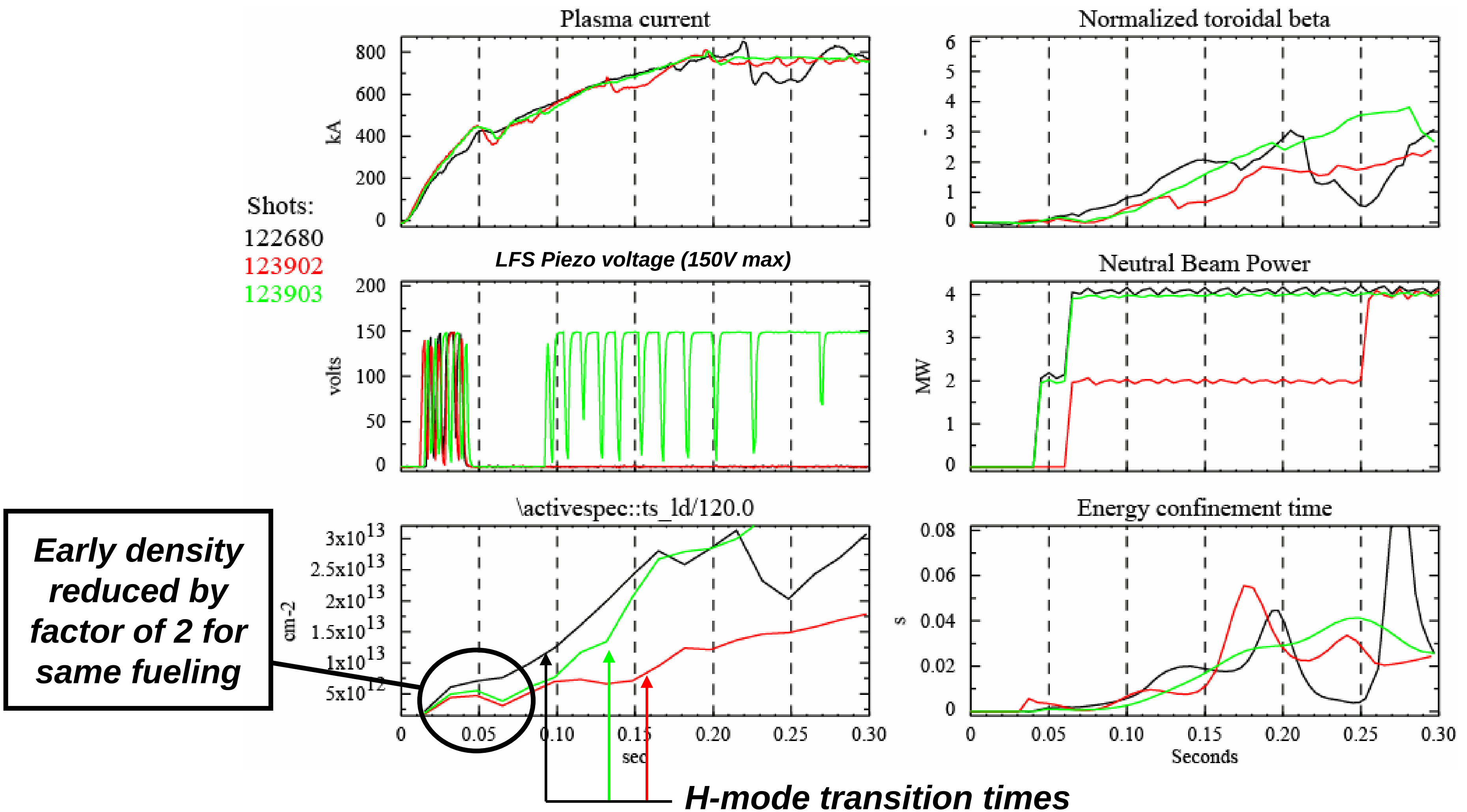
High LITER evaporation rates (30-40mg/min) with 7 min He glow can significantly increase D pumping

Black → reference discharge w/o LITER from 2007

Red → with LITER (different beam programming unfortunately)

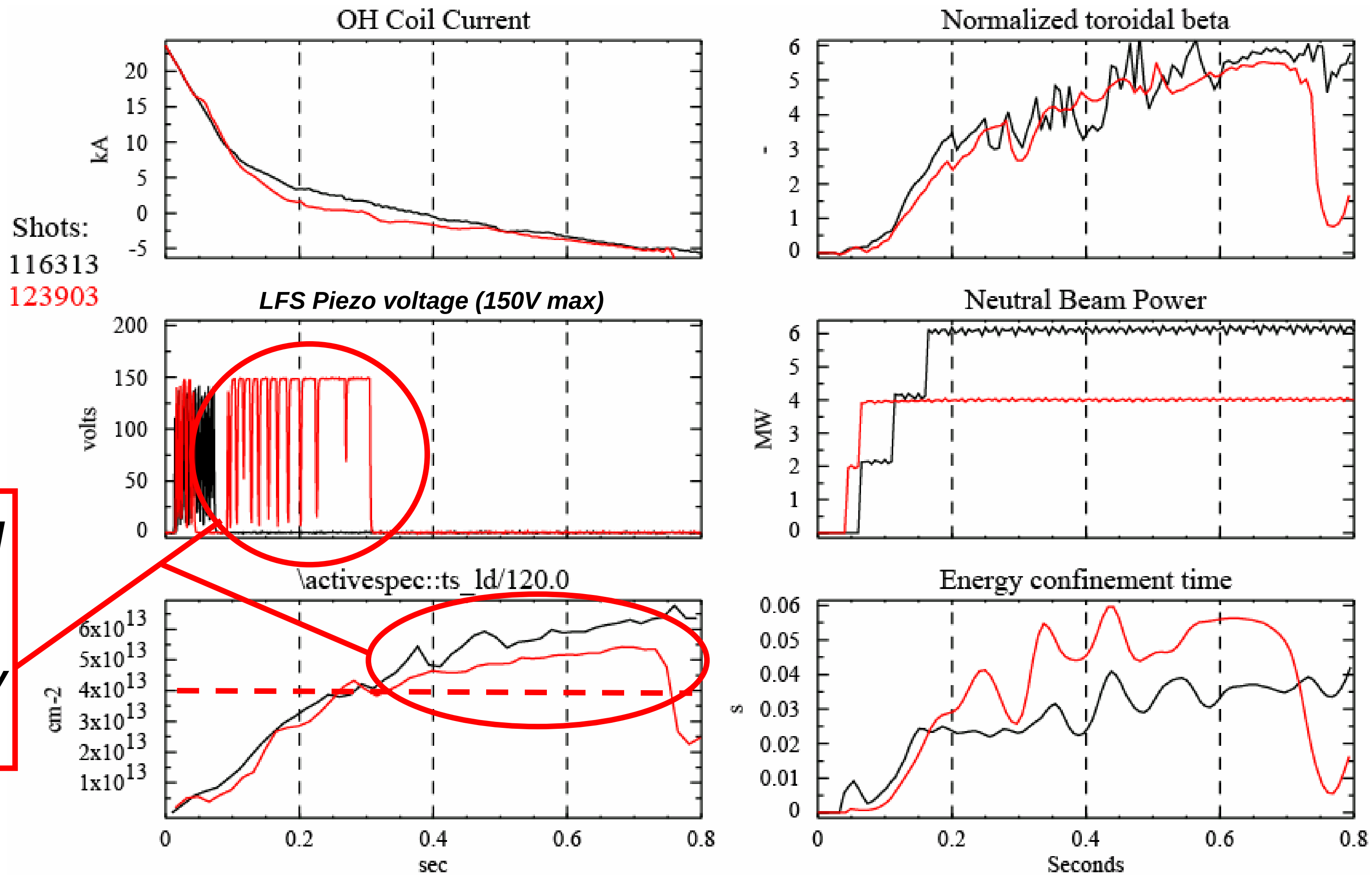
Green → Strong LFS fueling needed in I_P ramp to match reference



LITER → Achieve same β_N and flux consumption of previous long-pulse discharges with 1/3 less NBI power (using NBI A+C) and at lower density

Black → w/o LITER - 2005 long-pulse discharge at 750kA and 4.5kG

Red → with LITER, same β_N → 5-5.5 with 2 sources → τ_E = 35ms → 55ms



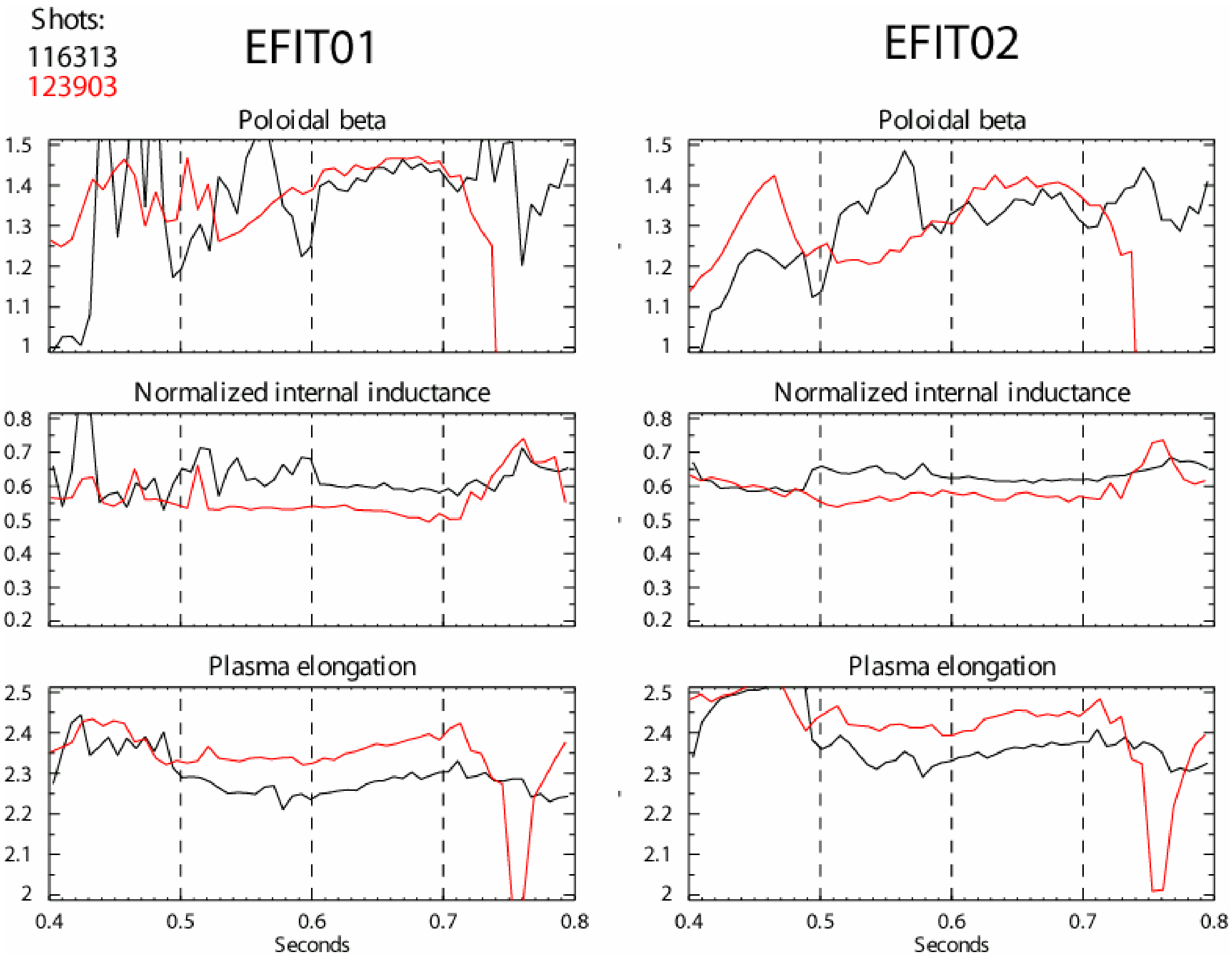
Note lower n_e and slower rate of density rise with much higher early LFS gas fueling

- ***ISD Goal: try to achieve constant $\bar{n}_e$ in flat-top ($4x10^{19}m^{-3}$) using shoulder and SGI fueling***

LITER → Achieve lower l_i and higher κ compared to reference

Black → w/o LITER - 2005 long-pulse discharge at 750kA and 4.5kG

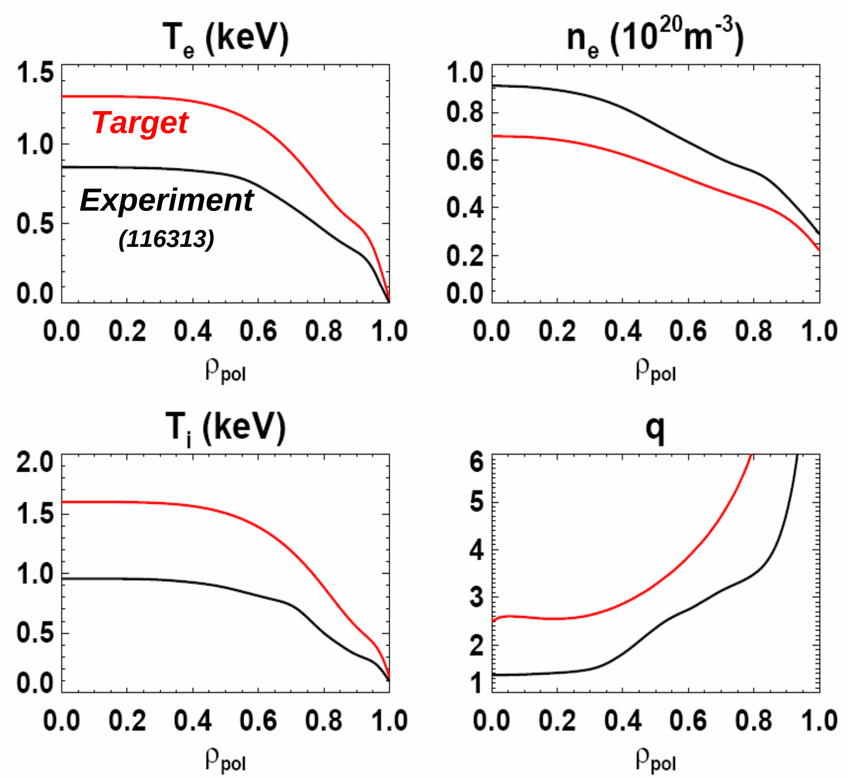
Red → with LITER, l_i decreases 10-20% → κ = 2.35 → 2.45 (goal is 2.6)



- ***ISD Goal: try to achieve κ = 2.6 LSN at high β_N and high δ***

Fully non-inductive scenario requires higher confinement, higher *q*, strong plasma shaping

- Need 60% increase in T, 25% decrease in n_e
  - **Lithium for higher τ_E & density control?**
    - **20% increase in thermal confinement**
    - **30% increase in HH_{98}**
  - **Core HHFW heating**
- Want $q_0 \approx q_{min} \approx 2.4 \Rightarrow$ higher with-wall limit



- Higher κ for higher q, β_P, f_{BS}
- High δ for improved kink stability

κ= 2.3, δ_{X-L} = 0.75
δR_{SEP} = -1cm

κ= 2.6, δ_{X-L} = 0.85
δR_{SEP} = -2mm