP group contributions on ELM mitigation physics

- 1-1: Test pedestal β_{pol} and ν^* scaling of pedestal width across devices and parameter regimes; develop the theoretical basis for this scaling
- 1-2: Establish pedestal conditions required for L-H transition through cross machine experiments and theory
- 1-4: Determine compatibility of divertor detachment and robust pedestal pressure
- ✓ 2-3: Validate physics basis for ELM control by Resonant Magnetic Perturbations (RMP); i) collisionality threshold, ii) rotation dependence, iii) magnetic mode spectrum optimization, iv) plasma response and v) effect on pedestal stability
- 2-4: Compatibility of RMP ELM control with ITER operation; i) pedestal degradation, ii) pellet fueling, iii) divertor heat flux control, and iv) L-H transition power threshold
- 2-5: Develop physics of ELM dependence on toroidal field ripple and rotation
- ✓ 2-6: Assess applicability of low collisionality small ELM regimes [high δ, κ] in NSTX]; Grassy ELMs and QH-mode [compare similarities with lithium enhanced H-mode and QH-mode?]
- 2-7: Develop and test nonlinear MHD and turbulence models of ELM evolution

NSTX will need new data to contribute to PEP ELM task in areas of Lithium suppression of ELMs and n=3 de-stabilization of ELMs

- Collisionality threshold
  - A collisionality threshold may be present in our ELM stabilization with lithium coating
  - Haven't checked if collisionality threshold present in ELM de-stabilization
- Rotation dependence
  - Rotation can be varied dramatically with 3-d field amplitude
- Magnetic mode spectrum optimization
  - Present capability: can use n=2, n=3, or n=2+3
- Plasma response
  - May be able to image edge island evolution with SXR
- Effect on pedestal stability
  - Analysis in progress, both for ELM stabilization and de-stabilization results



OAK RIDGE National Laboratory