NSTX NOVA PHOTONICS Supported by U.S. DEPARTMENT OF ENERGY Office of Science

Reversed shear H-modes & Sustained reversed shear L-modes

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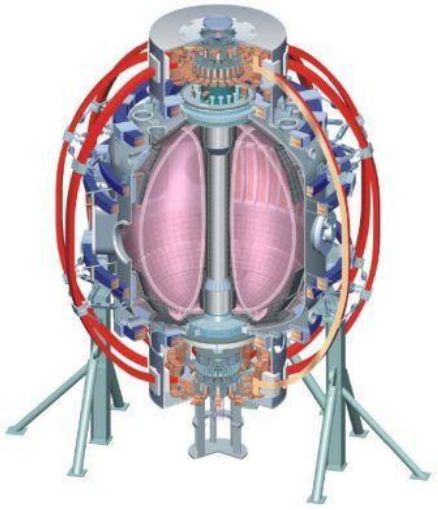
Presented by
Howard Yuh
Nova Photonics



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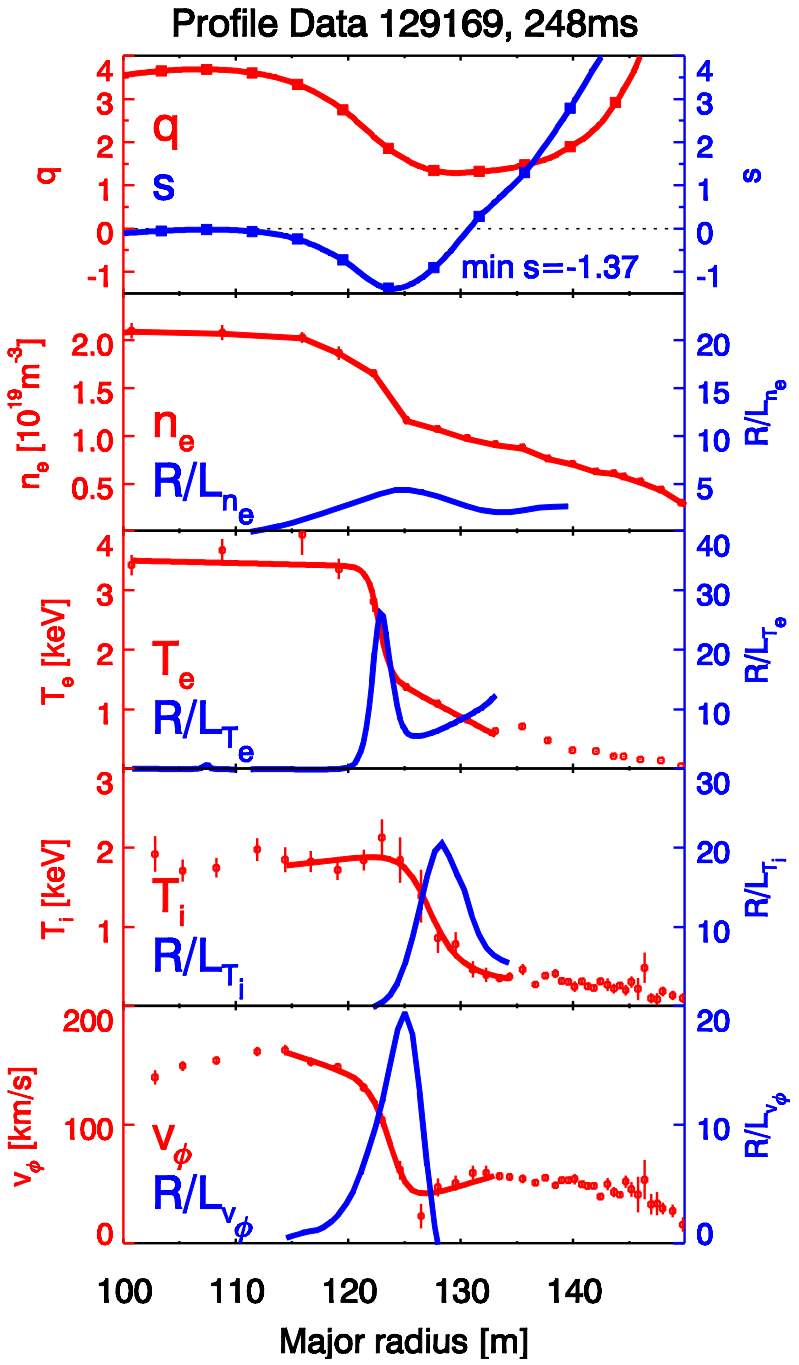
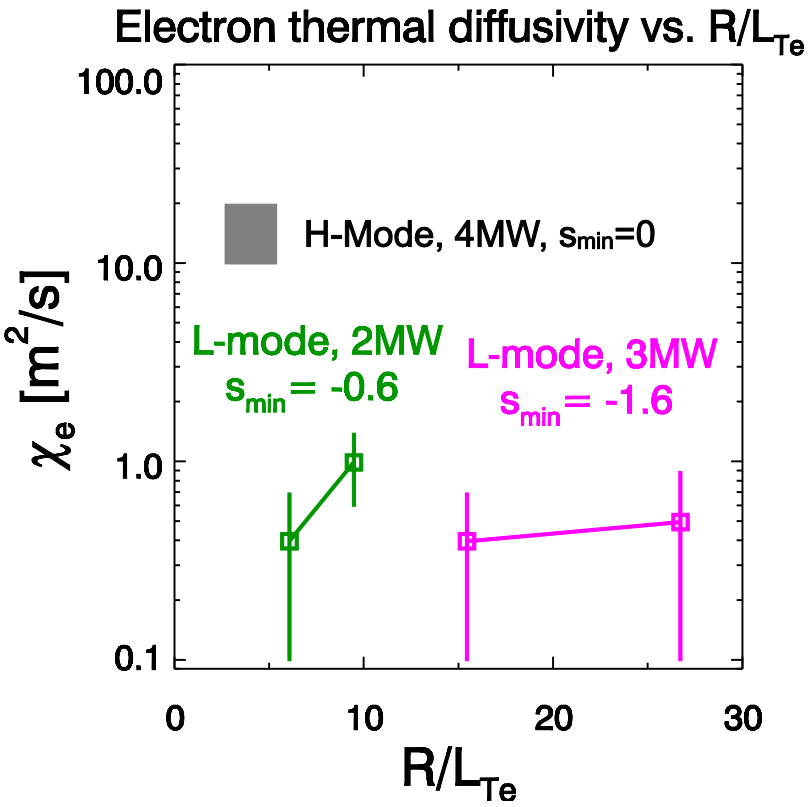
Internal transport barriers form when magnetic shear is negative

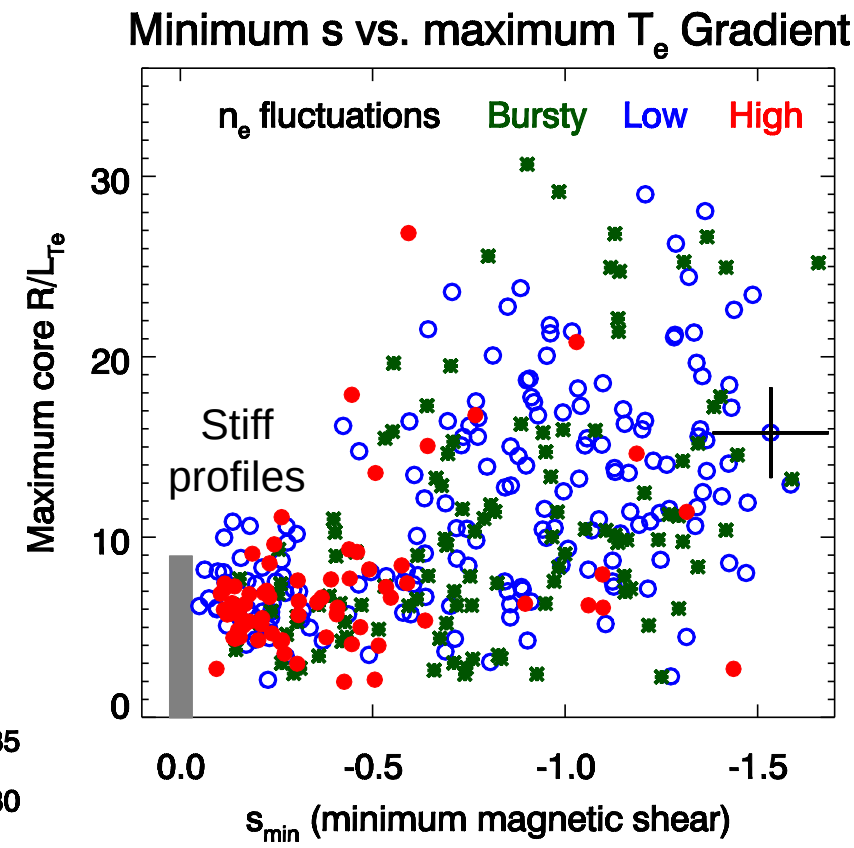


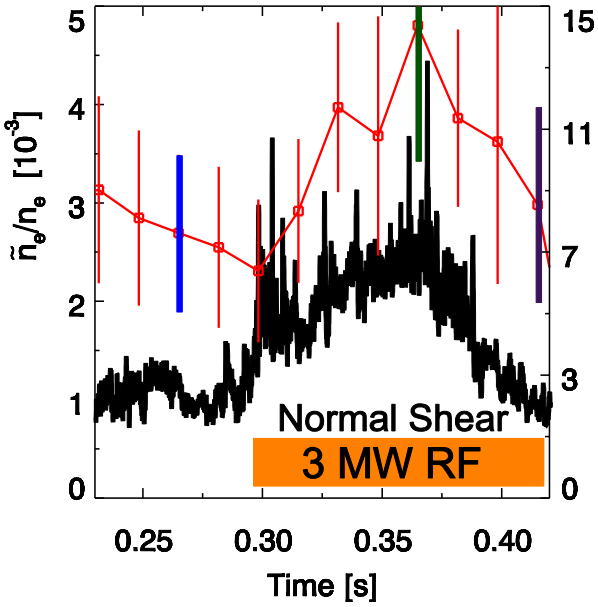
- 2008 ITB results
- L-modes
- Rare enhanced electron energy confinement regime

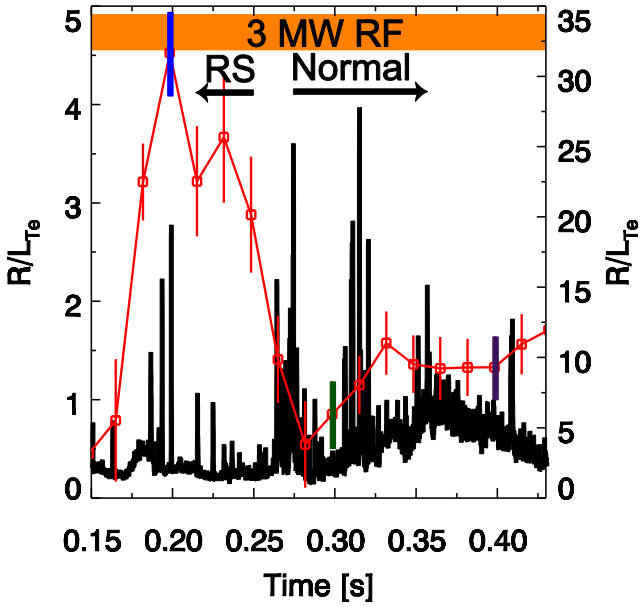


Continuous, bursty, suppressed ETG thresholds

- Does turbulence change behavior through a slow shear evolution?
- Hysteretic turbulence onset?
- Low-k?
- Can we add an H-mode edge to a RS ITB discharge



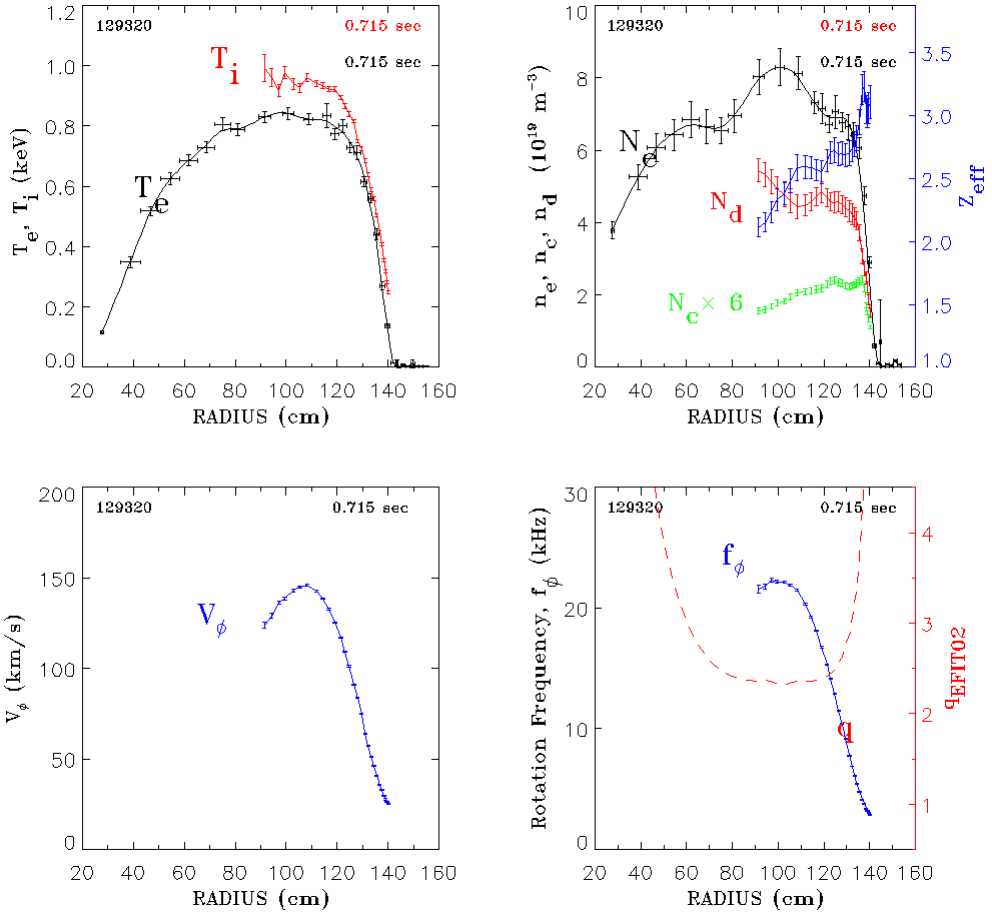




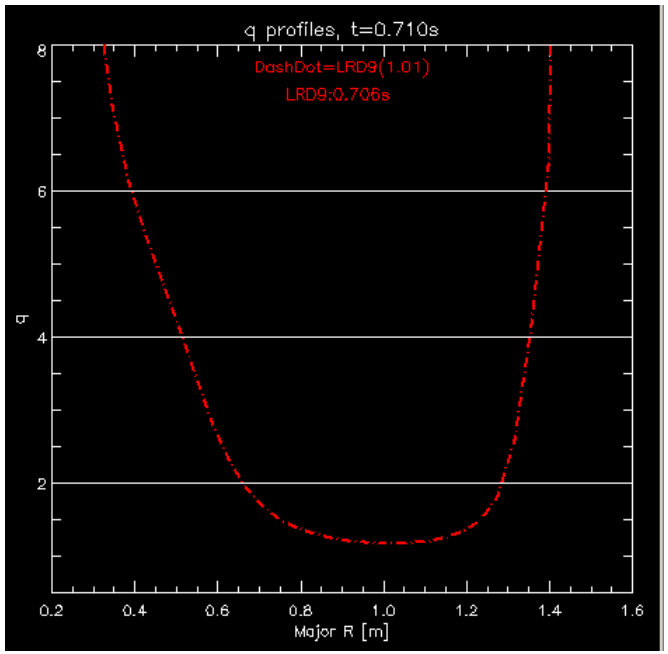
Proposed experiment (s)

- Turbulence through slow current diffusion in L-mode (0.5-1 day) **T&T**
  - Establish strongly RS (3-4 shots)
  - Reduce power until q_0 no longer collapses
    - Requires low (1-2 MW) steady HHFW
    - Try Src B at 1MW as well
    - HHFW only, in anti phasing to retard core current
  - Beam blips for diagnosis
- Developing H-mode with ITB (0.5-1 day) **ASC**
  - Start from successful RS L-mode
  - Eliminate method previously used to keep in H-mode (small inner gap), add outboard gas etc...
  - Add more power during rampup without causing q_0 collapse, beams and/or HHFW
  - HHFW only power ramp-up. Capability used last year.

2nd Proposal, Electron transport & Turbulence under high positive shear



no runtime requested, just fluctuation measurements high-k and BES



- n_e pedestal typically narrower than T_e pedestal
- Electron confinement often present to 125cm, well inside pedestal
- Is it strong positive magnetic shear (no streamers for high positive values)
- High-k/BES in outboard mode (133-140) in a variety of q-profiles and rotation profiles to achieve a database of positive shear values
- Need to decouple from E×B shear, T_i thermal coupling