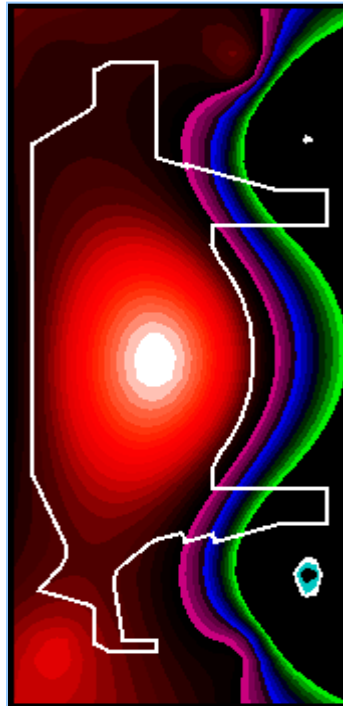




HIGHLIGHTS OF ALCATOR C-MOD TRANSPORT EXPERIMENTS



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Presented at
Princeton Plasma Physics Lab
May 1999

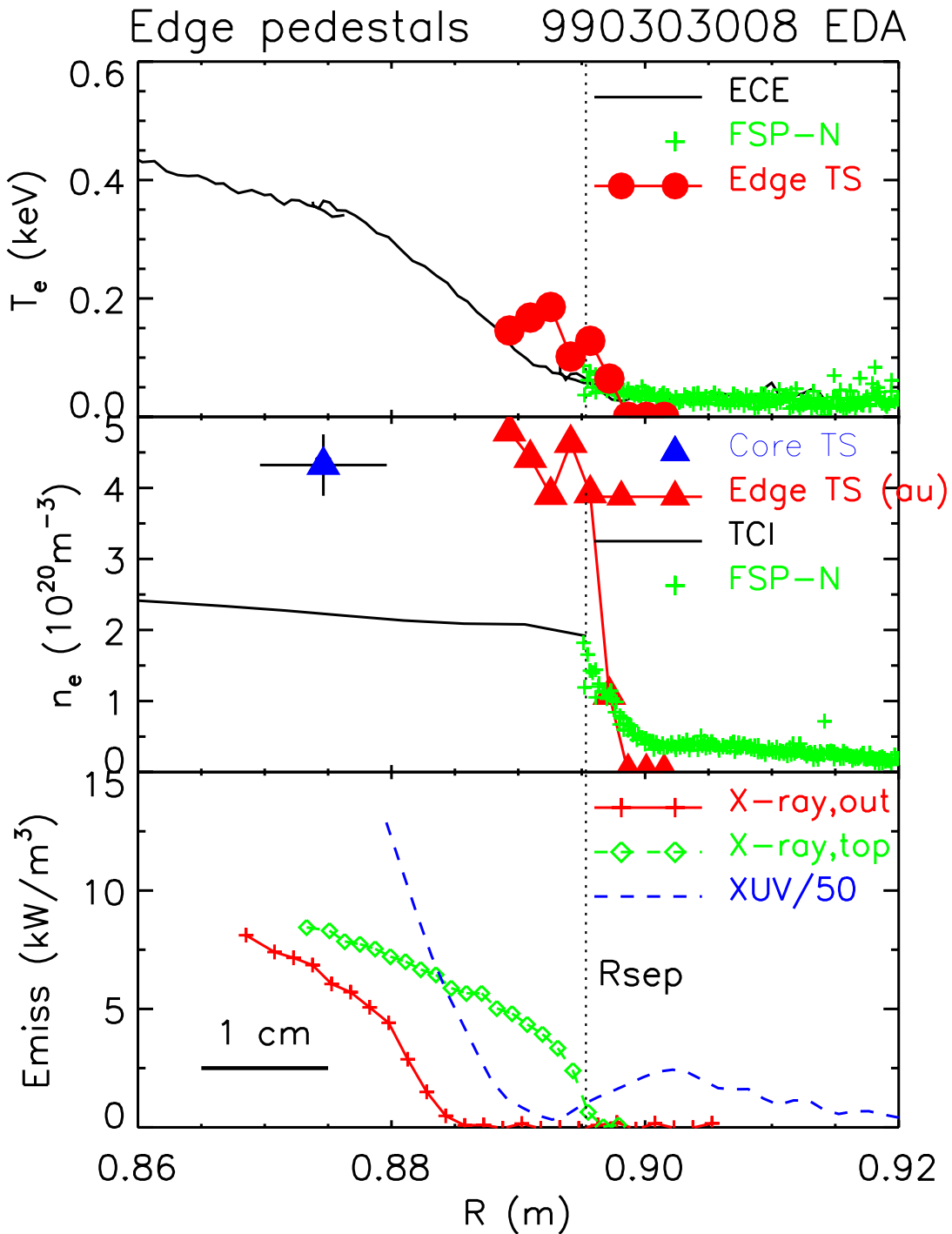


OUTLINE

- H-Mode Regimes
- Pedestals – Profiles and Fluctuations
- Toroidal Rotation w/o Direct Momentum Input
- Spontaneous Generation of Internal Transport Barriers
- Density Limit Studies



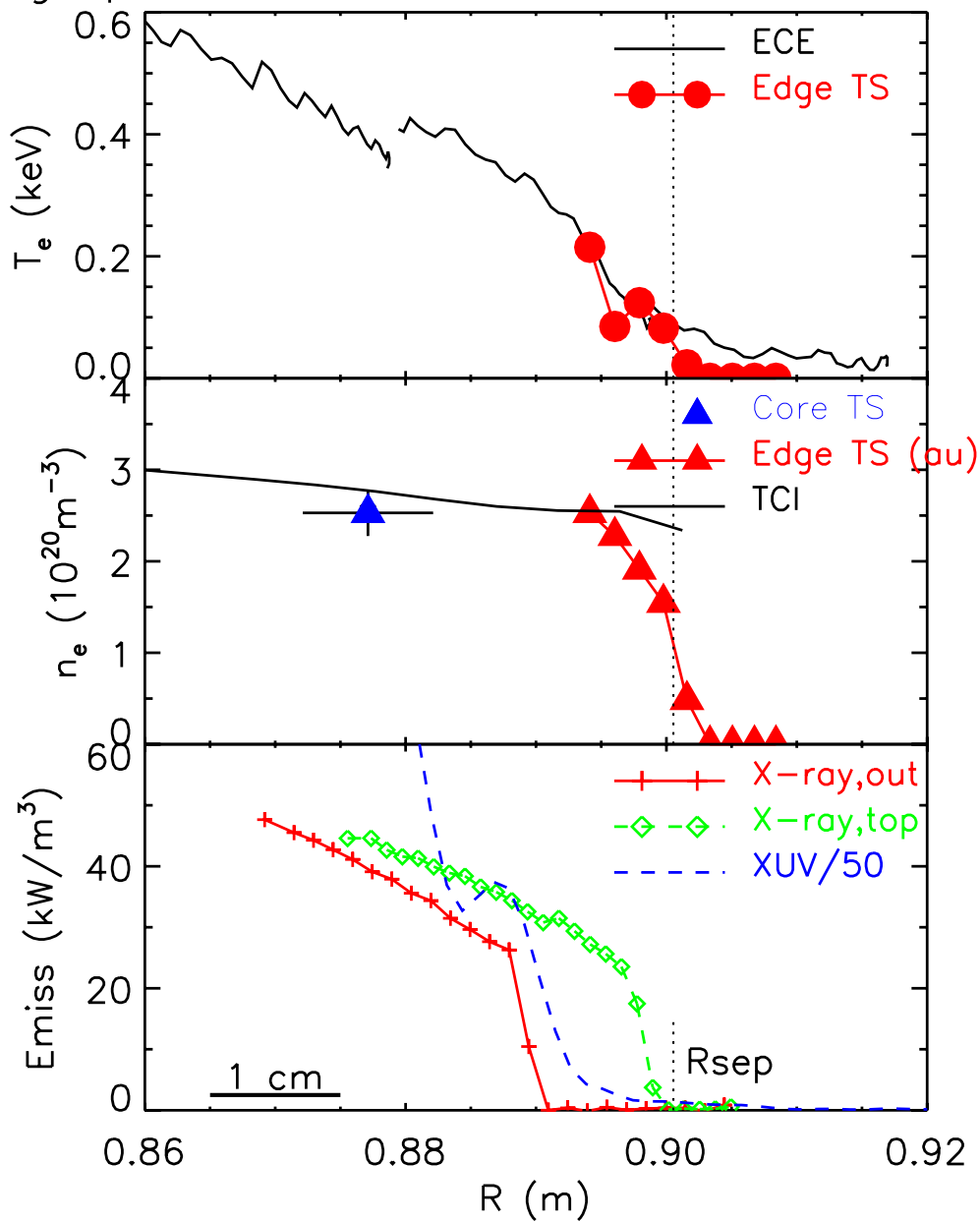
SCALE LENGTHS ARE DIFFERENT FOR DIFFERENT PARAMETERS





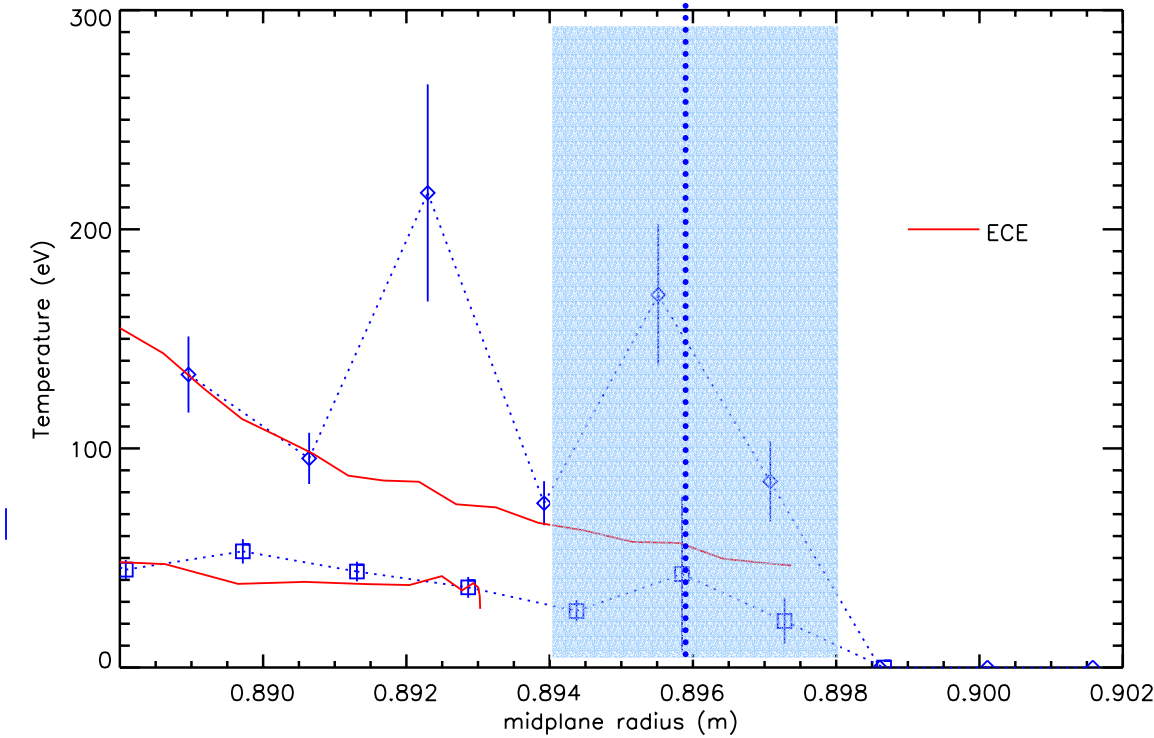
PEDESTAL SCALE LENGTHS VARY FOR DIFFERENT PARAMETERS

Edge pedestals 990304008 ELM-free, 1.2 MA





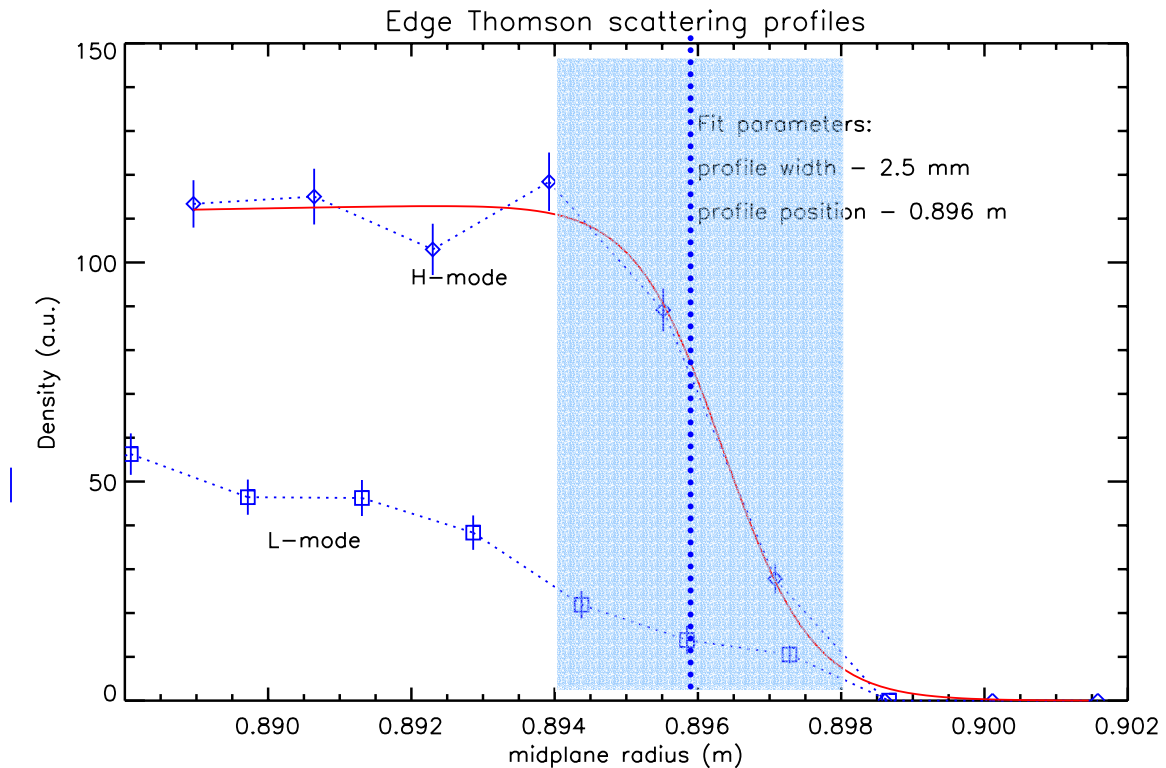
EDGE TEMPERATURE PROFILES ARE BEGINNING TO BE MEASURED WITH SIMILAR RESOLUTION



HIGH RESOLUTION EDGE DENSITY PROFILES



ARE NOW AVAILABLE



- Measured widths are 2-6 mm (instrumental resolution ~ 2 mm).
- Position of separatrix with respect to pedestal is uncertain to roughly the same order.
- We can clearly resolve differences between ∇p , ∇T and ∇n



SUMMARY

- A new and promising H-mode regime is being explored
- The edge barrier in this regime seems to be controlled by a continuous rather than intermittent process
- We observe substantial toroidal rotation without direct momentum input – the mechanism is under investigation
- We observe the spontaneous formation of internal barriers triggered by the H/L transition – probably driven by the peaking density profile.



FUTURE PLANS

- Improved diagnostics for profiles and fluctuations

- ⇒ CXR, MSE - $T_i(r)$, $n_i(r)$, $V_i(r)$, $j(r)$

- ⇒ BES, PCI, Reflectometry, ECE - \tilde{n}_e , \tilde{T}_e

- RF Shear Flow Drive

- ⇒ Upgrade to 8 MW source power

- ⇒ MCIBW \Rightarrow Poloidal Flow

- ⇒ Minority Heating \Rightarrow Toroidal Flow

- Current Profile Control (LH)

- ⇒ Off axis current drive at high density

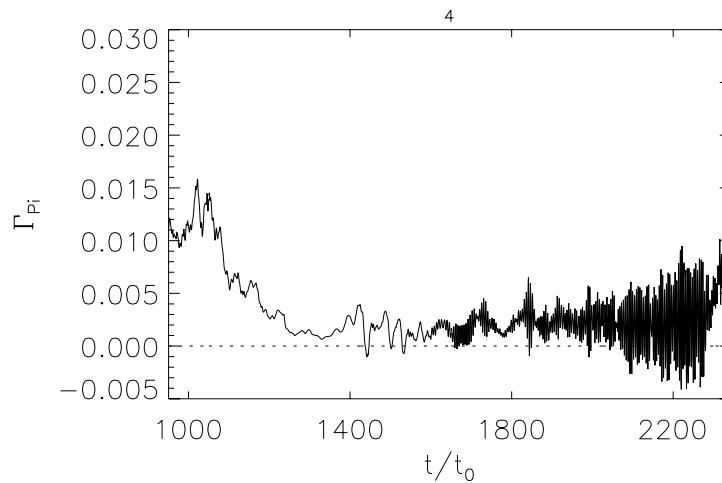
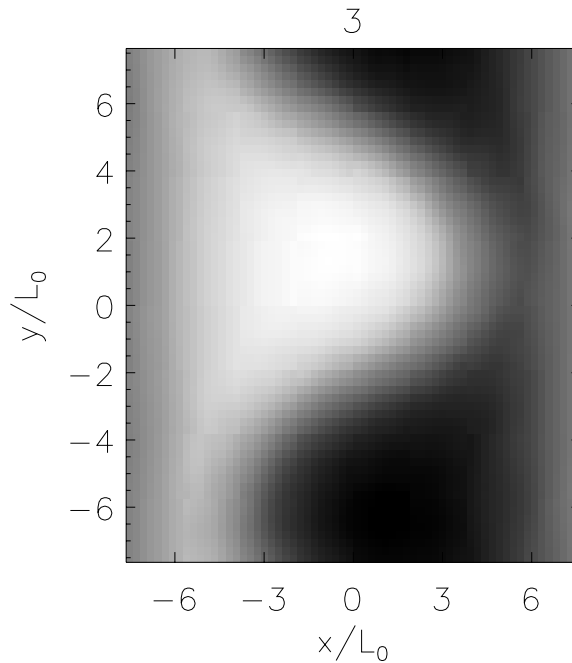
- ⇒ $\tau_{PULSE} \approx \tau_{SKIN}$



SIMULATIONS OF DRIFT-ALFVEN TURBULENCE*

SHOW AN MHD-LIKE MODE ARISE AT HIGH EDGE PRESSURE GRADIENTS

The calculated k ($3-6 \text{ cm}^{-1}$) and frequency (50-200 kHz) of this mode are in rough agreement with our measurements



*Rogers and Drake, submitted to Phys. Plasmas



C-MOD HAS SOMEWHAT HIGHER COLLISIONALITY THAN OTHER DEVICES

