Summary XP1044: Pedestal Height

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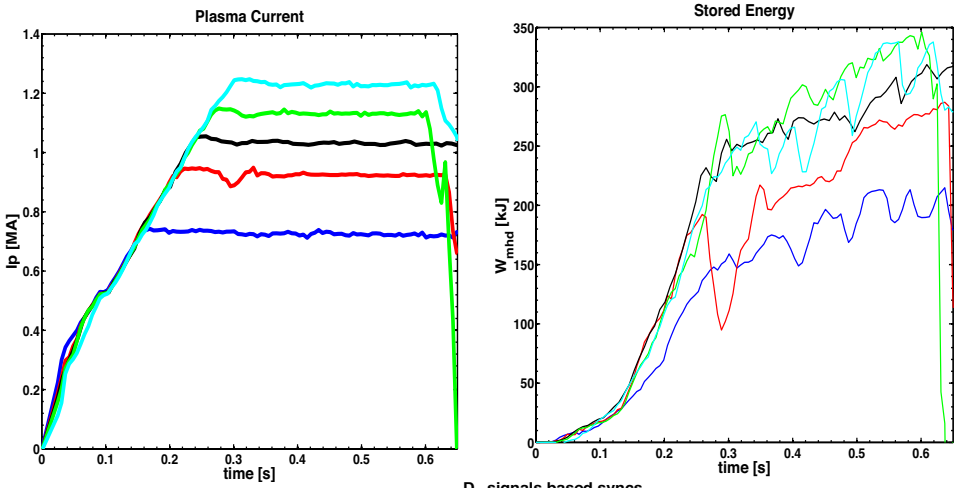
Experimental Plan: Target conditions setup by XP1043 but with ELMs for pedestal pressure saturation

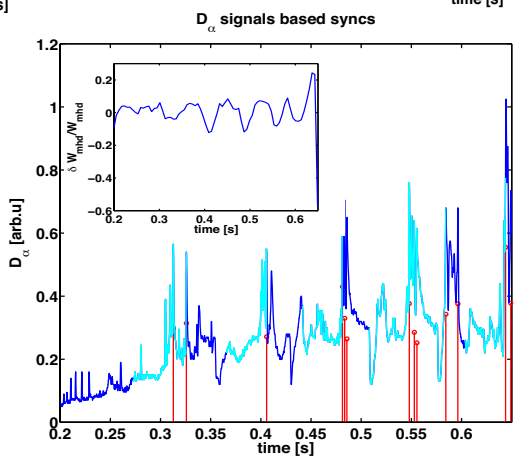
- Goals/Approach
  - Obtain detailed measurements of the pedestal structure (height and width) with varying global/engineering parameters (Ip and Bt) to evaluate and guide existing predictive pedestal models.
  - Access potential correlations of edge turbulence and the pedestal structure. What are the experimental signatures in edge fluctuations which precipitate the ELM crash?
    - Generate H-mode ***Elmy*** discharges
    - Perform scan in Ip and Bt: Investigate the scaling of the pedestal pressure height with global parameters.

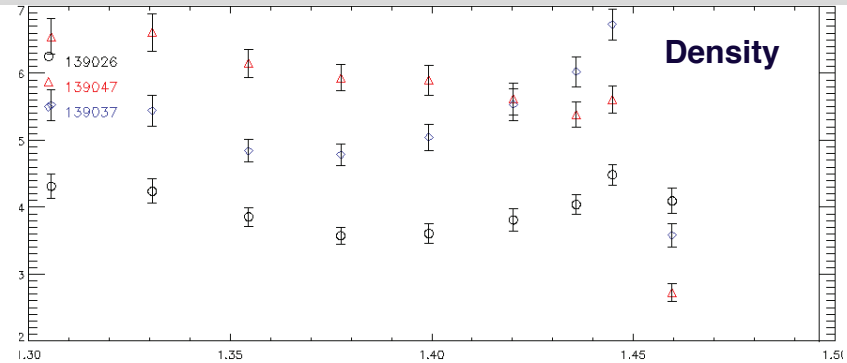
      1. Bt =0.5 T and Ip = {700 kA , 1.2 MA, 1.0 MA}
      2. Bt = 0.55 T and Ip ={700 kA, 1.1 MA, 900 kA}
      3. Bt = 0.45 T and Ip ={700kA, 1.3 MA}
- Data from June 30, 2010
  - Completed step (1) and most of (2). Need to complete (3) to finish the scan with more reliable ELMy discharges.
  - Preliminary profile analysis performed. Assessing the turbulence data.

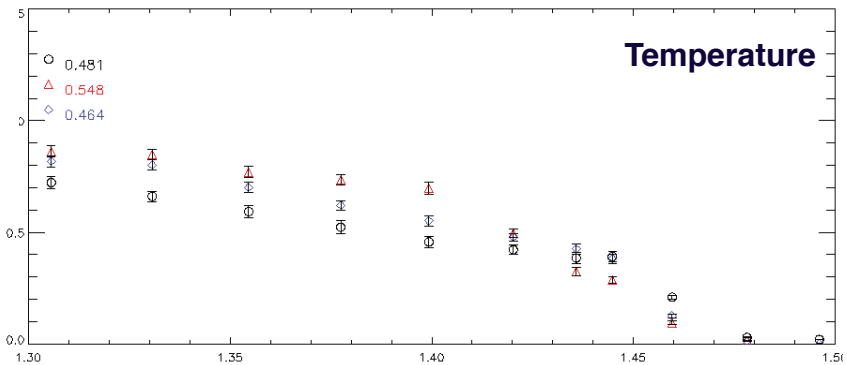
Increase of the electron pressure with plasma current

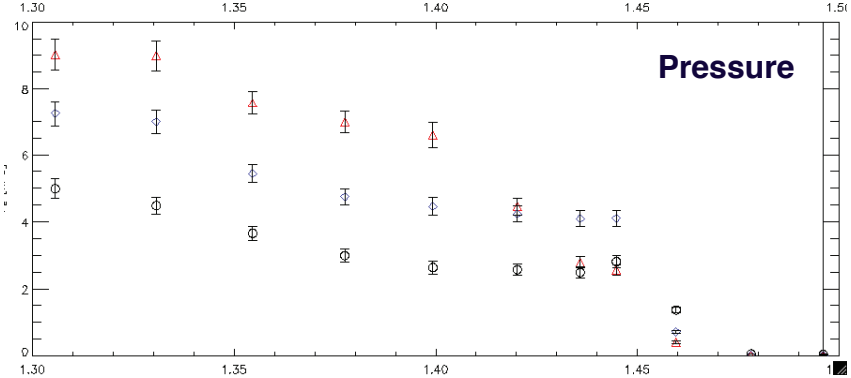


139026
139056
139047
139049
139037



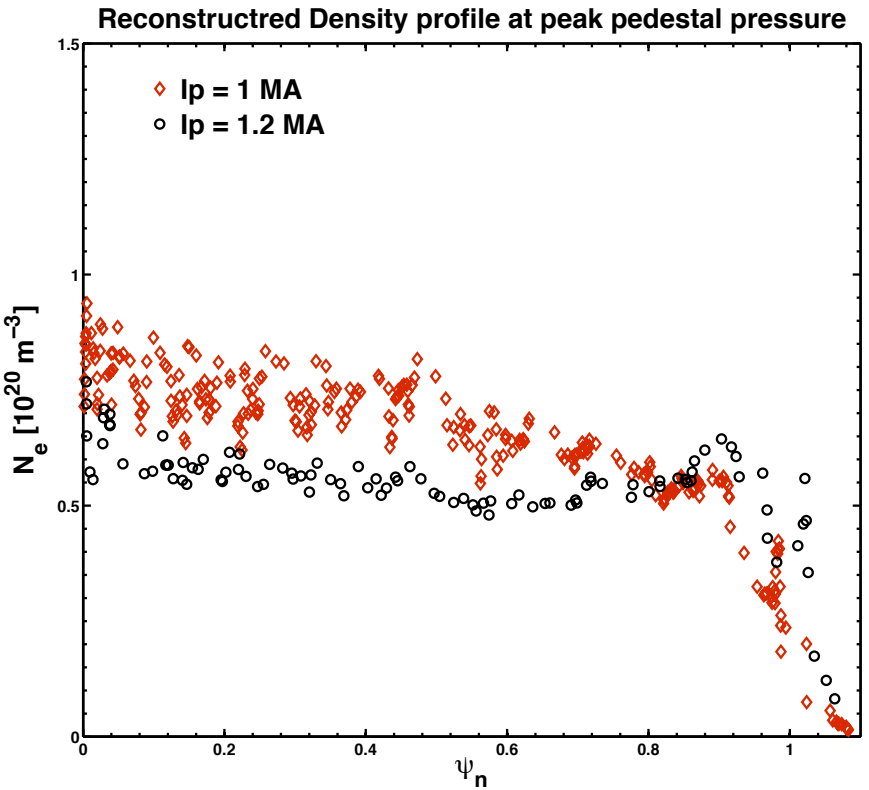


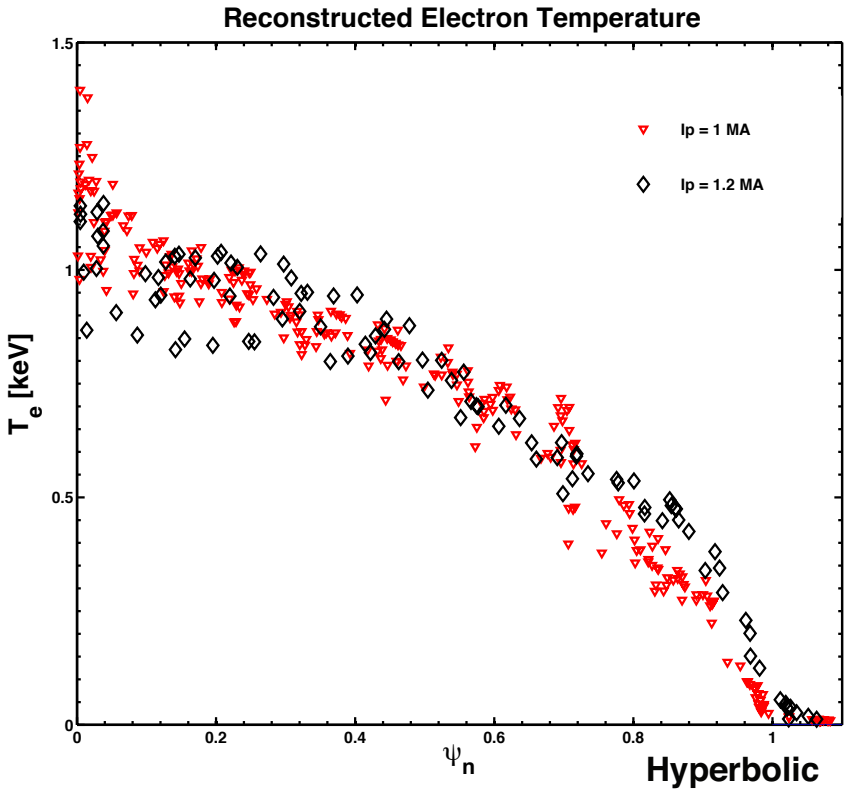




- High kappa discharges
- vary drsep ~ - 5 mm to get ELMs
- Liter @ 50 mg for most of the time.

Preliminary analysis: Reconstructed Profiles (Ne and Te) synchronized with ELM events



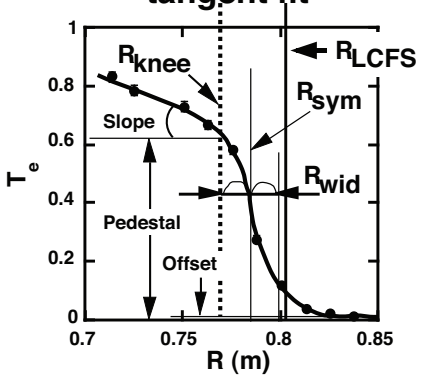


Parametrize these profiles in terms of the tanh to extract the top of the pedestal and to an extent the width. Do not distinguish between ELM types!

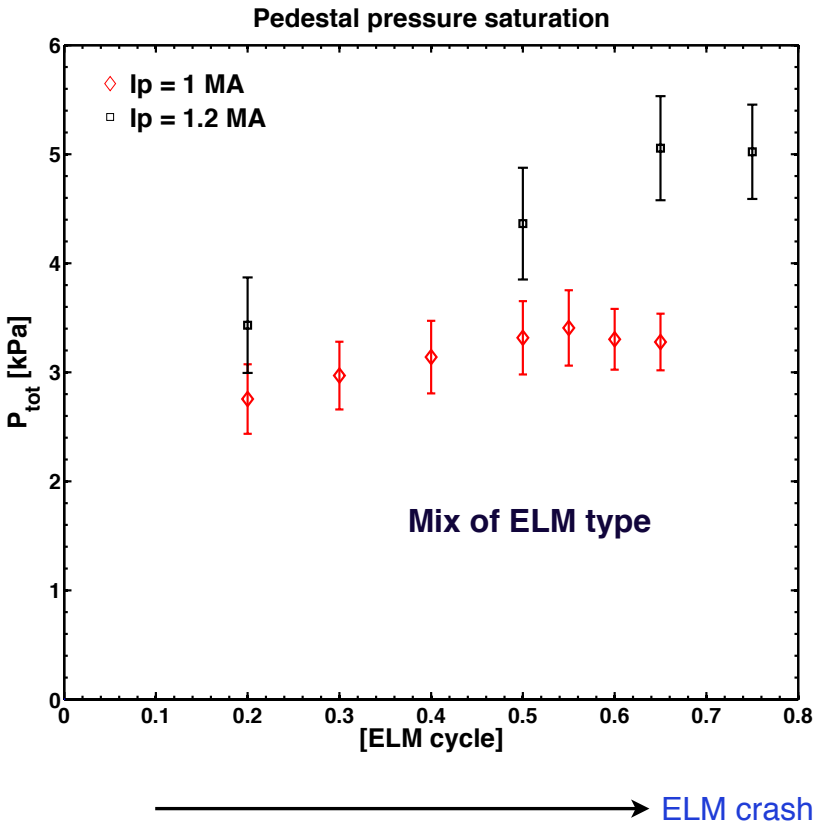
$$Te, Ne, Pe = A \cdot \tanh\left(\frac{R_{sym} - R}{R_{wid}}\right) + B$$

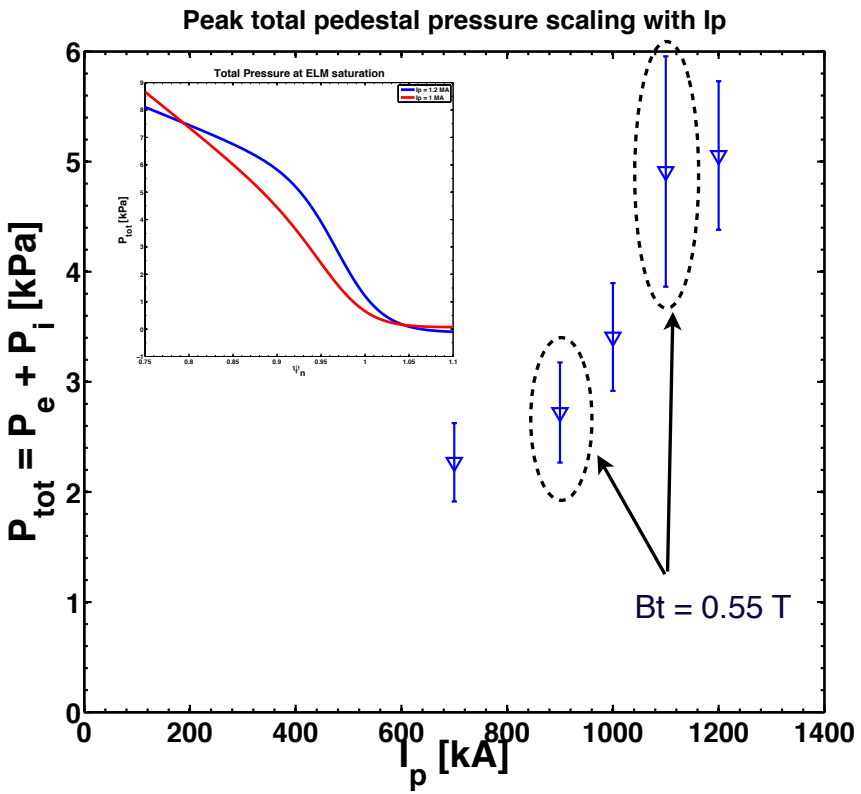
$$Pedestal = A + B$$

Hyperbolic tangent fit



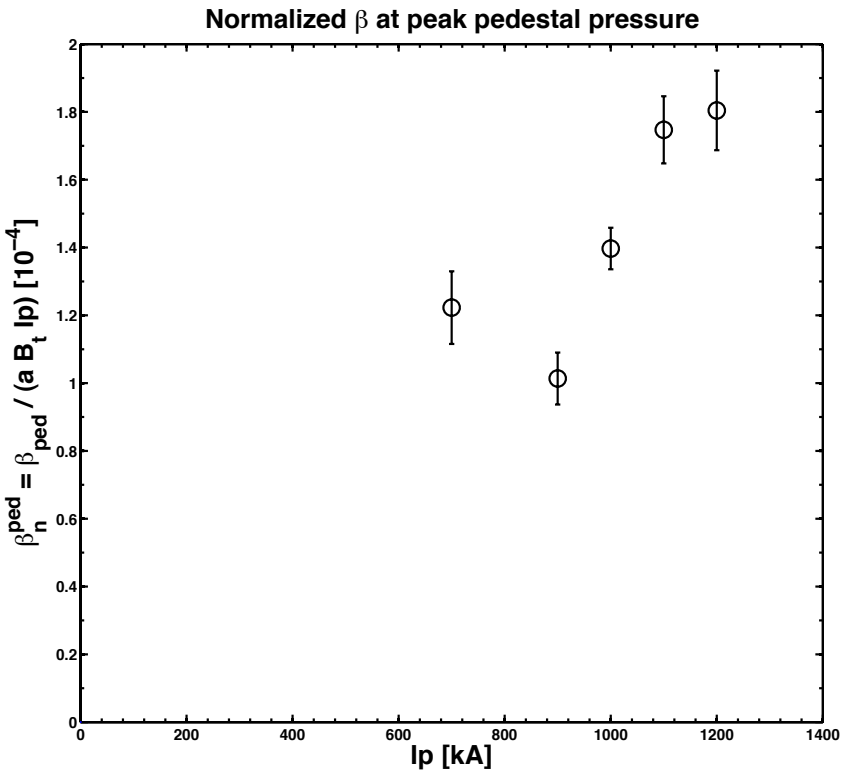
Preceding the ELM crash, confirmation that the total pedestal pressure increases until saturation

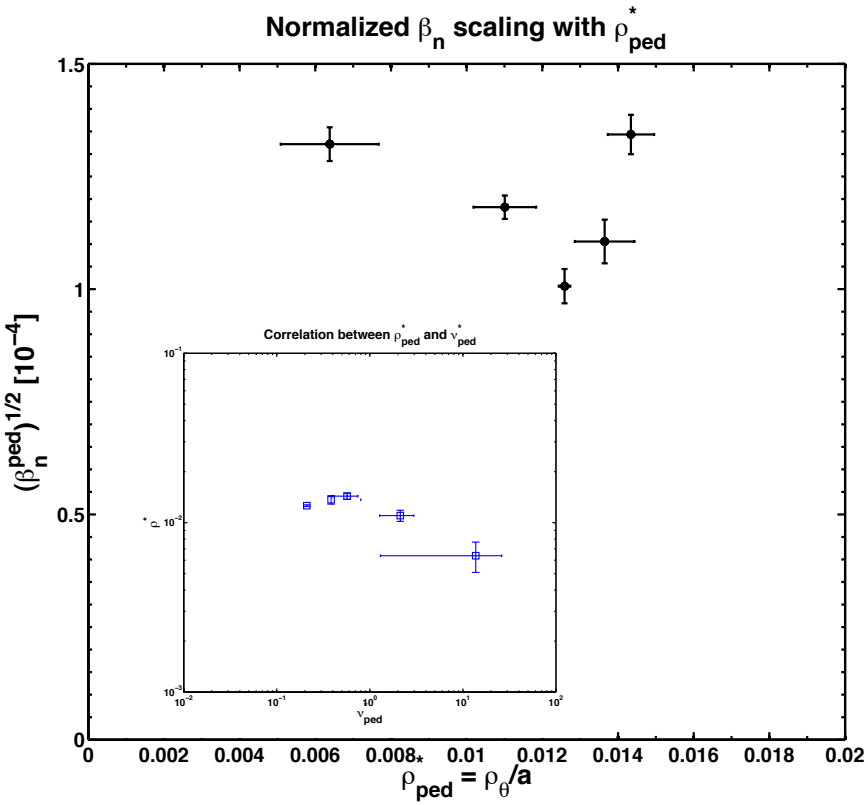




Need to fold in the magnetic field difference using the normalized beta poloidal

Beta poloidal at peak pedestal pressure scaling with rhos and Ip





Work in progress to analyze correlations between key plasma parameters at peak pedestal pressure

The pedestal width remains unresolved