

# Relation between the midplane SOL pressure width and the divertor heat flux width

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## Goal:

- Support OFES FY2016 Milestone by
  - ✧ Studying relation between widths of the SOL pressure pedestal and the divertor heat flux
  - ✧ Comparing experimental data to numerical studies with XGCa and XGC1

## Methods:

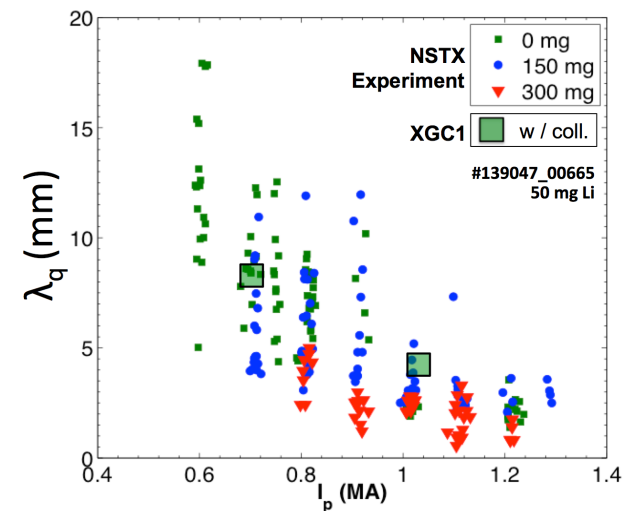
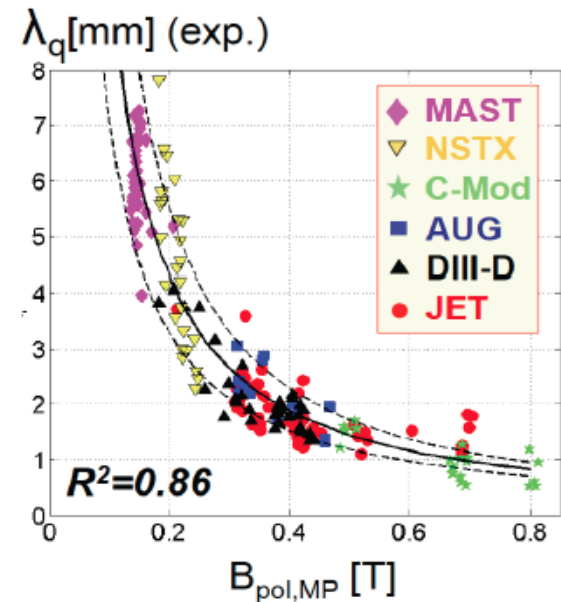
- Measure pressure ( $n_e$  and  $T$ ) profile at outer midplane with Thomson scattering
- Divertor heat load with IR camera

## Possible synergies:

- Pedestal physics: instability, turbulence and transport
- Blobby turbulence in SOL

# $1/I_p$ -scaling is a concern for ITER

- Heuristic scaling (Goldston, 2012), XGC1 (IAEA 2014) and XGC0 (JRT 2010) predict  $1/I_p$  dependence of heat flux width
- Present experiments show this scaling  
→ Concern for ITER
- Heuristic model neglects potentially important effects, such as blobs.
- In ITER, the ion orbit width is expected to become much smaller than the blob size
- Potential effect of resistive ballooning modes in SOL on pressure profile  
→ SOL pressure pedestal may be broader than orbit width because of turbulence in high B



# Investigate relation between SOL pressure pedestal and divertor heat flux

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- Measure outer midplane pressure with Thomson scattering
- Align separatrix with highest-resolution observation range of Thomson diagnostic
  - Have some high-res points on either side of the separatrix
- Measure divertor heat flux with IR cameras
- Analyze experimental data using gyrokinetic-neoclassical XGCa and eventually XGC1 to study kinetic effects
  - Parallel transport, ion orbit width, cross-field transport, drifts, SOL turbulence
- ~1 run day: ½ day boronized, ½ day with lithium
- DIII-D and C-Mod data may be available for comparison