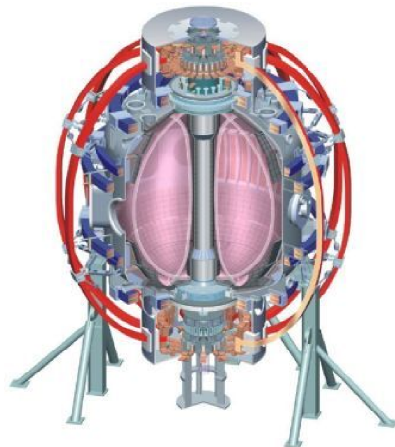


# Summary of XP-1039: Ohmic H-Modes

**S. Kubota**

**NSTX Results Review  
PPPL  
Nov. 30-Dec. 2, 2010**



*College W&M  
 Colorado Sch Mines  
 Columbia U  
 Comp-X  
 General Atomics  
 INEL  
 Johns Hopkins U  
 LANL  
 LLNL  
 Lodestar  
 MIT  
 Nova Photonics  
 New York U  
 Old Dominion U  
 ORNL  
 PPPL  
 PSI  
 Princeton U  
 Purdue U  
 SNL  
 Think Tank, Inc.  
 UC Davis  
 UC Irvine  
 UCLA  
 UCSD  
 U Colorado  
 U Maryland  
 U Rochester  
 U Washington  
 U Wisconsin*

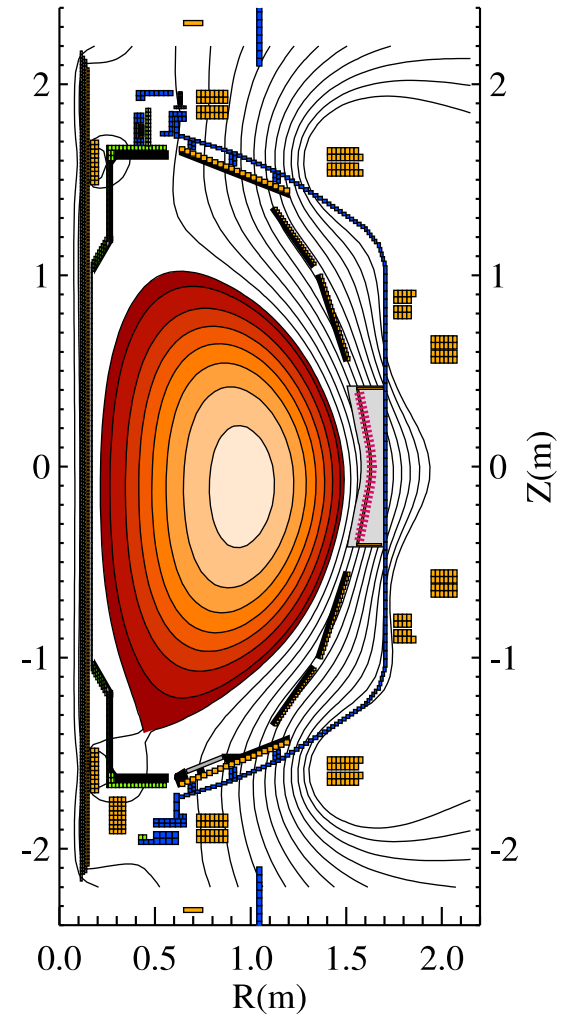
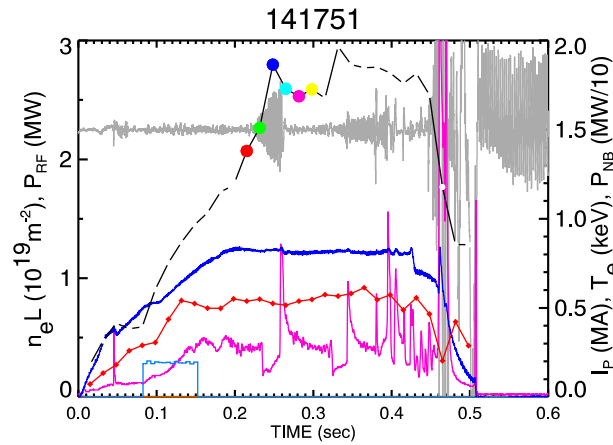
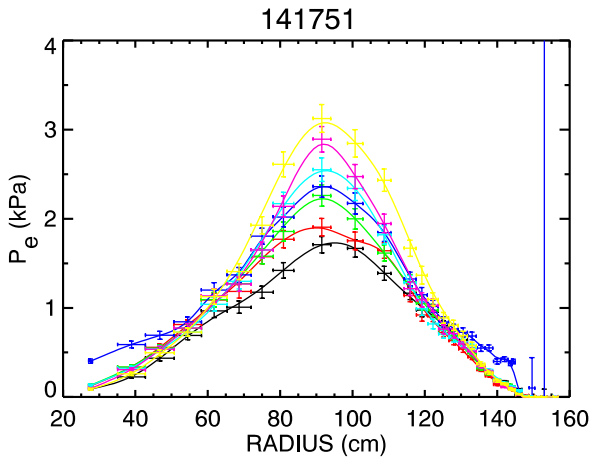
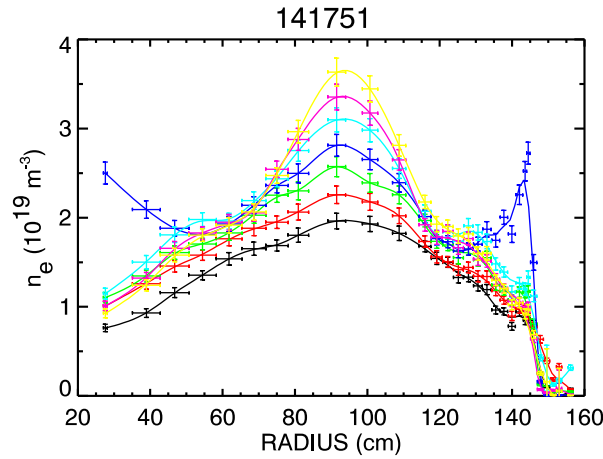
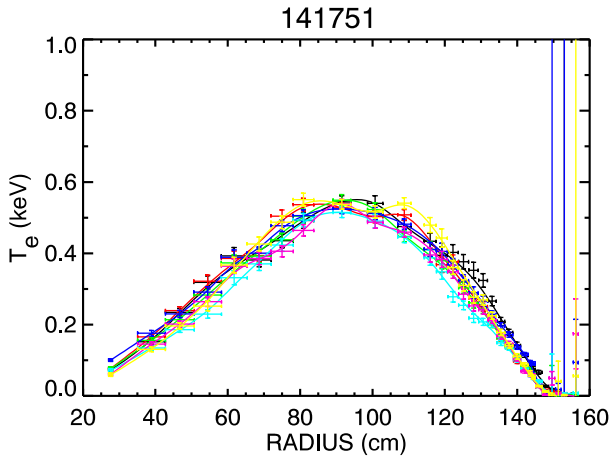
*Culham Sci Ctr  
 U St. Andrews  
 York U  
 Chubu U  
 Fukui U  
 Hiroshima U  
 Hyogo U  
 Kyoto U  
 Kyushu U  
 Kyushu Tokai U  
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 U Tokyo  
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 Ioffe Inst  
 RRC Kurchatov Inst  
 TRINITY  
 KBSI  
 KAIST  
 POSTECH  
 ASIPP  
 ENEA, Frascati  
 CEA, Cadarache  
 IPP, Jülich  
 IPP, Garching  
 ASCR, Czech Rep  
 U Quebec*

# XP-1039: Physics of Ohmically Heated H-Modes

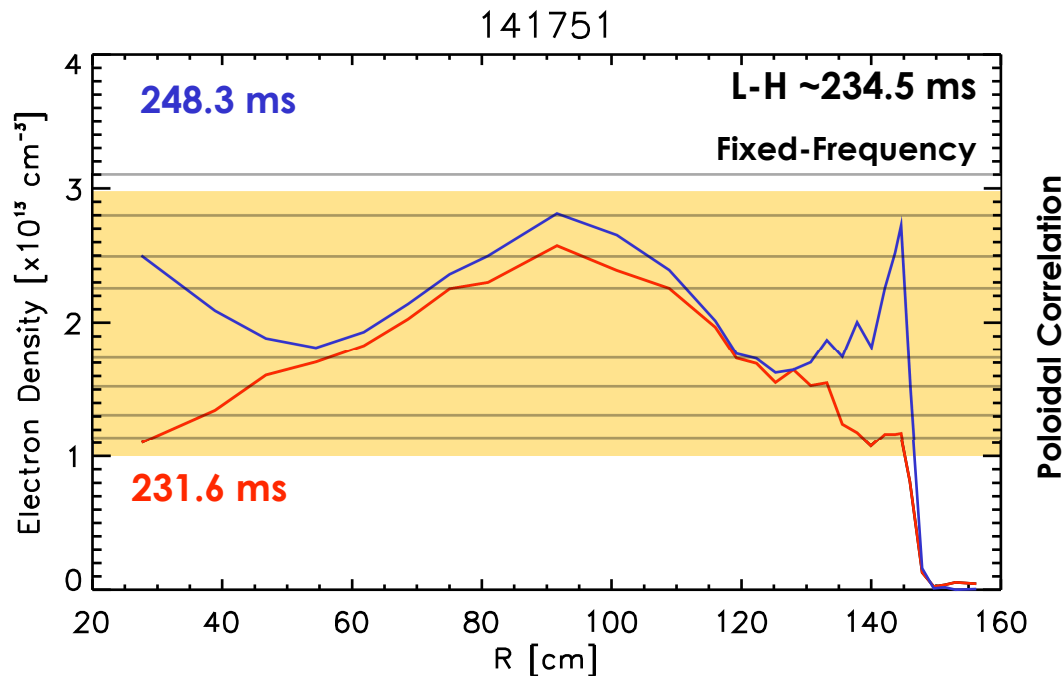
- **Goals**
  - Revisit Ohmic H-mode with advanced and upgraded turbulence diagnostics.
  - Study turbulence in L-mode, H-mode and in relation to the L-H transition.
    - > Look at correlation of local (edge) and non-local (core) turbulence with ETB formation.
    - > Compare data with L-H transition theories.
- **Motivation**
  - Reason for Ohmic H-modes.
    - > Peaked density profiles are good targets for reflectometers.
    - > No fast-ion driven fluctuations to complicate turbulence measurements.
    - > Avoid complicating physics due to external momentum input and hot fueling.
  - New and upgraded turbulence diagnostics available for 2010.
    - > FMCW & poloidal correlation reflectometers, backscattering, GPI (400 kSa/s), etc.
- **Operational Conditions**
  - $I_p=710$  kA,  $B_T=3.7$  kG, Deuterium, Ohmic with NB preheat during current ramp.
  - Edge density up to  $\sim 1.2 \times 10^{13}$  cm<sup>-3</sup>.
  - LSN.
- **Available Turbulence Diagnostics**
  - Reflectometers
    - > FMCW (profiles, radial correlation & backscattering).
    - > Single-frequency poloidal correlation.
    - > 16-channel fixed-frequency.
  - Additional
    - > GPI, high-k, FIRETIP, divertor probes, etc.

# Shot 141751

\NEFIT02, Shot 141751, time=230ms



# Target Density and Reflectometer Coverage



- **Achieved Primary Goals**
  - Raise edge density  $> 1 \times 10^{13} \text{ cm}^{-3}$  at L-H transition.
    - > Access to ETB region by fixed-frequency and poloidal correlation reflectometers.
    - > Variation in L-H timing gives radial scan.
  - Simultaneous measurements with GPI (and other diagnostics).
- **Analysis is ongoing.**
  - Detailed picture of edge turbulence at ETB formation.
  - Coupled to core turbulence?