

# XP 603: Long pulse double null development at high $\kappa$ and $\delta$

Presented at the NSTX Physics  
meeting 6/12/06

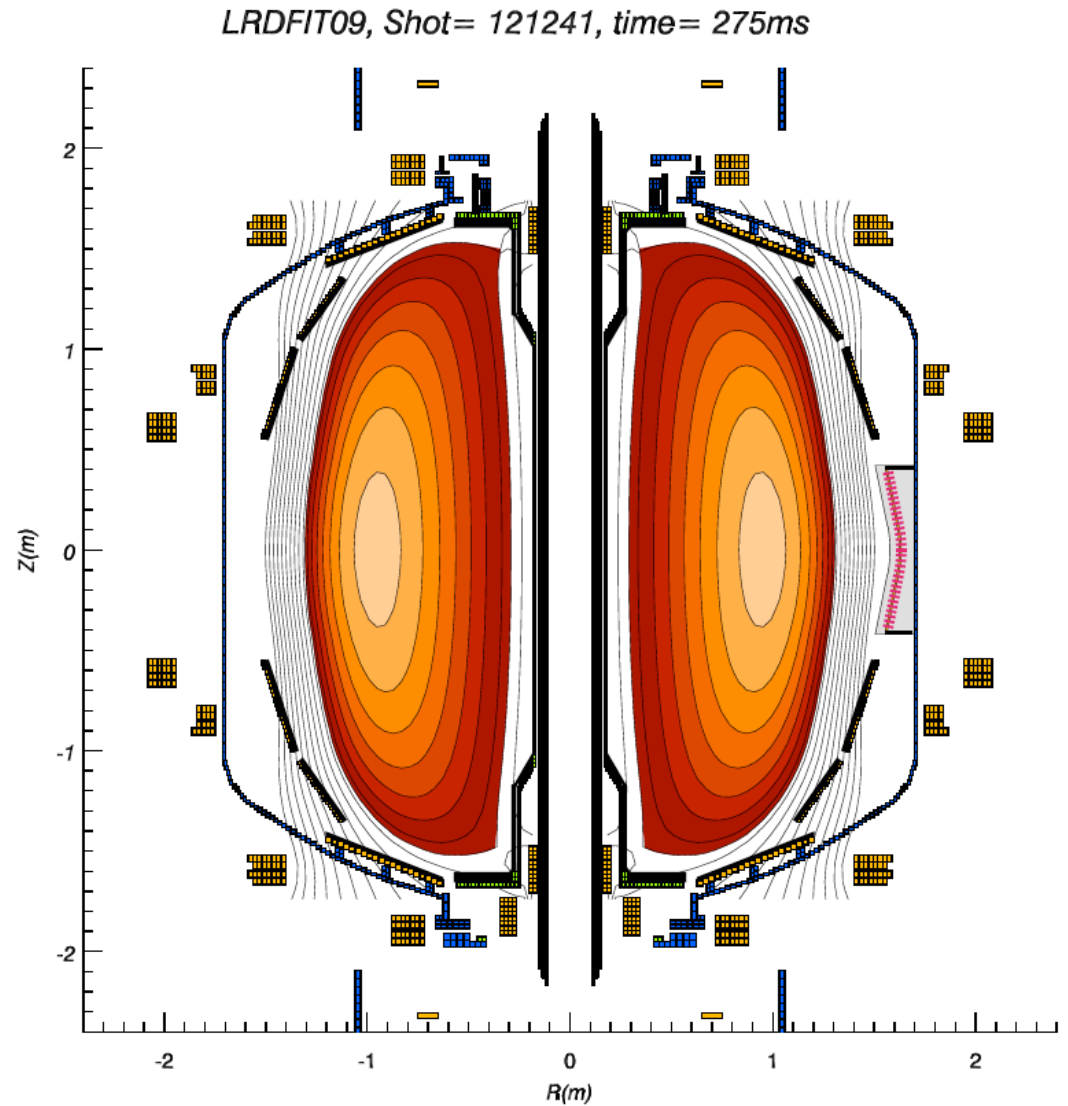
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# Goal: High non-inductive current fraction

- Method: Increase  $B_t$  and decrease  $I_p$  while increasing  $\kappa$  in order to maximize  $f_{bs}$  and hopefully  $f_{NBI}$  via increased  $T_e$
- Trade off: Decreased plasma current leads to decreased confinement (both for beams and for thermal particles)
- Actions: Develop high  $\kappa$  ( $\sim 2.7$ ) target at  $B_t = 5.5\text{kGauss}$ , vary plasma current between 0.7 - 1.0MA

# Results

- Record plasma elongation of  $\kappa \sim 2.95$
- Record sustained low  $I_i \sim 0.4$
- Record plasma shaping factor  $S \equiv q_{95}^*(I_p/[aB_t]) = 44$  (MA/[m•Tesla])



## Results (cont.)

- Best sustainment results at higher current,  $I_p \sim 0.9 - 1.0\text{MA}$
- Did not achieve (ST) record non-inductive fraction
  - Confinement reduced,  $\beta_N \sim 4$  instead of routinely achieved  $\beta_N \sim 5-6$
- Make drsep negative (routinely observed to raise confinement  $\sim 25\%$ )