EP H-mode on NSTX

- Enhanced Pedestal (EP) H-mode achieved $H_{98(y,2)}$ = 1.3 - 1.9 on NSTX
  - Increase in thermal confinement mostly due to increase in T_i
  - Concurrent increase in particle transport and ELM-free
- Accessed at low ion collisionality, often triggered during ELM recovery
  - Demonstrated with dedicated discharges and large database
  - Increased thermal confinement consistent with neo transport
- Positive feedback occurs when increased edge TEM thermal transport is overcome by neo reduction
  - Demonstrated with 1-D transport model and dedicated discharges
- Consistent with linear CGYRO calculations and BES measurements
  - Steep gradient region shifts inward, less shear outside barrier

EP H-mode on NSTX

- EP H-mode presents an avenue to high-confinement on STs and is an attractive regime for future devices
- What am I am working towards …
  - TRANSP produces negative ion heat flux in large T_i gradient region, NCLASS and GTC-NEO predict finite flux
    - Are there modifications to TRANSP calcs that improve agreement?
    - Does including more physics in the neo calcs (GTC-NEO, XGC) help?
  - EP H-mode is ELM-free with the pedestal shifting inwards and/or growing wider.
    - Is there a critical path through PB stability?
  - Move beyond a 1-D model to demonstrate positive feedback
    - Use TRANSP (XGC …) to reproduce threshold where an increase or change in the turbulent transport leads to an increase in T_i
  - Continue linear and non-linear CGYRO to classify TEM dependence on pedestal parameters