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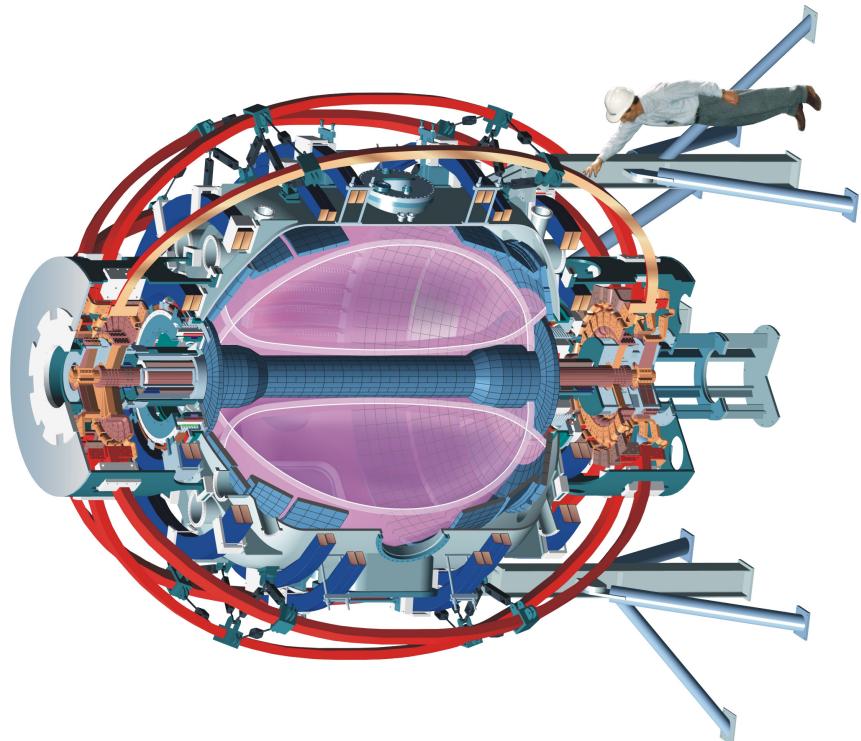


Strongly-shaped LSN plasmas using the PF1B coil

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NSTX Research Forum

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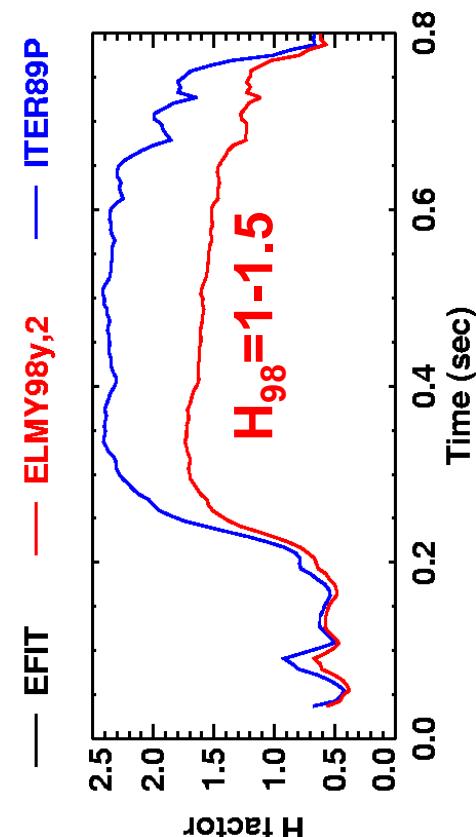
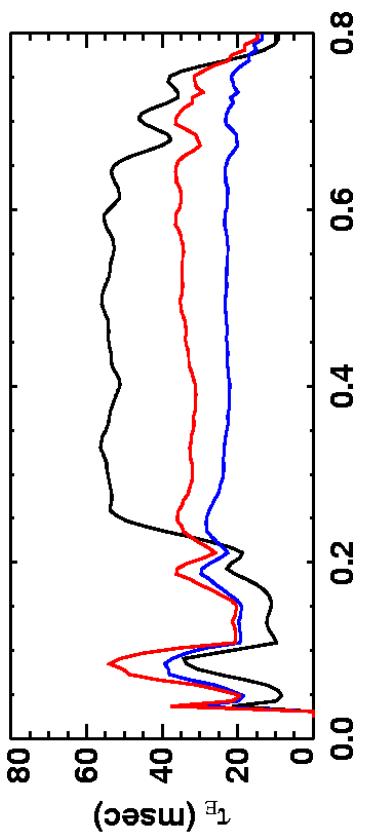


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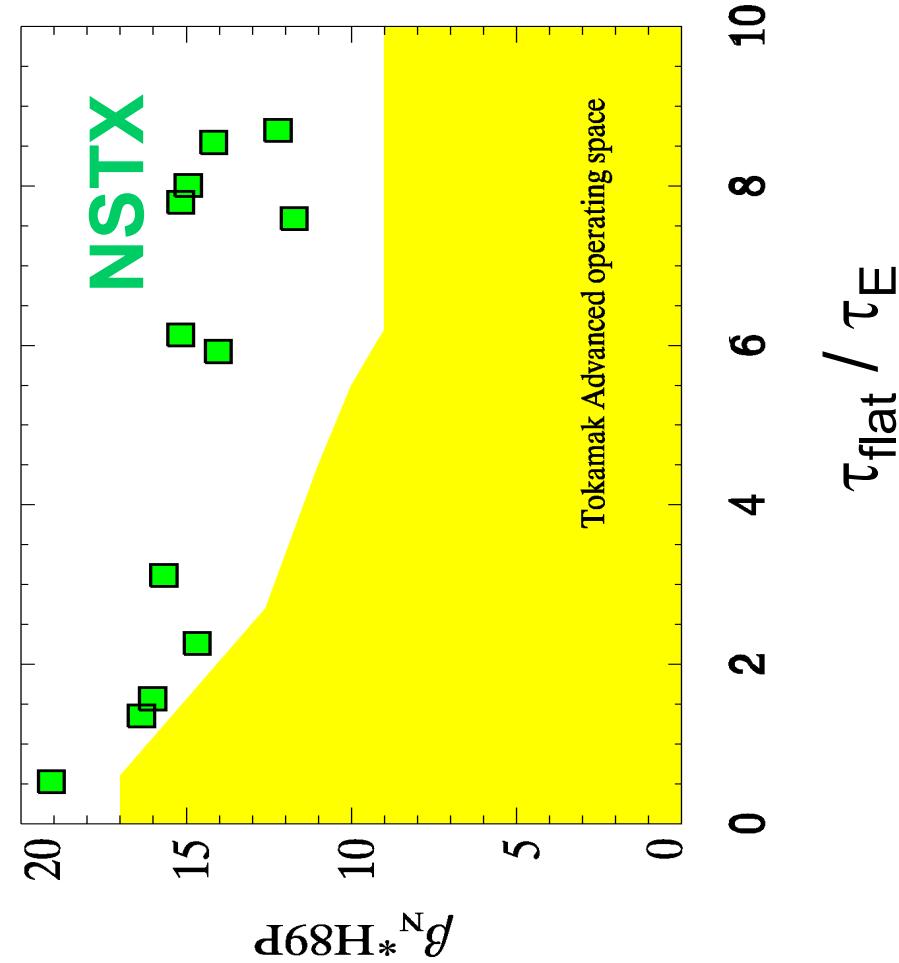
Good confinement obtained at high β in long-pulse LSN H-mode discharges



NBI A+B at 90kV, 4.0MW, 5.0kG
NSTX shot 108731



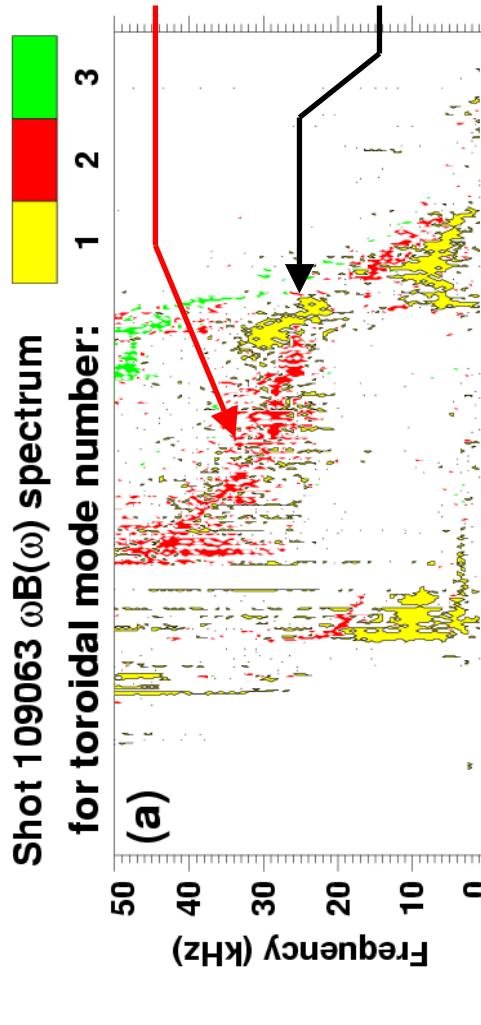
Long-pulse H-modes:



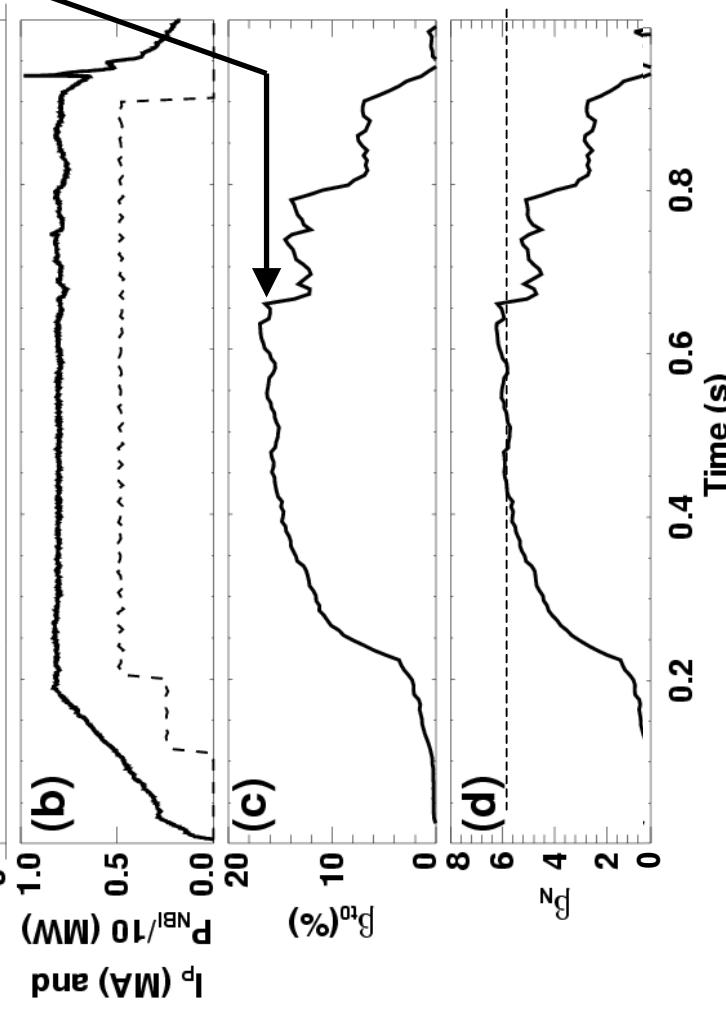
Longest pulse lengths to-date obtained in LSN



ELMs small or absent
• Long-lived $n=2$ mode



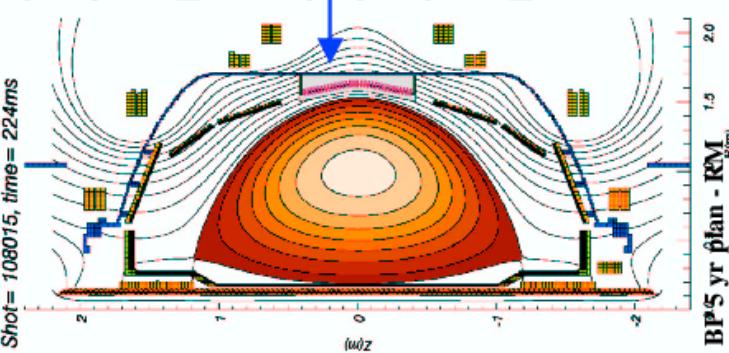
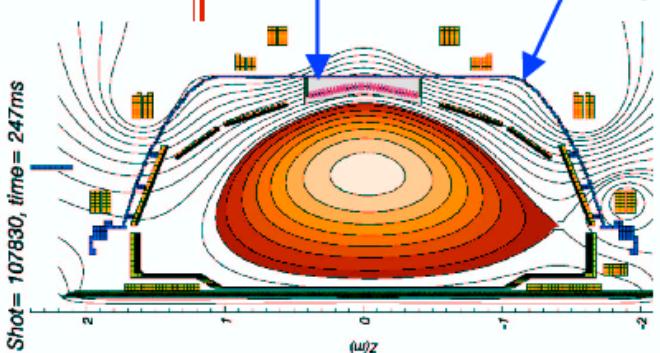
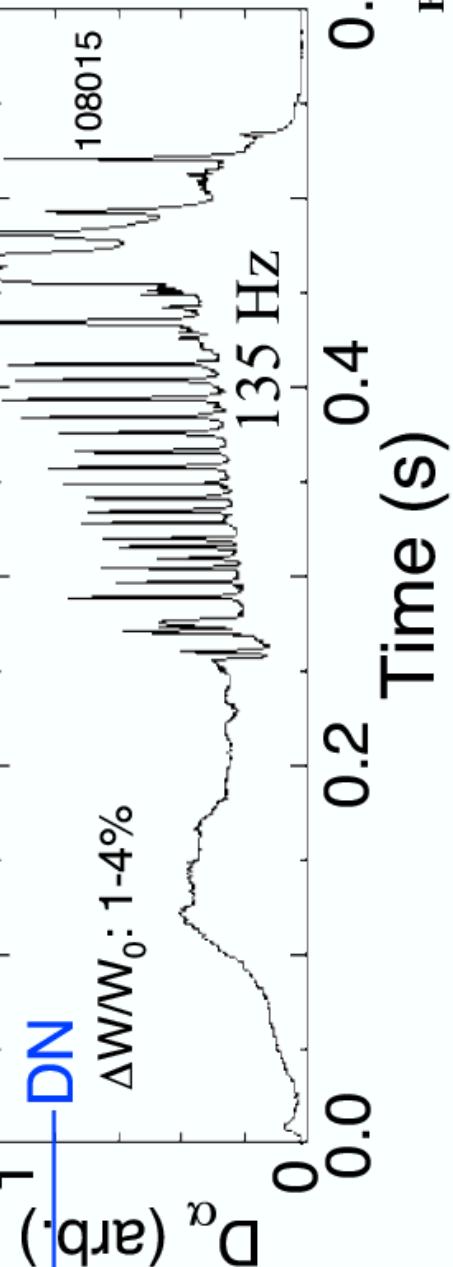
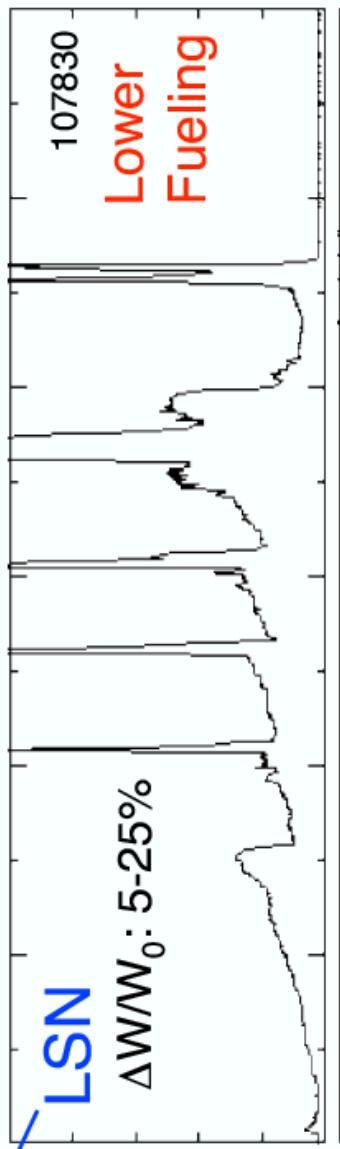
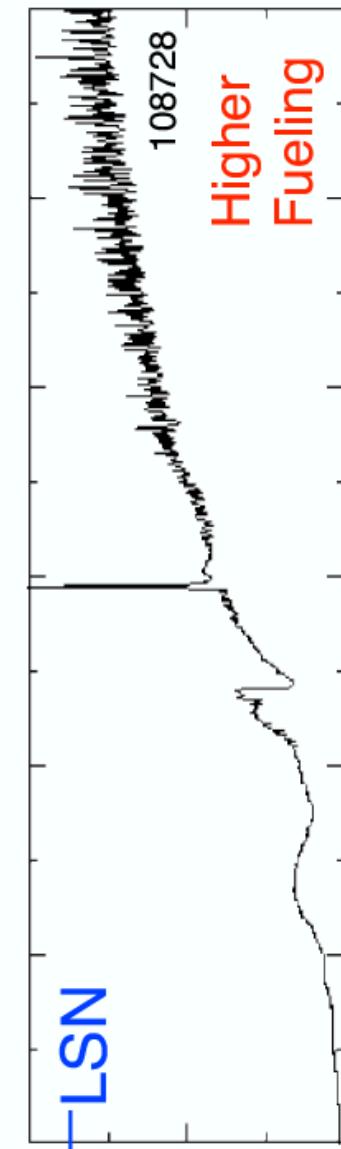
• Shots eventually suffer
from internal $n=1$ burst



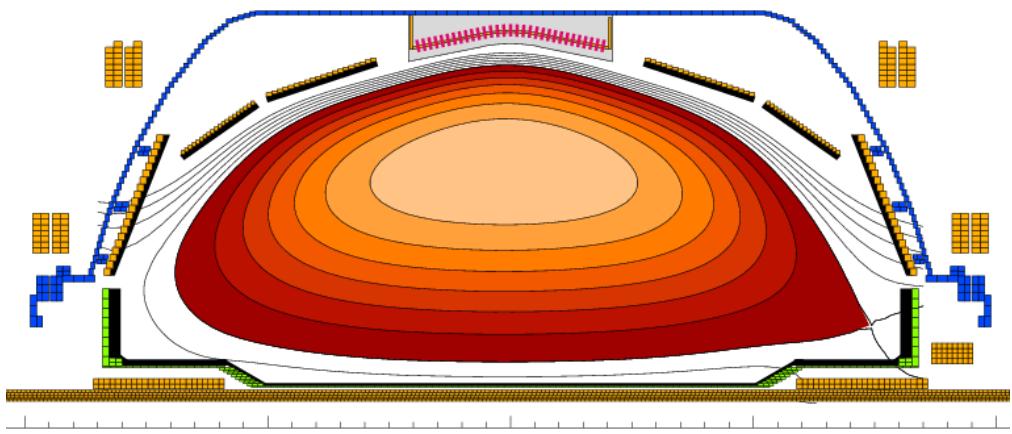
What controls ELMs?

Does shape matter?

ELM behavior depends on shape, fueling, ...



High- κ , δ in LSN can raise β limits at high β_P



LSN using PF1A's + PF1B:

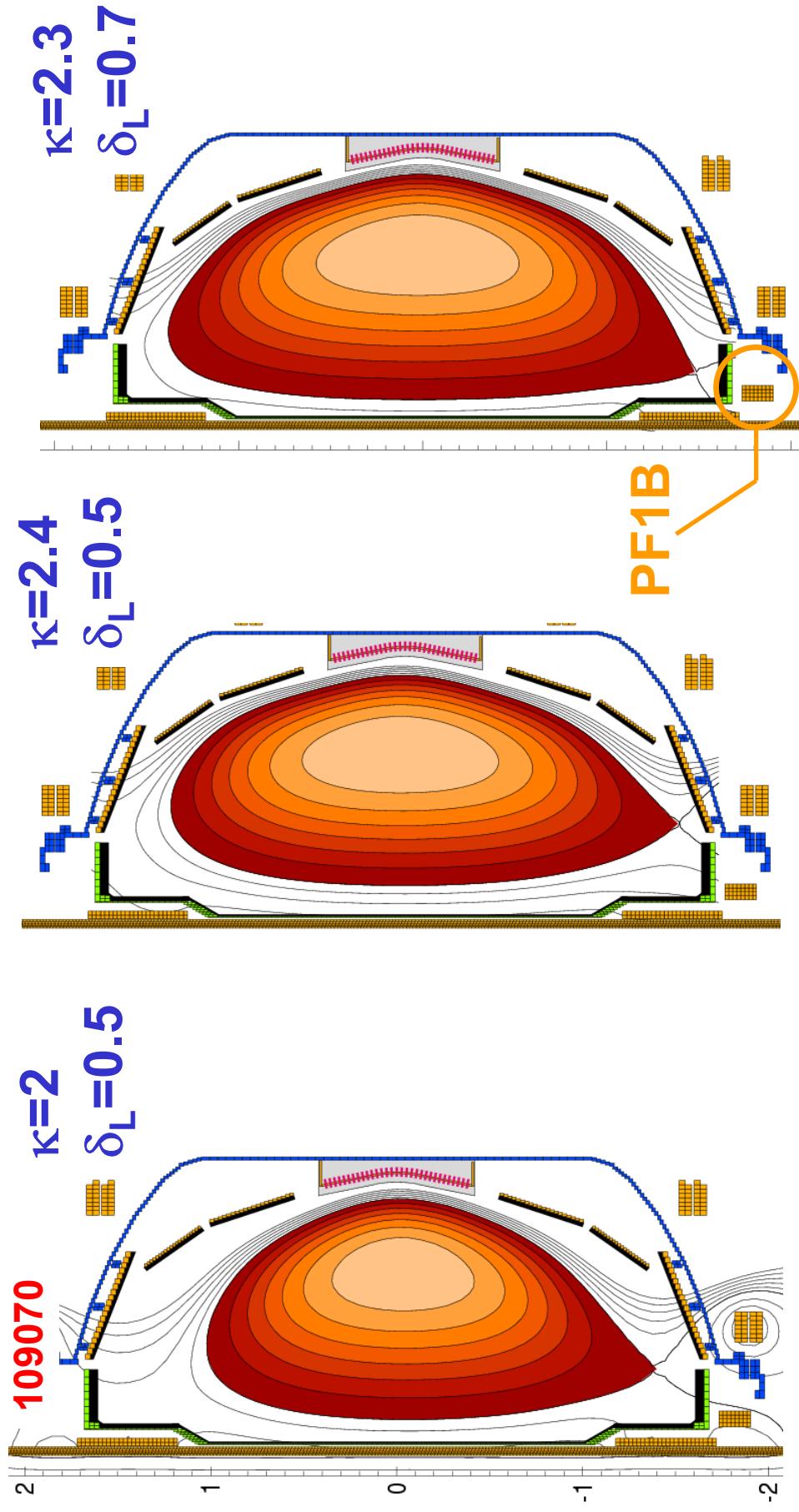
$$A = 1.49, \kappa = 2.38, \langle \delta \rangle = 0.59$$

- **Higher $\kappa \Rightarrow q(0) = 1.6 \rightarrow 2.1$**
 - Elimination of $q=2$ surface can raise limits:
 - $n=1$ ideal-wall β_N limit = **5.4 $\rightarrow 7.4$**
 - $n=1$ ideal-wall β_T limit = **15.4% $\rightarrow 21.8\%$**
 - Bootstrap fraction = **50% $\rightarrow 70\%$**
 - Raising q and f_{BS} will be important to extending pulse-length at lower B_T

Test β -limit, pulse-length, ELMs vs. LSN shaping

NSTX

Study $\kappa = 2-2.4$, $\delta_L = 0.45-0.7$



Development time + 2 run days requested