Update on GHC optics

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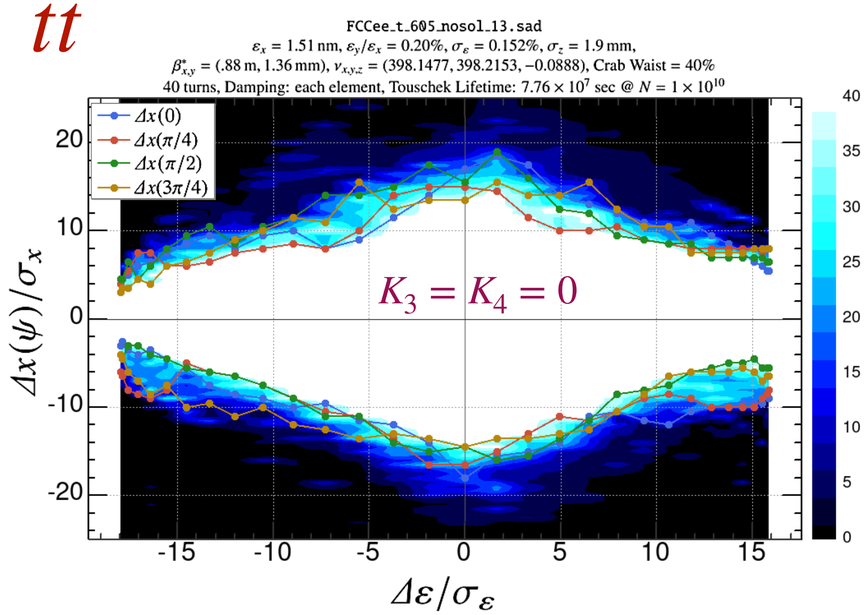
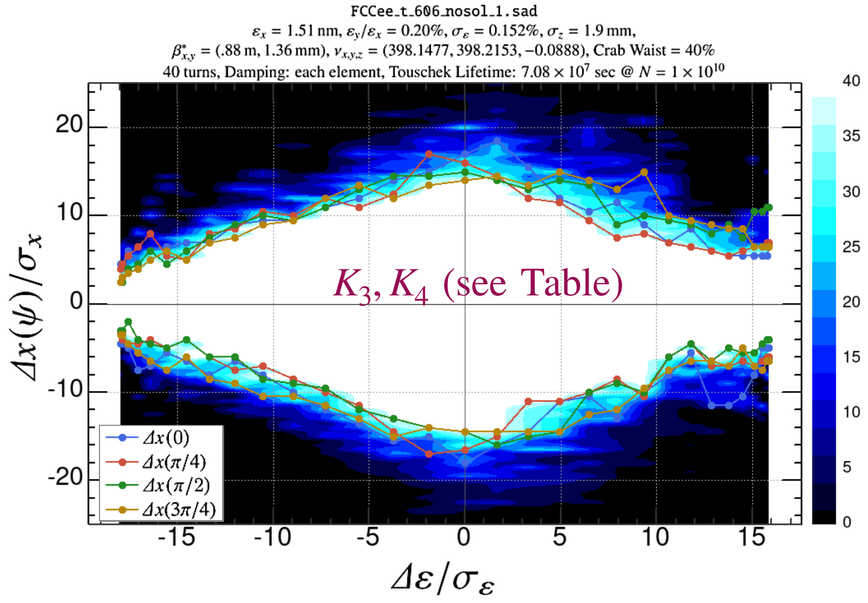
Octupoles/decapoles on SY (YCCS/Crab) sextupoles

$t\bar{t}$



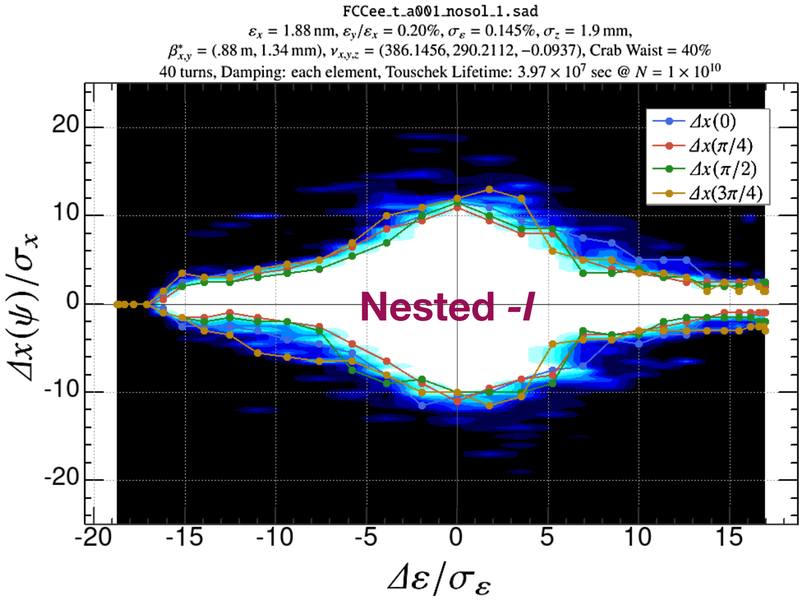


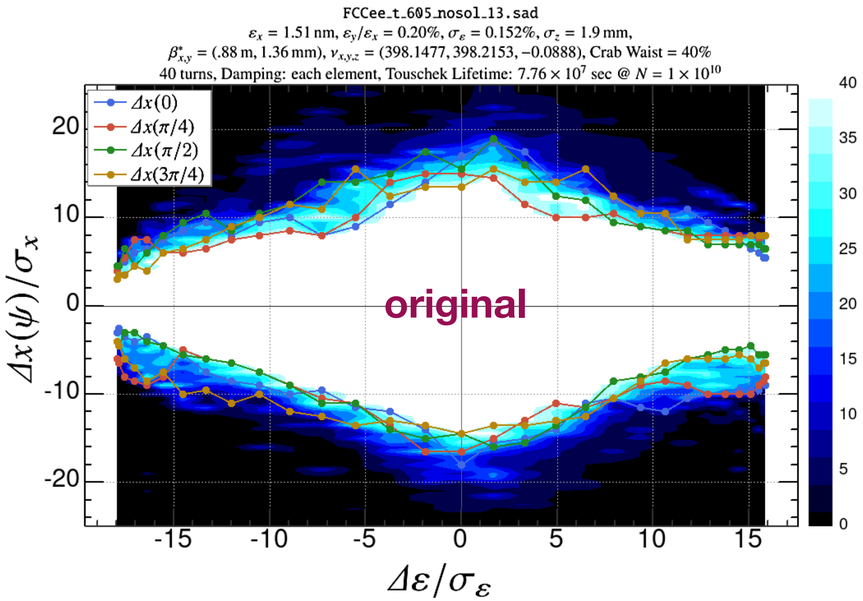
- As shown by Y. Cai at FCCW 2024, by adding octupoles/decapoles on SY (YCCS/Crab) sexts, the strengths of the arc sextupoles get weaker, by 12%.
  - The DA(MA) seems comparable.
- If such octs/decas are feasible, we may employ this scheme.

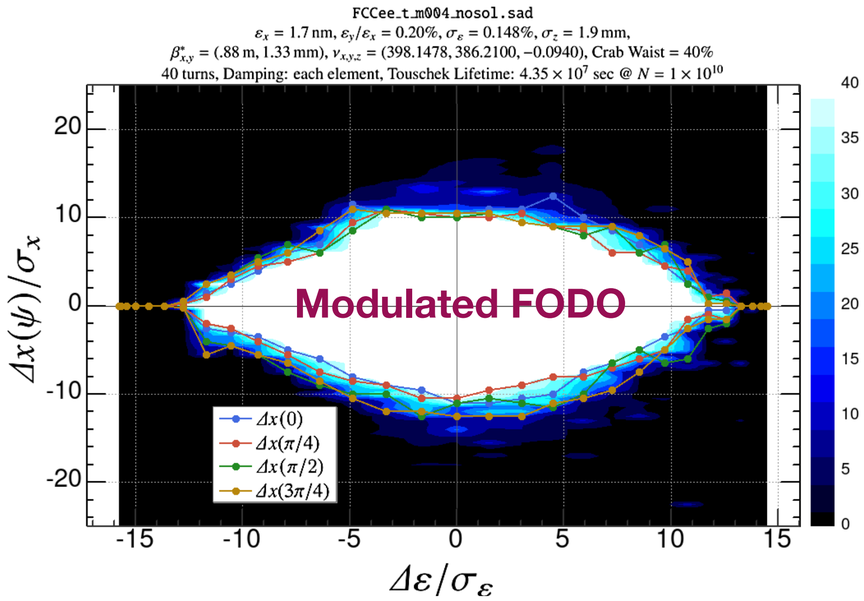
	FCCW 2024	t_606	
$\lvert B_3 \rvert_{\max}$	0	0.81	T
$\lvert B_4 \rvert_{\max}$	0	0.40	T
$\lvert K_{2,\mathrm{arc}} \rvert_{\max}$	1.7	1.5	$1/\mathrm{m}^2$
$\sum B''^2 L$	11.3	10.5	$10^{12}\,\mathrm{T}^2/\mathrm{m}$

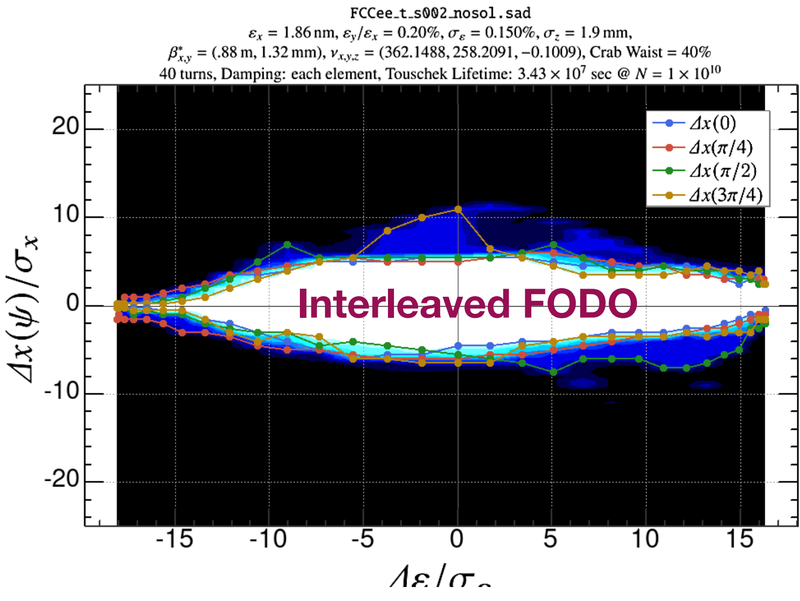
Alternative arcs (unsuccessful so far) $t\bar{t}$

- Several arc schemes have bee tried:
  - Modulated FODO: higher $\beta_{x,y}, \eta_x$ at sexts.
  - Interleaved FODO sexts: a sext at every quad, amplitude-detuning "optimized".
  - Nested -I: SD pair (-I) nested within SF pair (3π/2π).
  - Noninterleaved SF/SD pair (3π/2π) (even didn't reach a solution to examine DA yet)









Summary

- Octupoles/decapoles on SY sextupoles seem effective on DA(MA): make it possible to reduce arc sextupole strength by 12%.

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- Alternative arc designs are not successful yet.