WG 5: Divertor, Scrape-off Layer, and Fueling

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Initial views of the NSTX scientific elements:

- Divertor / Scrape-Off Layer (SOL)
- Fueling
- General edge physics issues
- Diagnostics

Divertor / SOL Physics Issues

- Do we want (or need) H-modes in NSTX ?
  - is normal confinement L-mode ?
  - is edge turbulence different in STs ?
  - what is the L-H transition threshold ?
  - is H-mode consistent with CHI / RF / high ∫ ?
  - does H-mode decrease SOL thickness ?
  - should NSTX have a more "closed" divertor ?

- How can we further reduce the divertor heat flux ?
  - increase flux expansion further ?
  - divertor sweeping (reactor-relevant) ?
  - partial detachment or radiative divertor ?
  - moving belt limiter or other new ideas ?

- Is edge pumping desirable as an NSTX upgrade ?

- Are wall coatings important for ST operation ?

General Edge Physics Issues

- Should aim to have edge diagnostics capabilitie at least as good as C-Mod or DIII-D

- Should have coordinated program on plasma-surface interactions and neutral particles

- Should have coordinated program on edge theory and modeling

NSTX Divertor Diagnostics Should Facilitate Operations and Allow Characterization of Divertor Physics

- NSTX Divertor Diagnostics
  - *Facilitate Operations*
    - Monitor Power Deposition
      - Fast Thermocouple Array
      - IR Camera Viewing
    - Strike-Point and X-Point Positioning
      - Floating Probe Array
      - Local Flux Loops
      - TV Camera Viewing
  - *Physics Characterization*
    - Power Handling
      - Thermocouple Array
      - IR and TV Camera Views
      - Foil Bolometers
      - Water Calorimetry for long pulse
    - Particle Influx and Entrainment
      - H-Alpha / CII Detectors
      - Divertor Region Spectroscopy
      - Bolometer Poloidal Arrays
      - Filtered Camera Imaging
      - Fast Framing Camera
      - Fabry Perot (flow and species)
      - Gas Injection Manifolds
      - Laser Ablation Impurity Injection
      - B and Li Coating Deposition
      - Deposition Thickness Monitor
    - Neutral and Particle Density
      - Fast Neutral Pressure Gauges
      - μ-Interferometry
    - Divertor Edge Plasma Parameters
      - Edge Probe Arrays
      - Edge Thomson Scattering