Dynamic aperture update

Demin Zhou

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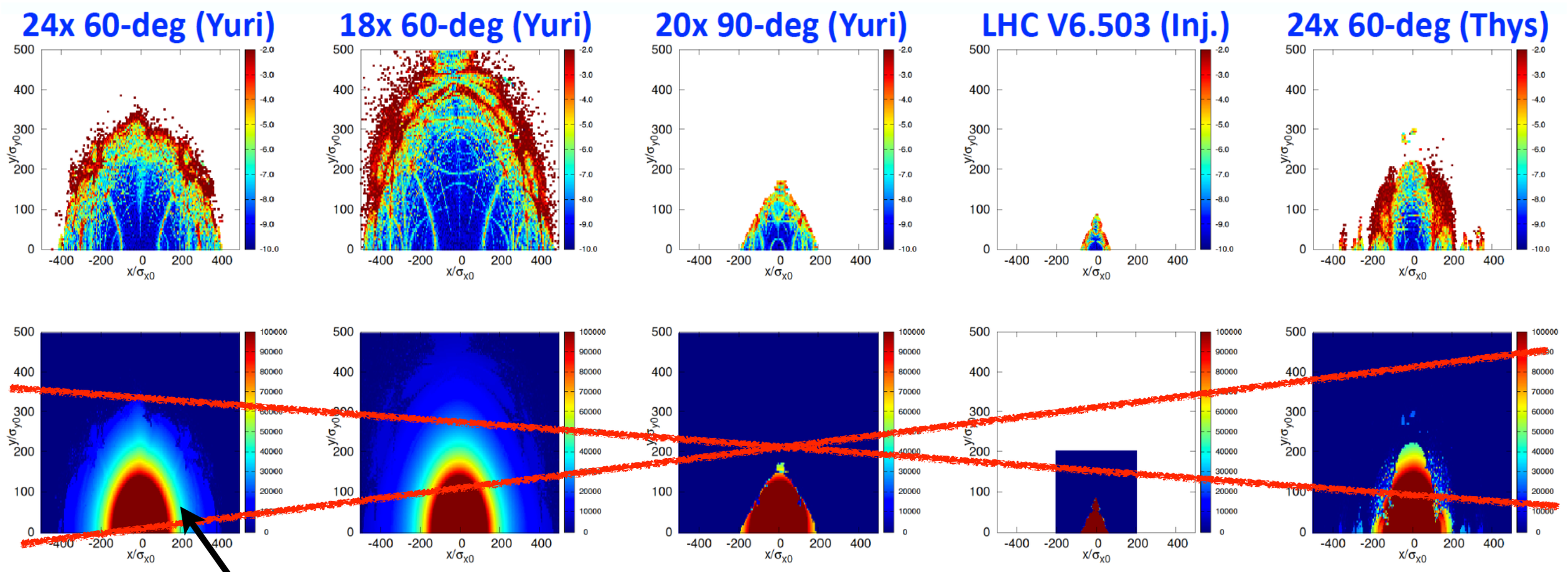
Outline

- ➤ **Dynamic aperture (update since FCC week 2017)**
  - **Short- and long-term DA**
  - **DA with errors**
- ➤ **Outlook**

1. Dynamic aperture

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

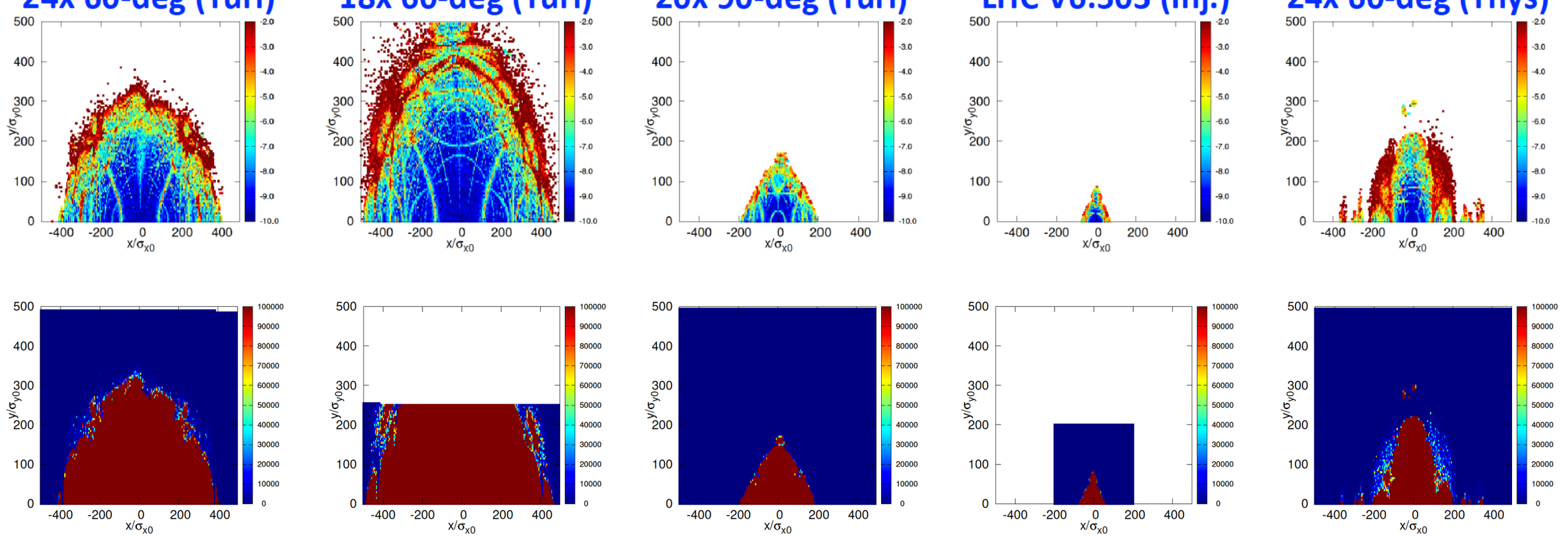
- Short-term (upper, tracking 1024 turns): colorful dots => survived over 1024 turns
- Long-term (lower, tracking 10^5 turns): colors scale as survival turns (w/ RF but incorrect settings)



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 (w/o RF cavity)



1. Dynamic aperture

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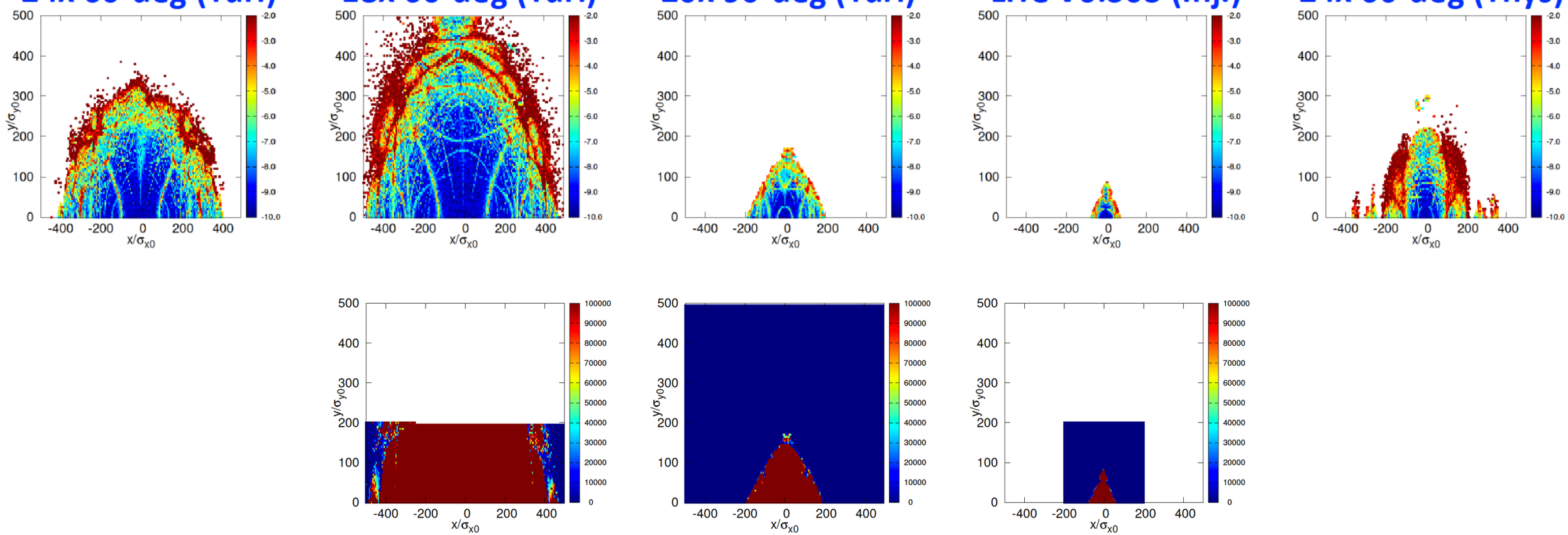
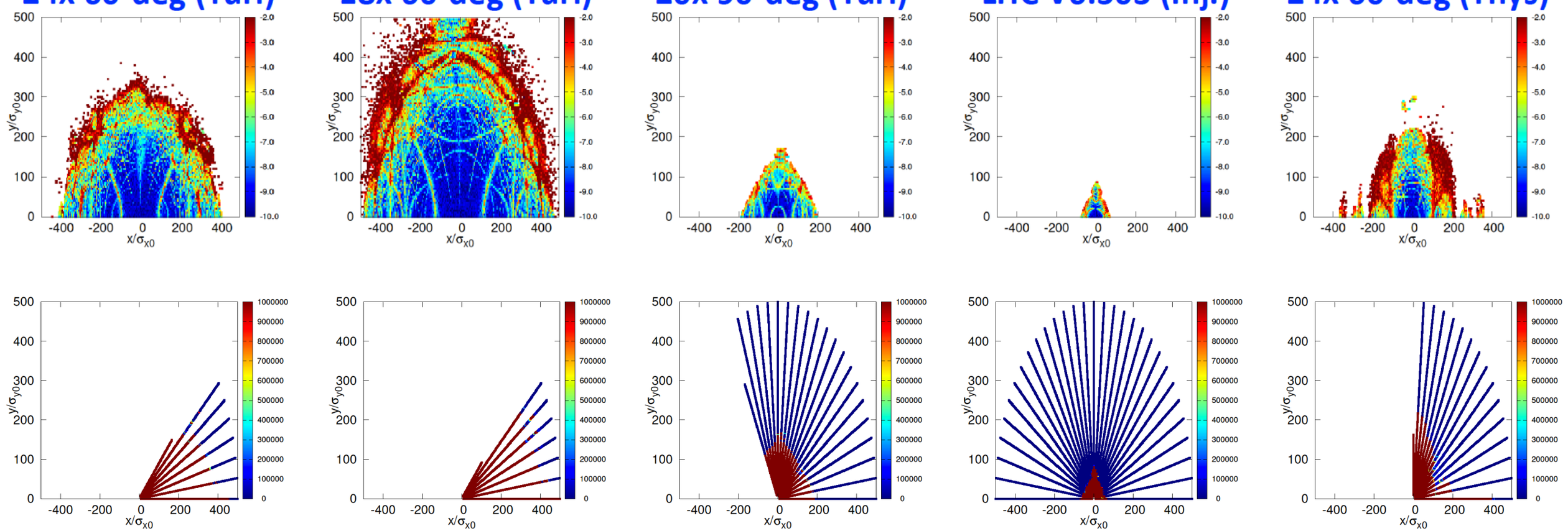
- Long-term (lower, tracking 10^5 turns): colors scale as survival turns (w/ RF cavity)



1. Dynamic aperture

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

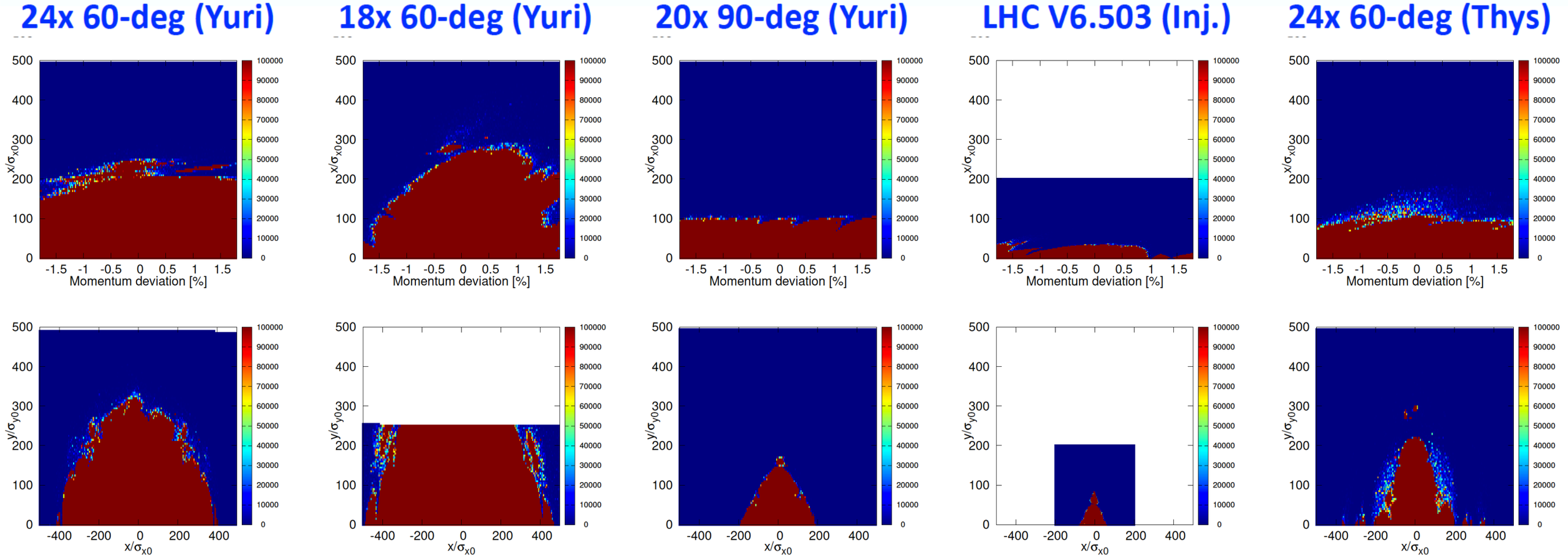
- Short-term (upper, tracking 1024 turns): colorful dots => survived over 1024 turns
- Long-term (lower, tracking 10^6 turns): colors scale as survival turns (w/o RF cavity)



1. Dynamic aperture

➤ **Long-term (tracking 10^5 turns): colors scale as survival turns (w/o RF cavity)**

- upper: δ-x space (with amplitude dx=dy)
- lower: x-y space (with δ=0)

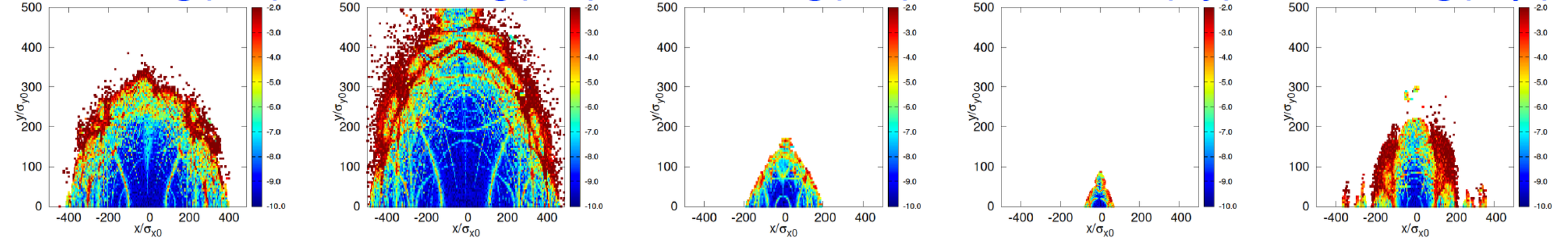


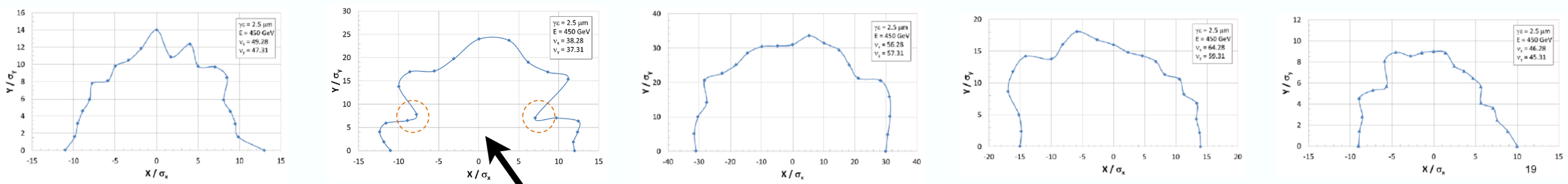
1. Dynamic aperture

➤ 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)





Latest result from Yuri (including b7s)

2. Summary and outlook

➤ Summary

- DA not sensitive to tracking turns (short-term tracking with FMA well predicts DA?)
- Errors dominate DA

➤ Outlook

- Narrow down choices to 18x 60-deg and 20x 90-deg [Or 18x 90-deg arc (resonance free)?]
- Need systematic simulations of DA with errors (Tools: SAD, LEGO, MADX/SixTrack)
- [Urgent] Need to prepare MADX toolkits (Full lattice with respects to engineering details, macros for lattice manipulations, simulation tools, etc.)