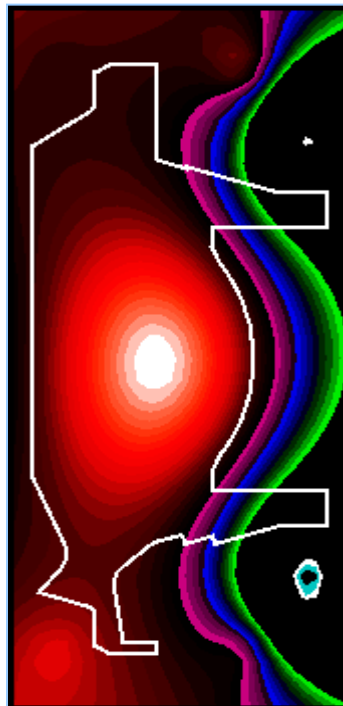




# HIGHLIGHTS OF ALCATOR C-MOD TRANSPORT EXPERIMENTS

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Presented at  
Courant Institute NYU  
April 1999

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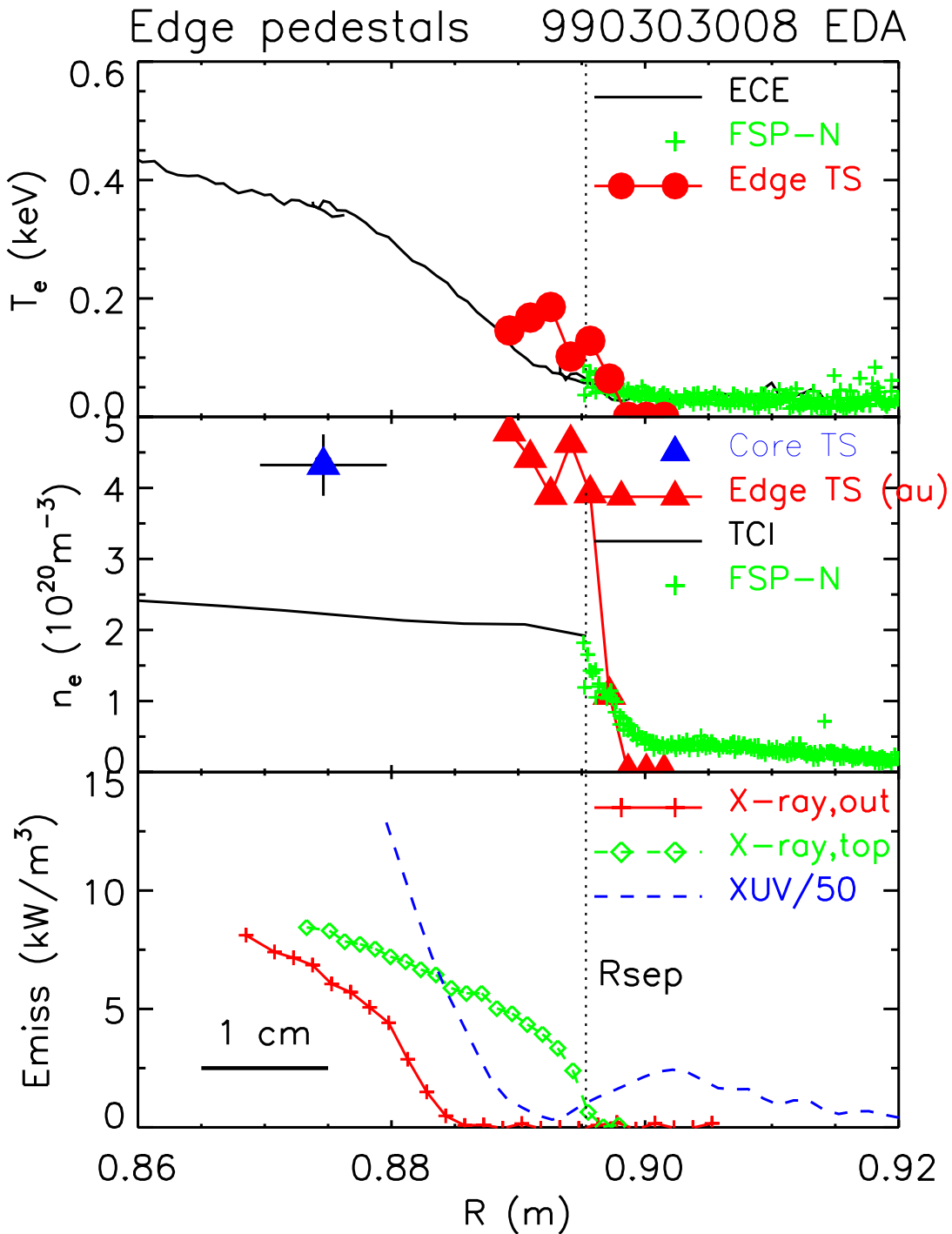
# OUTLINE

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



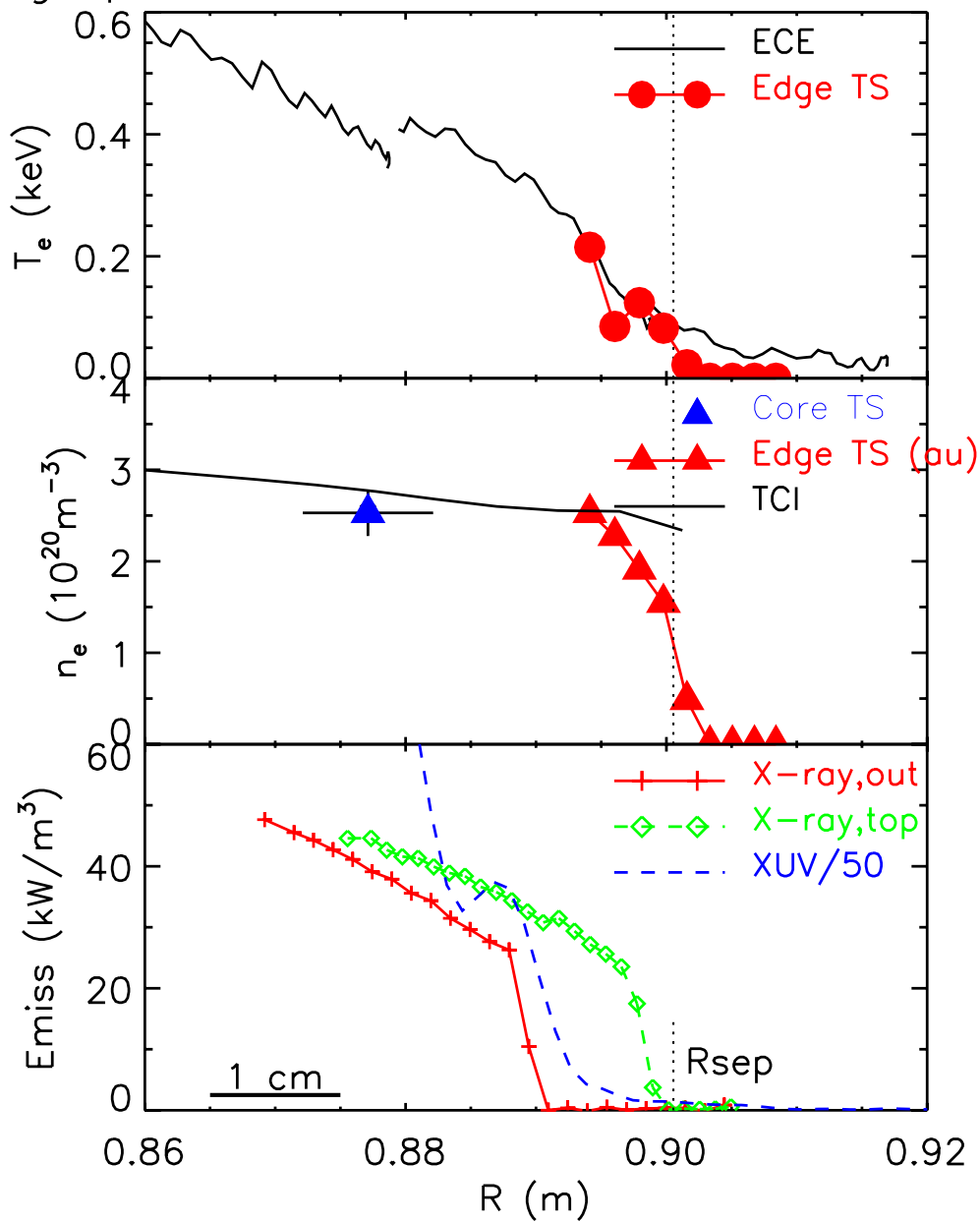
# SCALE LENGTHS ARE DIFFERENT FOR DIFFERENT PARAMETERS





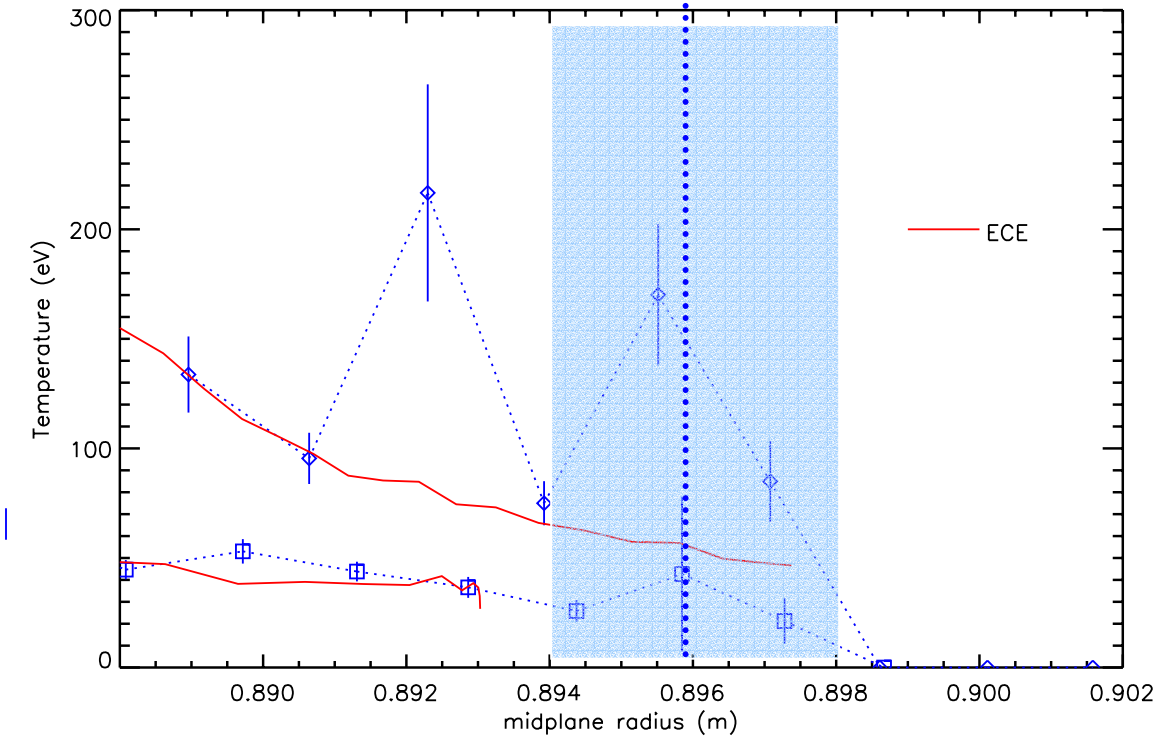
# PEDESTAL SCALE LENGTHS VARY FOR DIFFERENT PARAMETERS

Edge pedestals 990304008 ELM-free, 1.2 MA





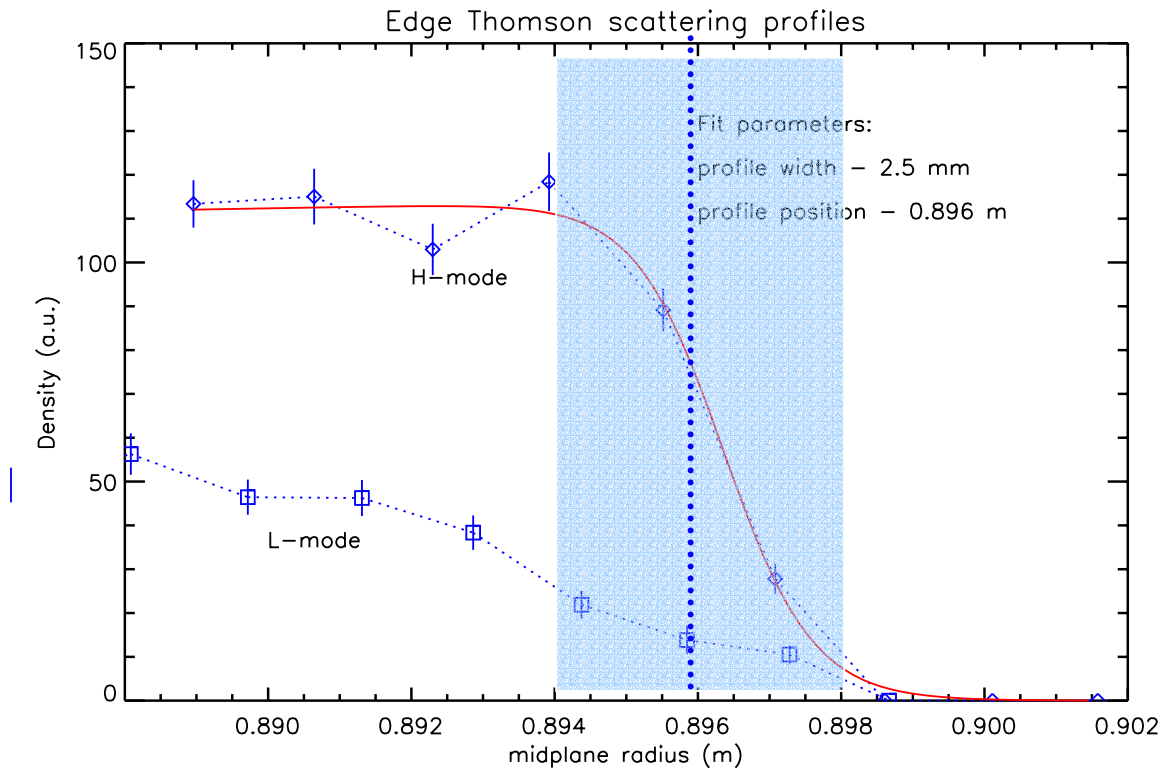
# EDGE TEMPERATURE PROFILES ARE BEGINNING TO BE MEASURED WITH SIMILAR RESOLUTION



# HIGH RESOLUTION EDGE DENSITY PROFILES



## ARE NOW AVAILABLE



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



## SUMMARY

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- 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

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- 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

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