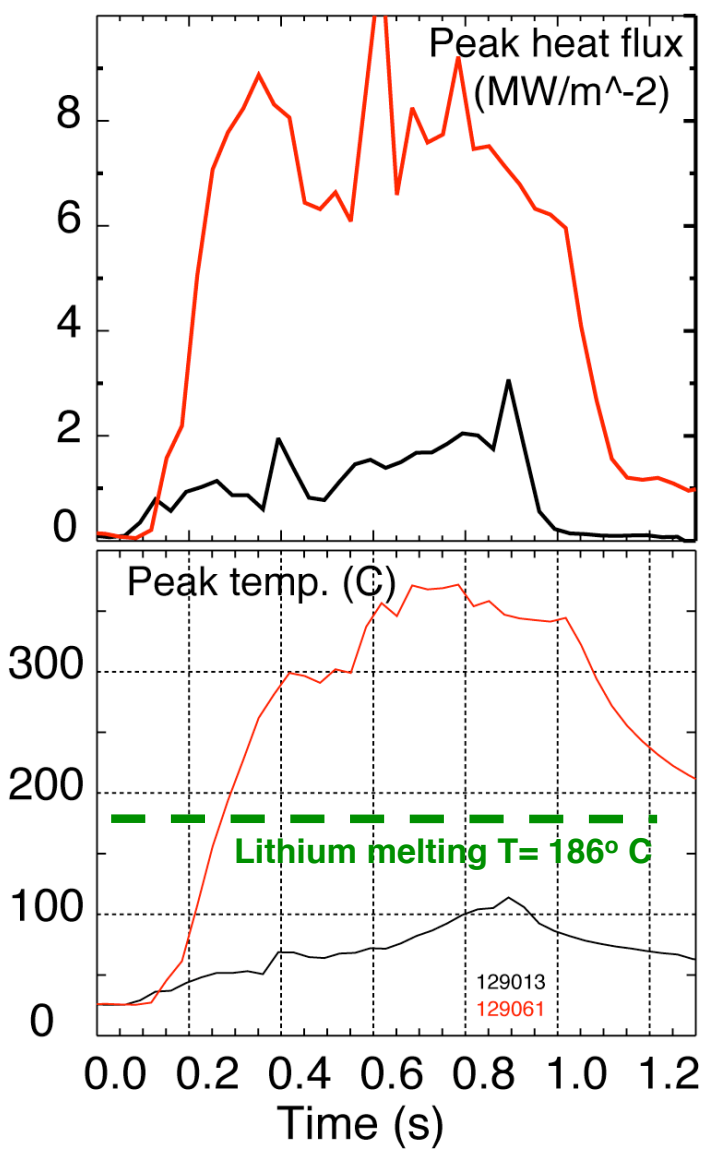
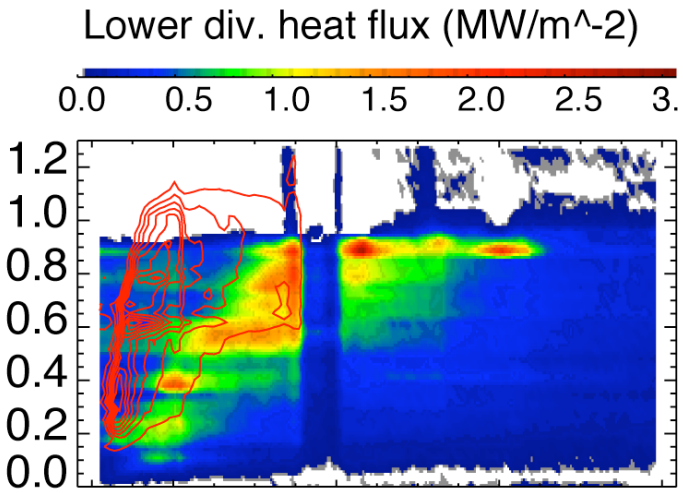
Boundary Physics TSG priorities for 2010 and LLD timing are in conflict

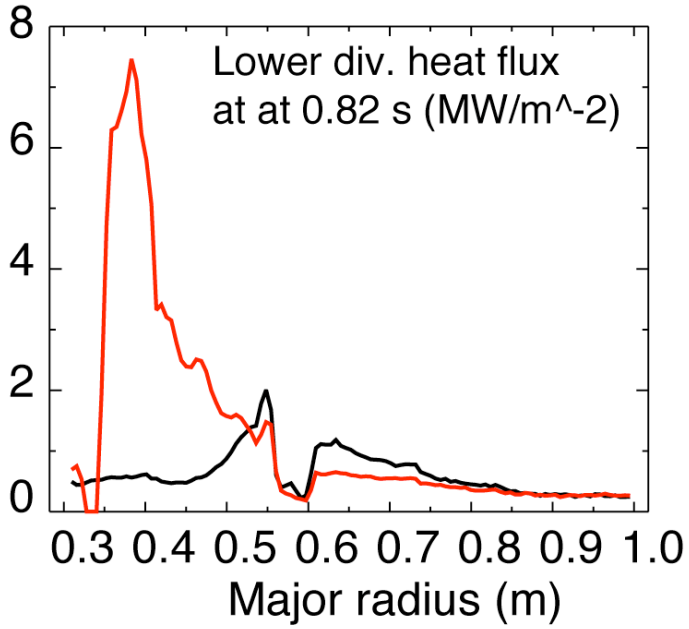
- **FY2010 Joint Research Milestone**: Compare divertor heat flux widths to midplane density and temperature widths and edge turbulence characteristics, and determine the scaling of SOL and divertor heat transport
  - LLD impact: compromise IR camera calibrations
- **NSTX Milestone R10-3**: Determine the relationship of ELM properties to discharge boundary shape, lithium conditioning, and 3D resonant magnetic perturbations (RMPs), and compare stability of pedestal/ELMs with model calculations
- **FY2011 Joint Research Milestone**: Understand and develop a predictive capability for the physics mechanisms responsible for the structure of the H-mode pedestal
  - Concern: LLD / lithium changes pedestal MHD stability and ELMs

Divertor heat flux measurements are complicated by lithium coatings

- Instrumental effects:
  - Thermal contact between lithium coating and bulk graphite tile
  - Surface emissivity reduction
- Plasma effects:
  - Much lower P_{SOL}
  - Higher divertor heat flux?







No lithium (129013)
190 mg Lithium (129061)

Thoughts on start-up planning…

- Boundary Physics TSG would greatly benefit from a no-lithium period

- NSTX 10-year experience: poor plasma performance without boronization (or lithium)
  - GDC alone cannot mitigate the issue

- Questions to NSTX and LLD Managers:
  - If LLD is success, we will be prepared to take advantage of LLD as a tool
  - Planning for LLD failures is important - are we prepared to
    - Identify failure modes and their impact on NSTX operations
    - Plan for specific problems and ways to resolve them

- Proposed start-up plan
  1. Run without lithium until the no-lithium research agenda is exhausted (~1 week)
  2. Run with LLD until the critical LLD experiments are completed (~ 2 weeks)
  3. Assess options to continue
  4. An administrative decision may move # 2 to # 1 to benefit LLD research

Plan for LLD start-up experiments

- Focus on four main thrusts
  - LLD pumping capability
  - Effect on pedestal and core performance
  - Effect on SOL / divertor transport
  - Divertor heat flux handling

- Start LLD experiments in an as much controlled manner as possible
  - High-triangularity (δ~0.7-0.8, R_{OSP} ~ 0.4-0.5 m) fiducial 2-4 MW NBI
    - little heating / heat flux on LLD
  - Use LLD at controlled temperature using heaters
    - scan temperature between 150 and 350 C
  - Obtain data to address the four point above
  - Then proceed to medium triangularity shape (δ~0.5-0.6, R_{OSP} ~ 0.5-0.65 m) but start with cold LLD