

Review of

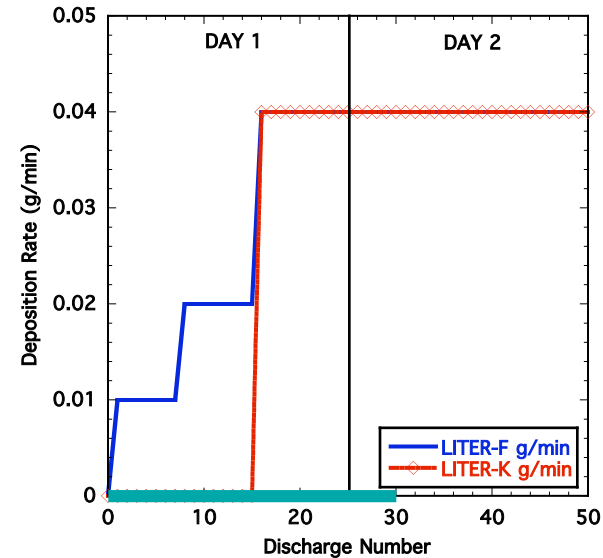
**XP-827: LITER Characterization (H. W. Kugel)
and ELM Mitigation (D. K. Mansfield)**

April 30, 2008

XP-827: LITER FY08 Evaporation Profile

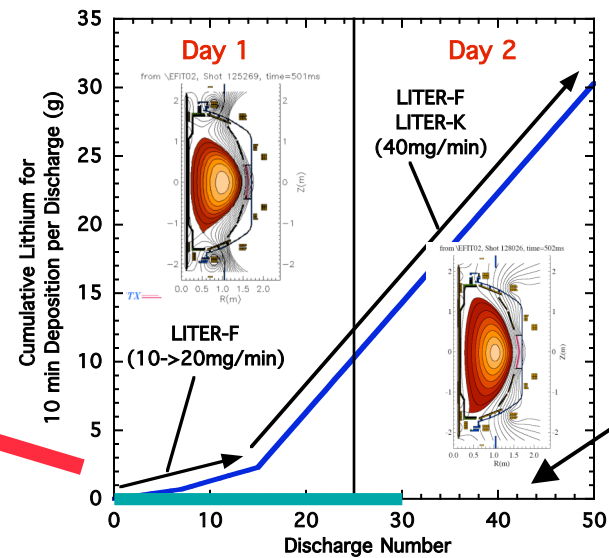
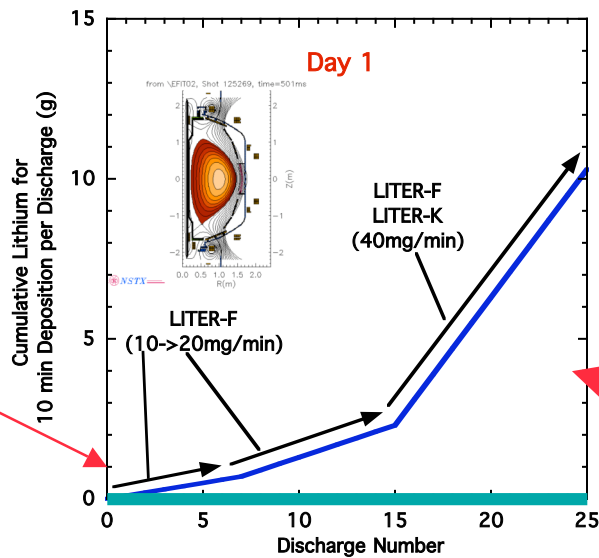


- Start with 1 LITER operation, & increase deposition rate slowly
 - to make contact with FY07 database and seek possible transition from ELMs to no-ELMs
- Measure effect of increased coverage on increased pumping



HeGDC 5 min
+ 10 min LITER

• Region of Possible ELM to no-ELM Transition

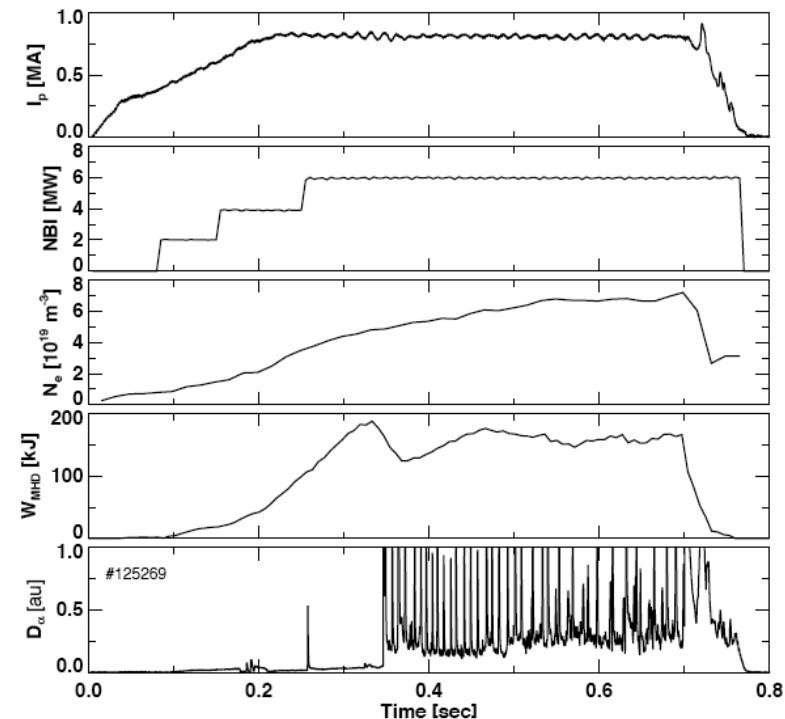
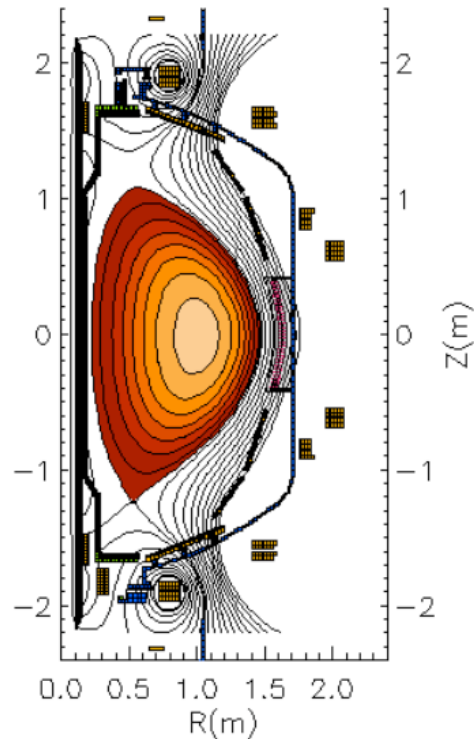


• HeGDC TBD + 10 min LITER

XP-827: Day 1- ELM Mitigation

- Procedure: for reference shot use 125269, LSND, $\delta=0.5$ a high recycling, ELMing, H-mode, (4.5KG, 800KA, 700ms, 3 NBI)
 - increases sensitivity to Li pumping effect on recycling
 - good sensitivity to possible ELM-to-no ELM transition

\EFIT02, Shot 125269, time=501ms

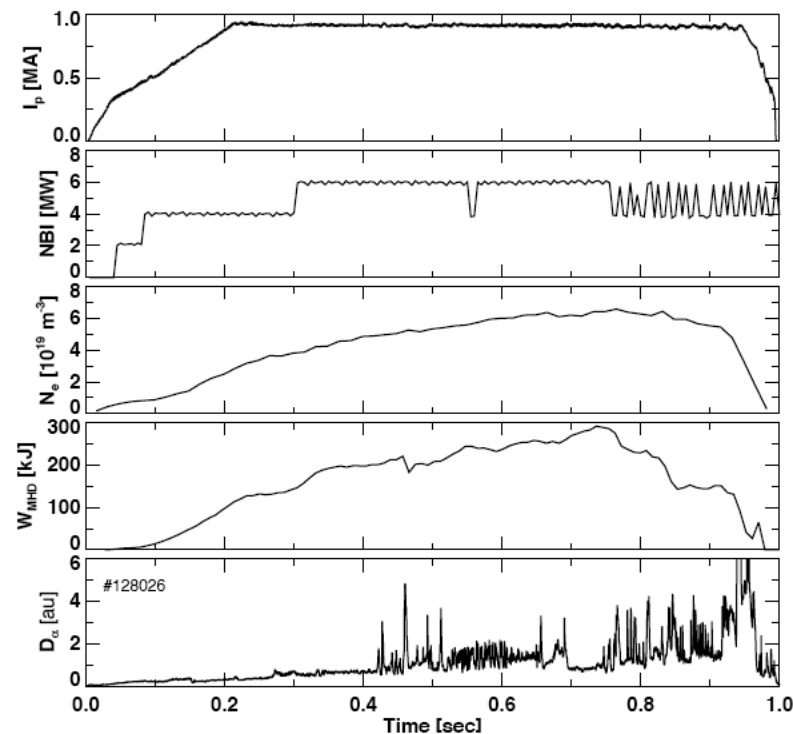
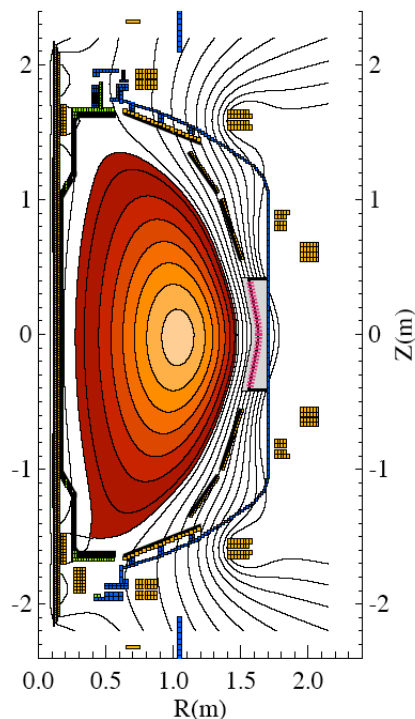


XP-827: Day 2 - LITER Characterization



- Procedure: for reference shot use 128026, LSND, $\delta=0.8$, a high recycling, ELMing, H-mode, (4.5KG, 800KA, 700ms, 3 NBI)
 - make contact with FY07 database
 - Characterize transition from ELMs to no-ELMs
 - Measure effect of increased coverage on increased pumping
 - Characterize effect of shorter HeGDC applications

from \EFIT02, Shot 128026, time=502ms



XP-827: Initially Use 5 Min HeGDC and Then Decrease Duration as Higher Deposition Rates are Accessed



- LITER and HeGDC Sequence:
 - at -30s turn off LITER power, start LITER withdrawal to Park position
 - after LITER at Park position, close Shutter, open diagnostic shutters
 - start discharge
 - after discharge, keep LITER Shutter closed, close diagnostic shutters
 - start 5 min HeGDC
 - stop HeGDC, open LITER Shutter, insert LITER, turn on power

- Using NSTX FY07 LITER data
 - LITER cooldown rate paced by high thermal inertia, remaining Li, Snout temperature relative to oven temperature.
 - Example: a sample warm-up from 675°C to 689°C at full heating power. This starting temperature is based on 5 minutes of cool down during GDC. The whole process took approx 7 minutes and 548.02 mg evaporated, compared to 633.08 mg with the heaters on the whole time, for a ΔLi of 85.78 mg. If we add on the 5 minutes of savings during GDC, the net Li savings per shot at this evaporation rate is ~100 mg. -J. Kallman