

# Progress APS Invited: Outline

Ahmed Diallo

- ✓ Pedestal structure scaling and dynamics throughout the ELM cycle and comparison with other tokamaks in the ELMy H-mode.
- ✓ NSTX contribution: comparison with lithiated cases (“ELM free”)
  - Pedestal height is larger in the ELM-free case
- ✓ Edge fluctuation correlations with pedestal evolution during the inter-ELM phase
  - Transport estimates during the inter-ELM phase

# Inter-ELM dynamics and scalings of the pedestal structure

- Pedestal height and width increase prior to the onset of ELM: consistent with approaching the stability boundary.
- The height saturates for lower plasma current and height increase with triangularity.
- Similarly, the pedestal width increase and saturate during the last 40% of the ELM cycle.
- Pedestal height and width can be fitted with a linear function:

characteristics of ballooning stability in the bootstrap-current dominated regime of the edge barrier

# Comparison with ELM-free regimes

- The pedestal height in ELM free regime are larger than that of ELMy regimes with comparable or lower injected power
  - Evolution of the pedestal pressure vs “ELMiness”
- ELM-free regimes are farther away from the kink/peeling stability boundary than ELMy regime but show a larger pedestal height

# Return to ELMy case: Correlation between edge density fluctuations and pedestal buildup

- Hypothesis: KBM/ITG limits pedestal pressure gradient
- Observation of two disparate scales of correlation lengths in the pedestal region using the reflectometer.
- The correlation length at the pedestal top increases as the pedestal height buildups.
- Correlation length at the pedestal top agrees with ITG type scales and no evidence of KBM was observed.
- *Would be useful to get  $V_{poloidal}$  from BES at the pedestal top (Smith) during the inter-ELM phase.*

# Thermal Transport analysis in the pedestal top during the inter-ELM phase

- Hypothesis: Do  $k_{\perp}\rho_i \sim < 1$  fluctuations cause large transport near the onset of ELM?
- ❖ Inter-ELM dependent 2D SOLPS modeling to the pedestal response (on going J. Canik)
- ❖ 1.5D TRANSP for xp't estimates of transport coefficient with tanh profiles (missing errorbar estimates: ongoing B. LeBlanc)
- ❖ Hypothesis: Ion transport is neoclassical
  - XGC0 for neoclassical calcs (ongoing CS Chang's group)