ELM Triggering with 3D Fields in NSTX

- Focus
  - Detailed measurements of ELM triggering with 3D fields
    - Goal is improved understanding of the impact of magnetic perturbations on pedestal structure and stability
    - So far data is from pre-Li plasmas
  - Scenario development: ELM pace-making for discharge control with Li
    - Triggering used as a tool to slow down impurities, density
    - Shows the potential to turn Li plasmas into steady-state scenario

- Experimental results
  - ELMs are destabilized when n=3 field is applied during a small-ELM/ELM-free plasma, and threshold has been measured without Li
  - Profile changes after 3D field applied, without Li:
    - Density unaffected: no pumpout
    - Pedestal Te goes up, gives increased pressure gradient
    - Rotation slows
  - ELMs can also be triggered in Li induced ELM-free H-modes
  - Triggering ELMs reduces impurity and density buildup, keeps energy confinement
  - Achievable ELM frequency, size show dependence on shape (better at high kappa)

ELM Triggering with 3D Fields in NSTX

- Theory
  - Vacuum spectral and field line following codes: edge is highly stochastic; IPEC: plasma response attenuates perturbation, may be reducing impact of resonant terms
  - Increase in Te in opposition to transport expected due to stochastic field, may support IPEC attenuation or island shielding
  - PEST shows stable before n=3, unstable after: can explain stability given the measured profiles (note this is without Li)
  - ELITE shows pedestal is near peeling stability boundary

- Experiment/theory I'd like to get before the meeting
  - Profile measurements with lithium conditioning, and stability calcs from these
  - Full stationarity in Li discharges via ELM pace-making
  - Stability calculations at higher kappa (to compare ELM size, requires measurements)
  - Measurements and calculations of strike point splitting as basic evidence of ergodic field
  - Vacuum field line calcs (as D3D) to compare figures of merit besides Chirikov