# Pedestal Structure & Control TSG

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NSTX-U Pedestal NSTX-U Pre-forum 2
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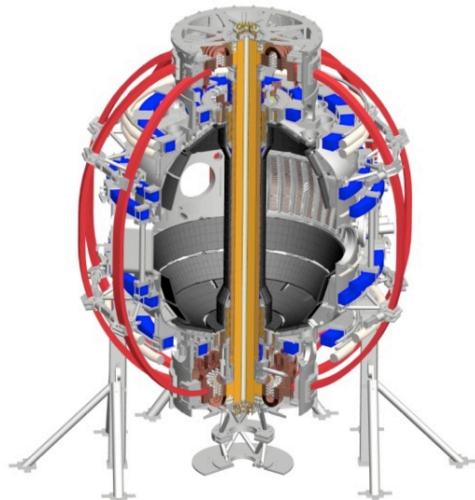
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Brief Outline of TSG PED plans

- Near term priorities

- Mid to late run priorities

- Needed action items for the ROF

NSTX-U PED research topics for FY 15 (I)
Early in the run (first 2months of operations)

- H-mode access and power threshold (L-H transition physics with T&T)
  - Explore H-mode access, variation with Rtan
  - Measure L-H threshold dependencies (power, Rtan, etc...)

- Characterize the H-Mode pedestal structure at increased BT, Ip, and NBI heating power, -- **R15-1**-- and shaping (triangularity, DN vs LSN vs USN) may require dedicated time beyond R15-1
  - Map out the stability diagram for three Ip and 2 shaping parameters
  - Determine the pedestal scaling with beta_pol
  - Pedestal structure and evolution after L-H transition and between ELMs
  - Turbulence characterization to understand the pedestal dynamics
  - Generate database for testing EPED on ST and for gyrokinetic codes

To be performed in boronized and lithiated wall

NSTX-U PED research topics for FY 15 (II)
Early in the run (first 2months of operations)

- Identifying common characteristics in the phenomenology of different ELM types (DivSol & MP)
  - RMP impact on the pedestal stability
  - Effect of (Boron)-Granule-Injection for increasing the ELM frequency
  - Snowflake impact on the pedestal stability *(if control is available during the boronized wall phase)*
    - Need to finish edge stability analysis of previous NSTX snowflake experiments that showed ELM destabilization to guide new experiments

- Exploit the transition from Boronized PFCs to lithium coatings
  - Compare intrinsic and triggered ELMy-H mode in Boron vs Li
    - Document transition from ELMy-ELM-free transition and then scan in Li ELM-free
  - Document the pedestal structure impact during the transition Boron to Li

To be performed in boronized and lithiated wall

NSTX-U PED research topics for FY 15 Mid-late run

- Refine pedestal characterization with high triangularity discharges
- Investigate/characterize ELM-free regimes such EPH mode, I-mode, etc...
- Pedestal destabilization physics using LGI in ELM-free regimes
- Develop optimum discharges for simulation-experiment comparison in pedestal region
  - Discuss with theory team for adequate discharges for simulations
  - Optimize cross-diagnostics (BES, GPI, reflectometry, and probes) in the edge region
- Transition from lithiated to boronized walls (with MP)
  - Impact on pedestal structure/evolution and ELM characteristics (hysterisis study)

Action items from the PED-TSG brainstorming meeting

- Investigate the impact of 2nd NBI on a fully developed pedestal
  - need calculations or theoretical arguments to predict effect of NBI tangency radius variation on fully developed pedestal

- Explore inner-wall limited H-modes space
  - L-H threshold physics motivated by experiment/theory discrepancies with ITPA scaling:
    - aspect ratio scaling, limited/diverted H-mode access, and edge collisionality.

- Investigate the impurity effects on pedestal stability
  - Extend XGC1 JET calcs to NSTX-U to help guide the experiments