

Troyon scaling at high I_N

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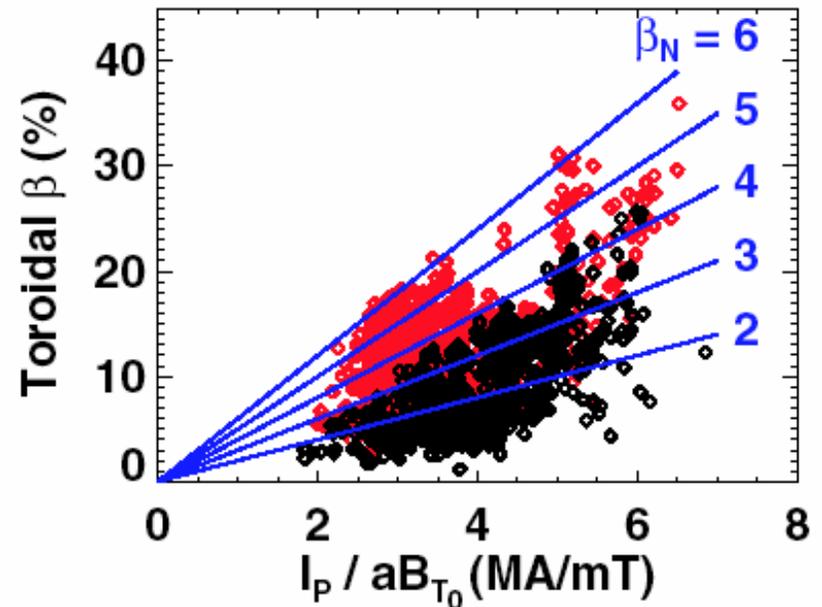
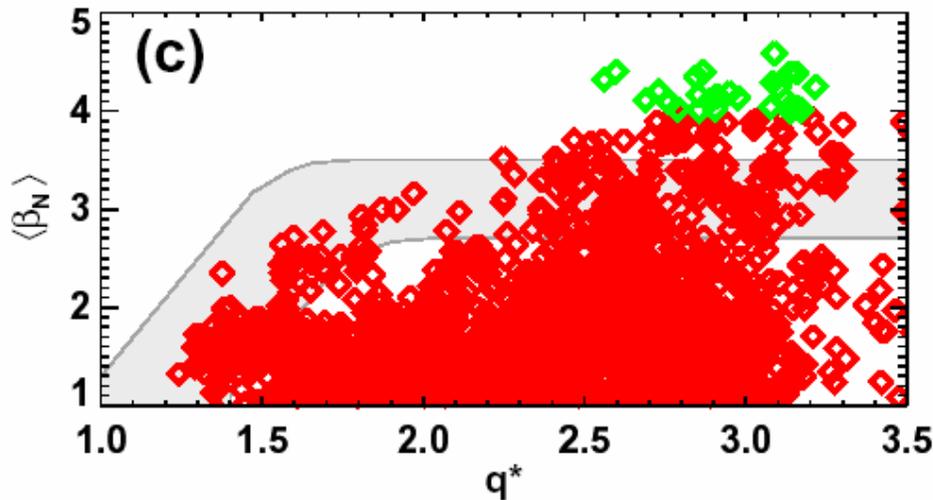
10/10 - 10/12/03

Princeton, NJ

New scaling of β limit proposed

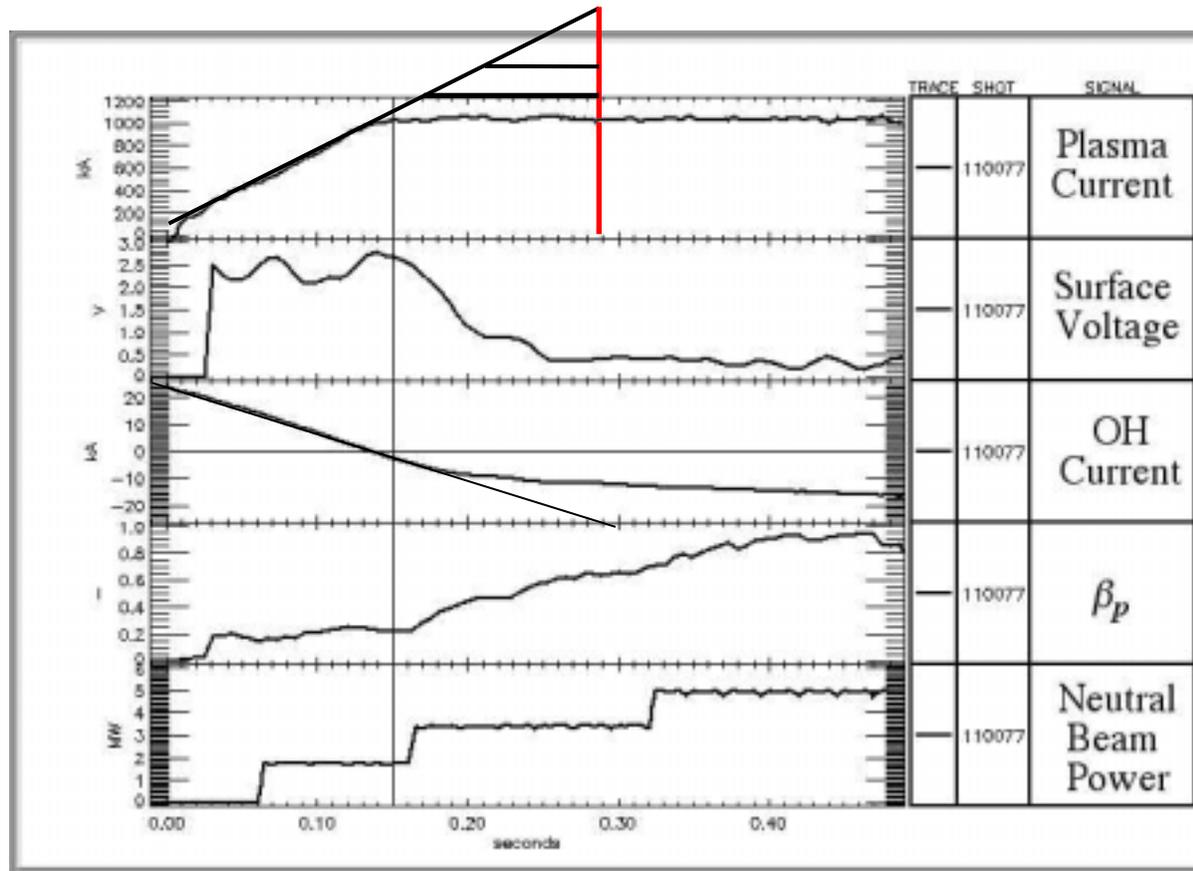
(J. Menard, et al. PoP)

- Suggests degradation of β -limit with decreasing q^*
- Verified over a reasonable range
- Higher plasma current range to be investigated
- Very high β_t possible



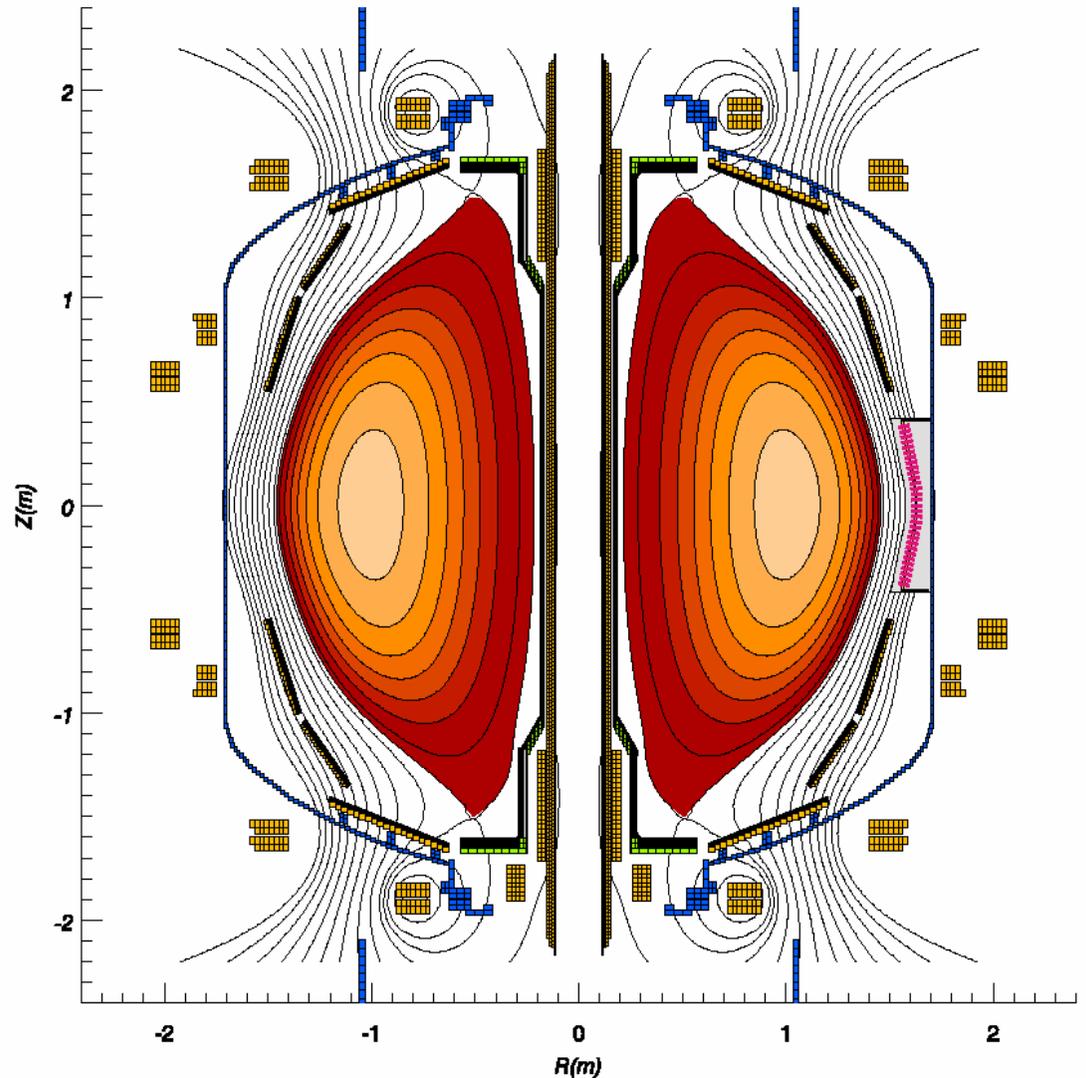
Fast current ramp projects to high plasma current

- New higher κ capability will enable fast ramp at lower toroidal field
- Could achieve I_p flat-top at $\sim 1.7\text{MA}$, $I_N = I_p/aB \sim 9$



High current equilibrium has $q(0) \sim 1$

- Interesting equilibrium identified
 - $\kappa = 2.4$
 - $\delta = 0.6$
 - $\beta_t = 53\%$
 - $\beta_N = 6$
 - $q_{95} = 3.5$
 - $I_p = 1.7\text{MA}$
 - $B_t = 3\text{kG}$



XP requirements

- 2-3 run days
- XP 228 (ISD approved last year) fast current ramp - prerequisite (or something like it)
- rtEFIT high κ control development - prerequisite
- 7MW of beam power!
- Publications - PRL and PoP

Run plan

1. Create desired shape using as fast an I_p ramp as possible. ($B_T = 0.3\text{kG}$) Adjust center stack fuelling to optimize H-mode,
2. Starting at 1.2MA, adjust beam timing to maximize β
3. Increase to 1.4MA. Repeat beam timing scan.
4. Attempt at higher plasma current value (maximum possible). Repeat beam timing scan.