

Dynamic aperture update

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Acknowledgements:

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16th HE-LHC design meeting, CERN, Jul. 06, 2017

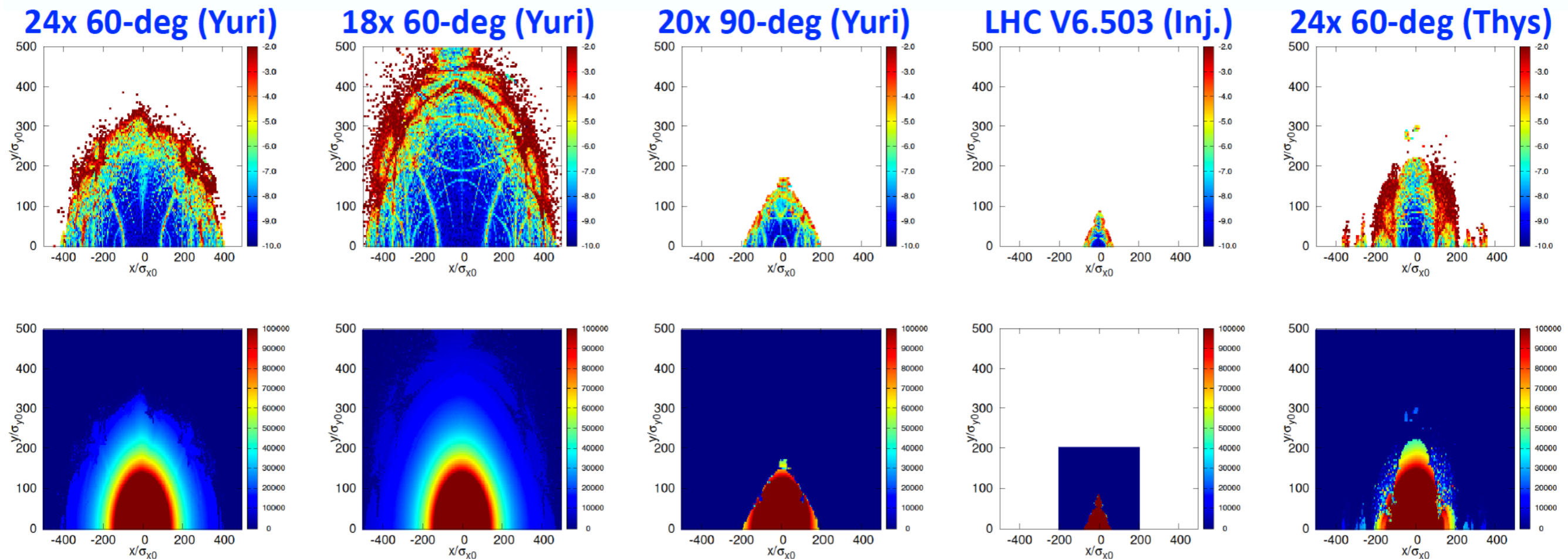
Outline

- **Dynamic aperture**
 - Short- and long-term DA
 - DA with errors
- **Outlook**

1. Dynamic aperture

► Compare short- and long-term DA w/o errors

- Short-term (upper, tracking 1024 turns): colorful dots => survived over 1024 turns
- Long-term (lower, tracking 10^5 turns): colors scale as survival turns

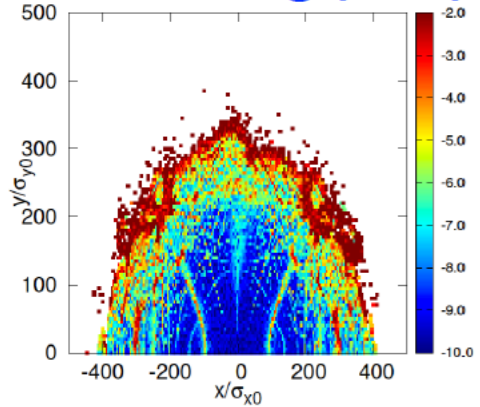


1. Dynamic aperture

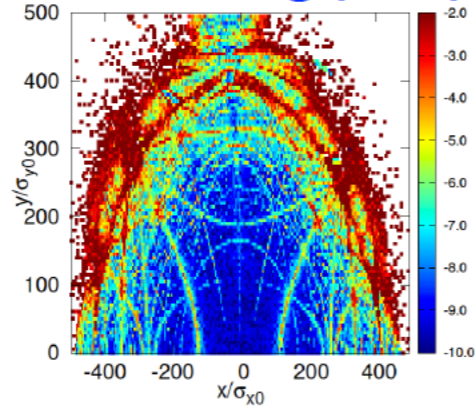
► Compare short-term DA w/o and w/ systematic errors

- Systematic errors: $b3s=+6$, $b5s=-1$ in dipoles
- 20x 90-deg version is more robust against errors?

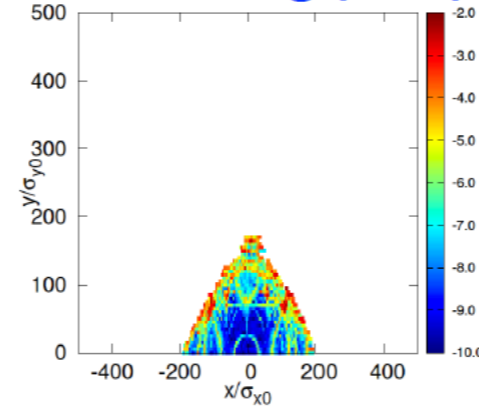
24x 60-deg (Yuri)



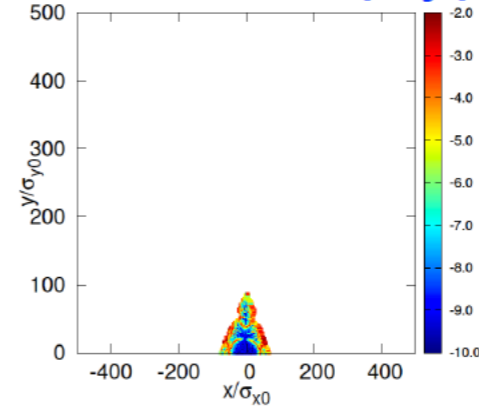
18x 60-deg (Yuri)



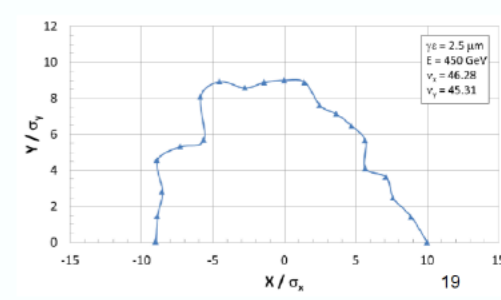
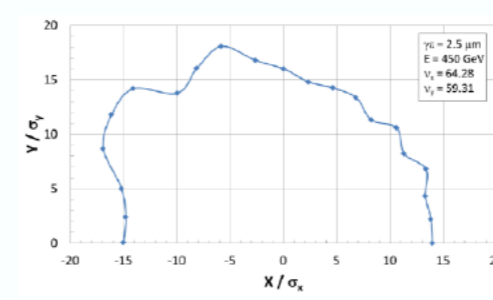
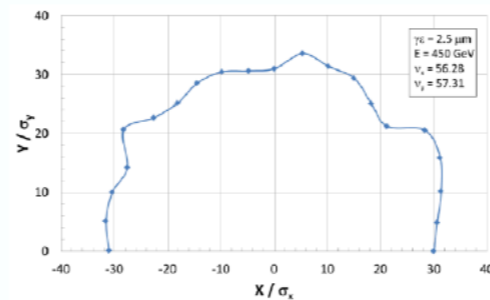
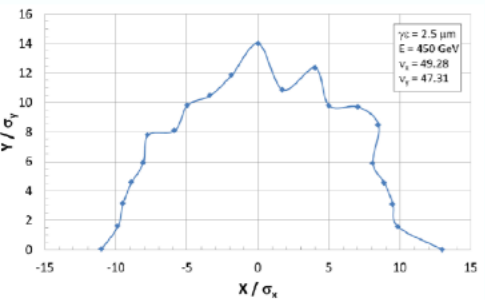
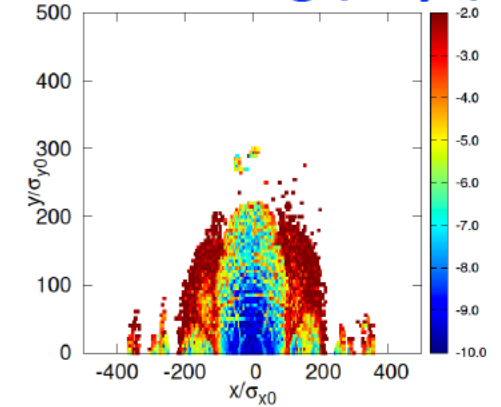
20x 90-deg (Yuri)



LHC V6.503 (Inj.)



24x 60-deg (Thys)



2. Summary

➤ Outlook

- Need systematic simulations of DA with errors (Tools: SAD, LEGO, MADX/SixTrack)
- Need systematic evaluations of the optional arc schemes for HE-LHC, and select the outstanding one
- [Urgent] Need to prepare MADX toolkits (Full lattice with respects to engineering details, macros for lattice manipulations, simulation tools, etc.)