

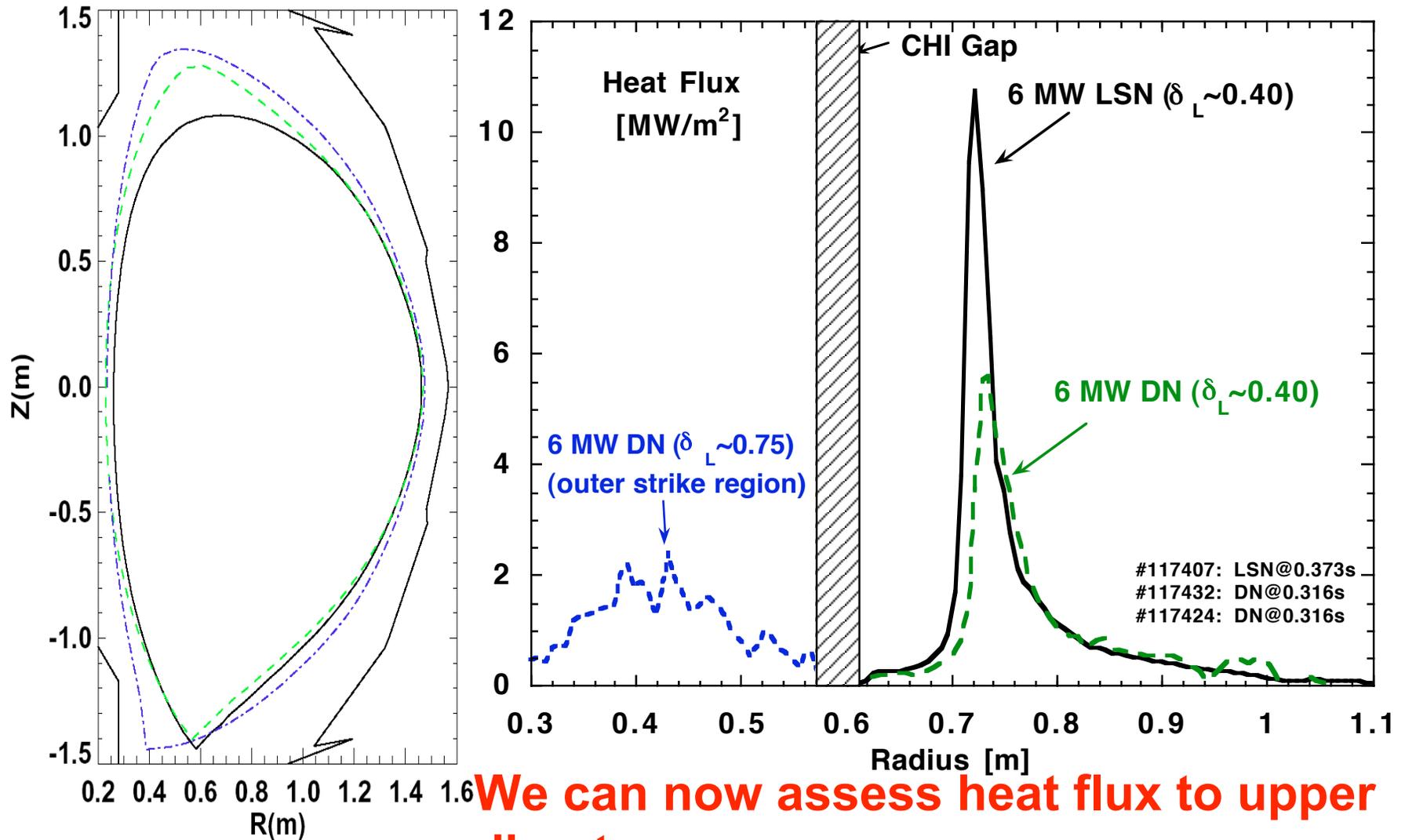
## Density Scan XP Goals

- Clarify deposition/erosion information on initial shots, GDC effects and  $I_p$  ramp effects
- Correlate radial transport and erosion/deposition
- Obtain scaling of edge turbulence with density and mode and SN/DN
- Do modeling of selected discharges
- Obtain Heat flux (IR camera) scaling with density, power and SNL vs DN

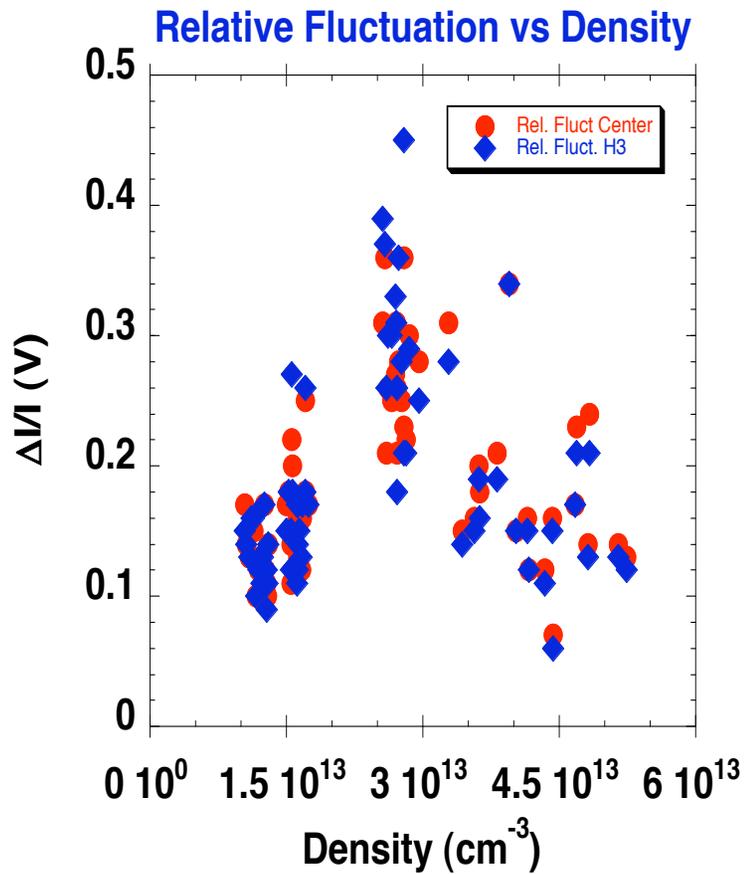
## Density Scan XP

- Camera specifications - average over the ELMs
  - 12 (14) bit digital data
  - 30 Hz sampling time, 25ms thermal e-folding time
  - 7 - 13 mm IR detection range
  - Divertor spatial resolution  $\sim 0.6$  cm
- Three views:
  - lower divertor
  - upper divertor
  - inner wall
- Higher NBI power preferred - better S/N
- Density scan highest priority - determine boundary transition from flux-limited to sheath limited power flow

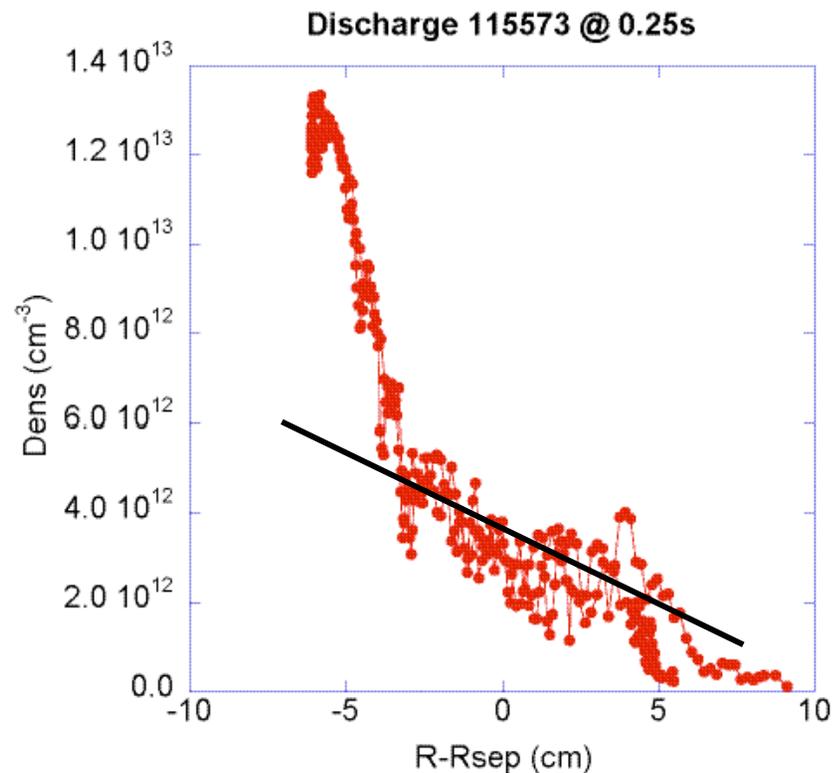
**Lower divertor peak heat flux decreased with number of divertors and increased triangularity**



**We can now assess heat flux to upper divertor**



- Scaling with density observed in ALCATOR C MOD, DIII-D
- Some scaling with density seen in

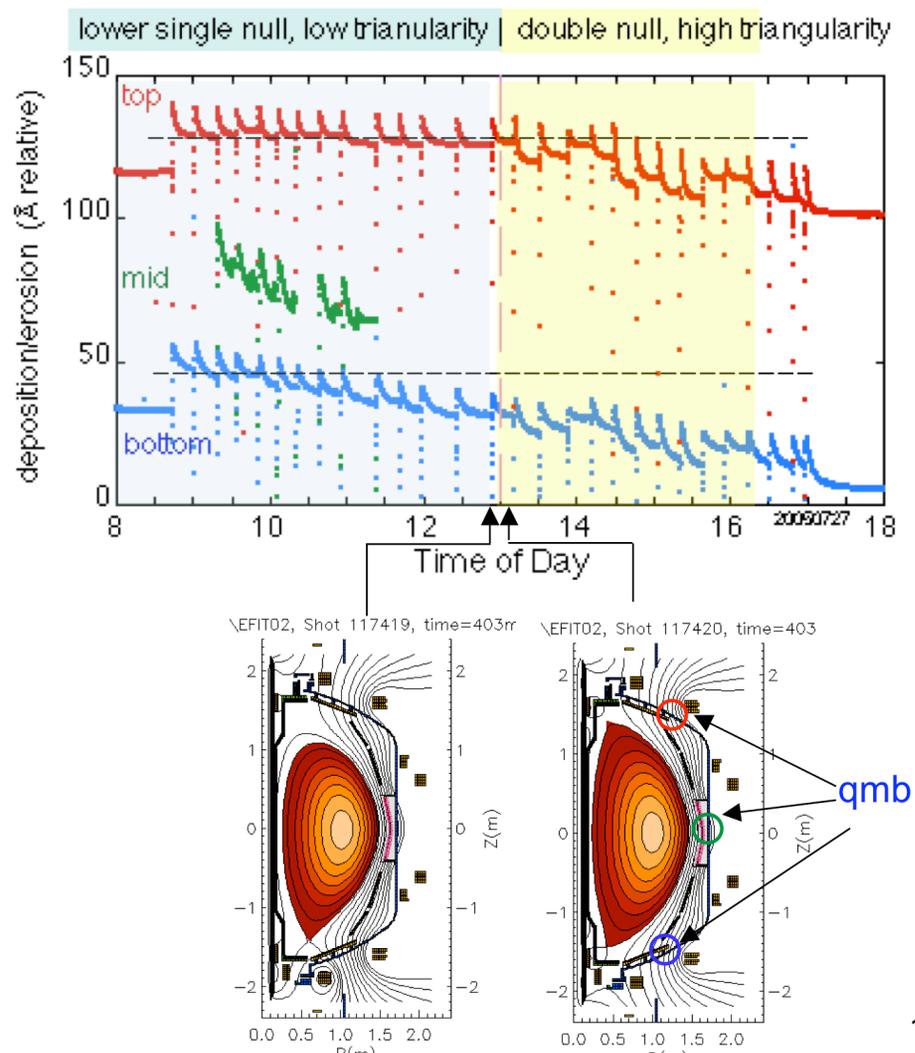


# Erosion/Deposition Work



## Deposition/erosion depends on plasma shape

- Discharge time marked by transients from pickup and temperature differences between thermocouple and crystal.
- First shot of day always experiences deposition.
- Subsequent discharges can show deposition or erosion (unlike 2004 location 80 cm from LCFS which mostly accumulated deposition).
- Interaction at upper divertor increases in DN discharges.



## Conclusions:

- Quartz microbalances shows complex pattern of erosion and deposition.
  - Deposition dominates on first discharge of day
  - Subsequent deposition/erosion correlates with plasma shape, stored energy, duration, ....
    - Analysis and modeling continuing...
  - For 2006 plan dedicated discharges varying discharge duration, H/L mode, reconnection events with GPI and reciprocating probe measurements of turbulence....

## Density Scan Plan

Flat density using Li pumping, Power scan during discharge 2 MW to 4 MW @ 300 ms OR a couple of separate 4 MW shots?

H-Mode LSN

Density scan Ng [0.2, 0.4, 0.6, 0.8, 1.0]

H-mode DN

Density steps (exploratory) Ng [0.2, 0.4, 0.8] or [0.2,0.8]

L-mode DN

Density scan Ng [0.2, 0.4, 0.6, 0.8, 1.0]

if time-pressed [0.2, 0.6, 1.0] or [0.2,0.8]

L-mode LSN

Density scan Ng [0.2, 0.4, 0.6, 0.8, 1.0]

if time-pressed [0.2, 0.6, 1.0] or [0.2,0.8]

# Shot Plan

## CONDITIONS

## SHOTS

• Fiducial before GDC		
• Fiducial 1		
• Fiducial 2		
• Fiducial 3		
• Long flat top		
• No flat top (ramp up and down)		
• Total Initial		6
• H-mode LSN and DN	5+3 (5+2)	8 (7)
• L-mode LSN and DN	5+5 (3+3) (2+2)	10 (6) (4)
<b>TOTAL:</b>		<b>24 (19) (17)</b>