

ATF Alignment status

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22th ATF2 Project Meeting
20 Nov 2018 at KEK

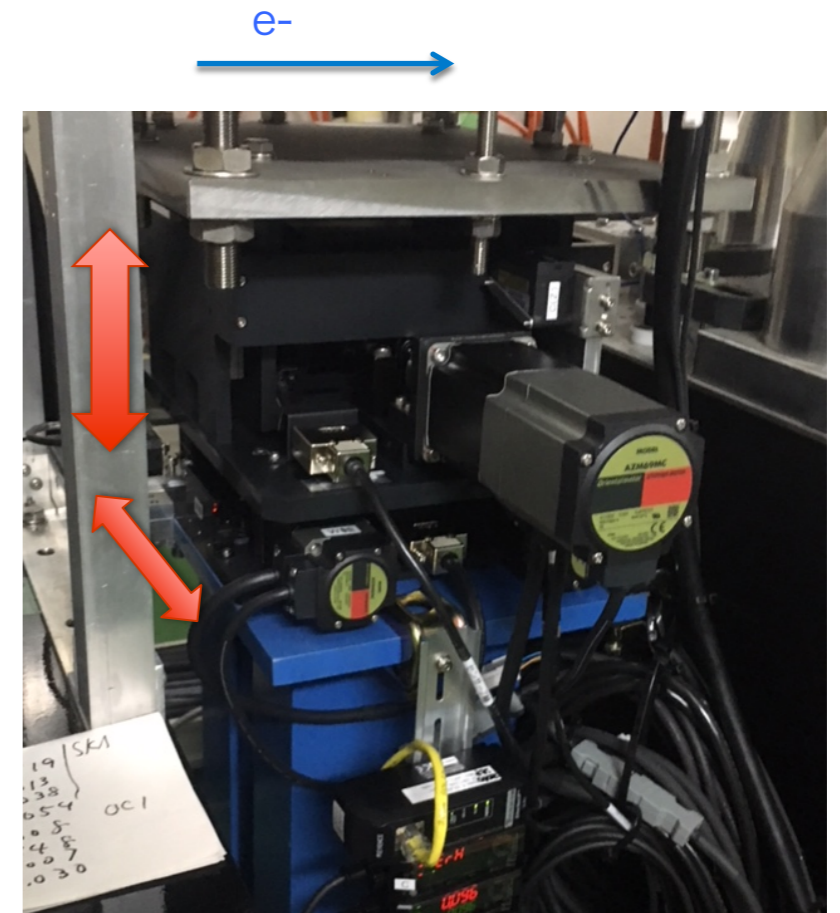
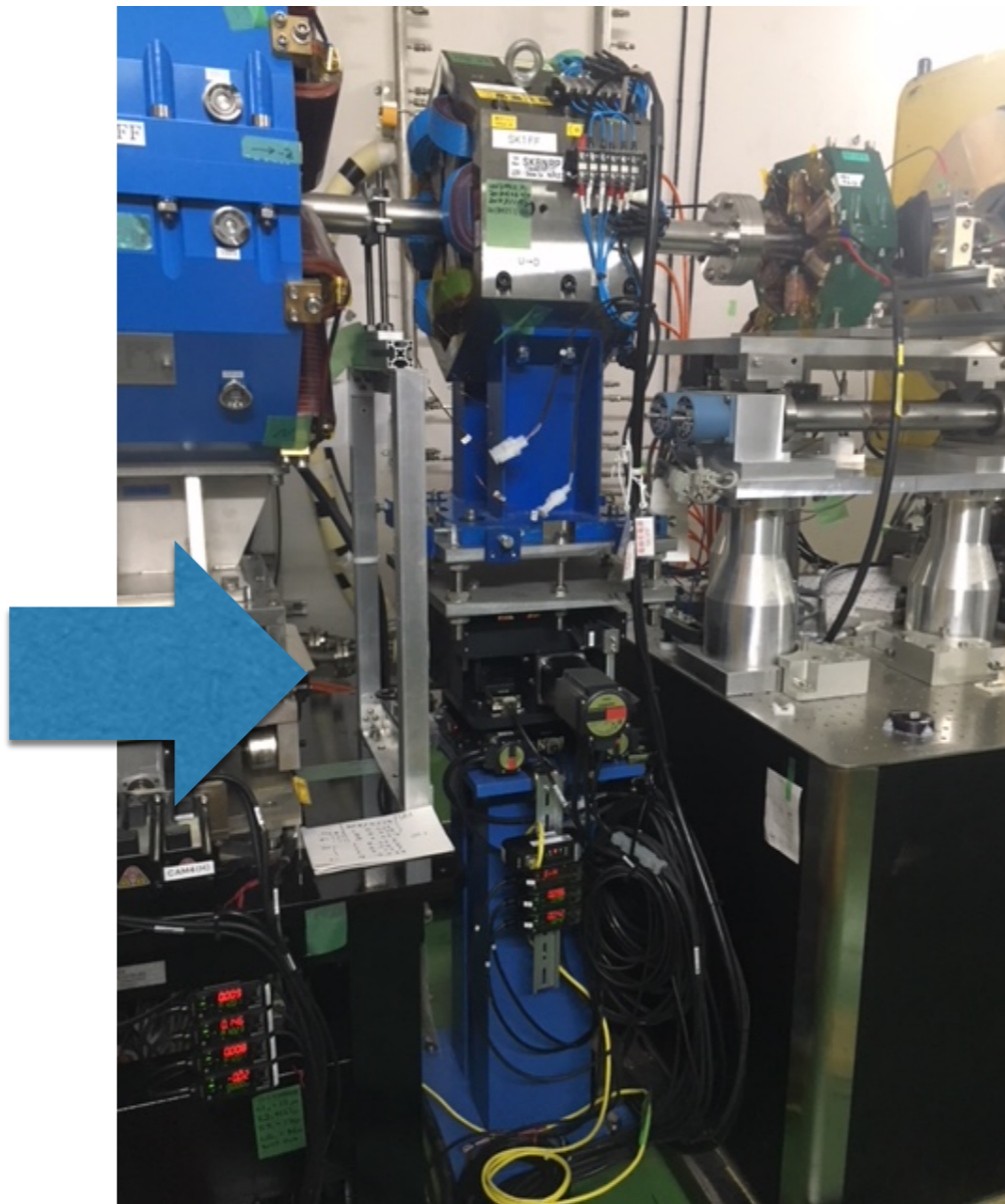
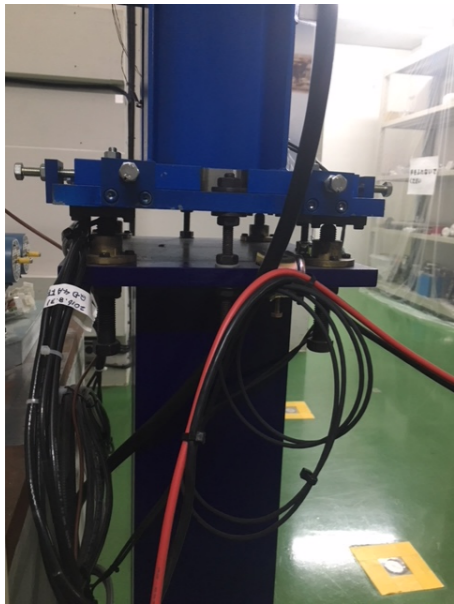


2018 alignment

- Check to roll/pitch at the DR (July) => OK
- LT survey and Roll/Pitch at the ATF2 (Aug)
- EXT old dump remove (Sep)
- Recheck to roll/pitch at the DR & ATF2 (Sep) => OK
- LT alignment at the ATF2 (Sep)
- LT alignment at the DR (Oct)
- We changed support of SK1FF magnet to Active mover (June)



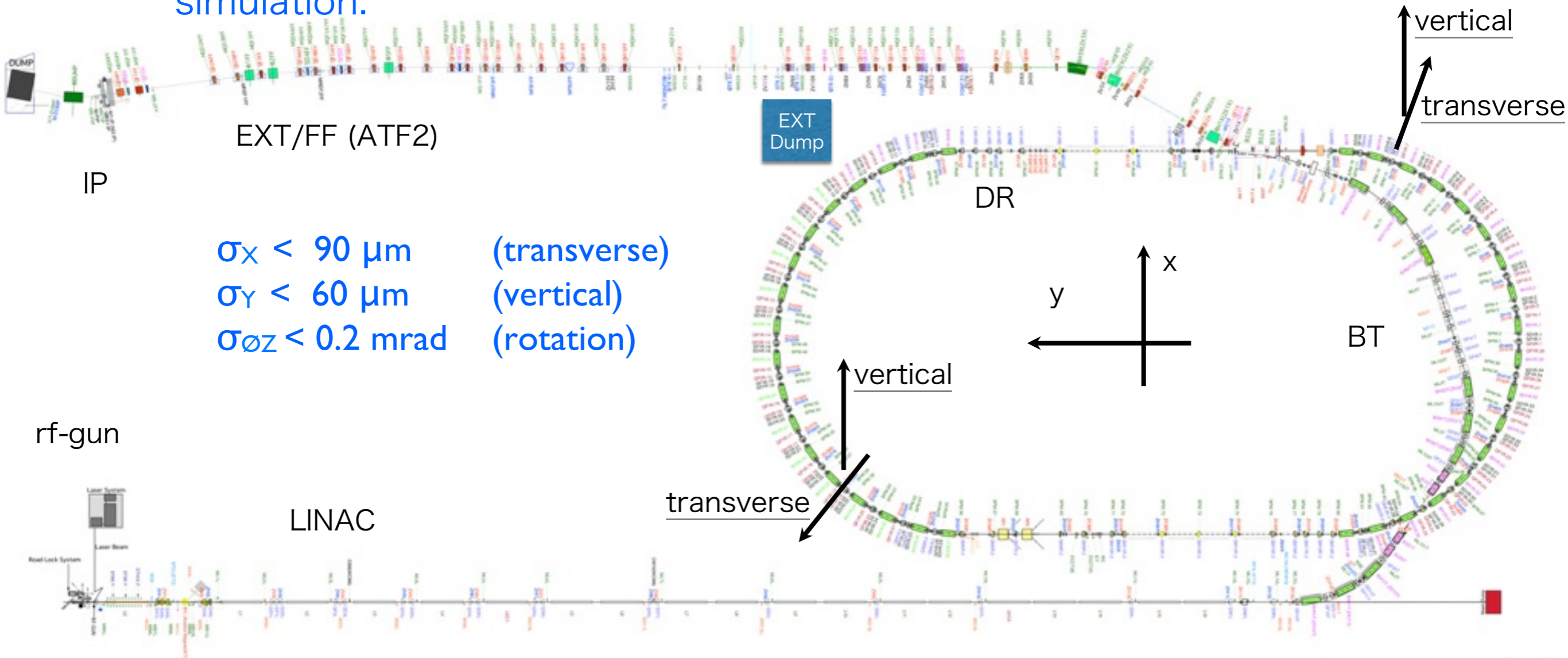
- SK1FF magnet replacement in spring 2018
- We installed a horizontal and vertical mover



SK1 mover
Range +/- 5mm
accuracy 2um
(No tilt adjustment mover)

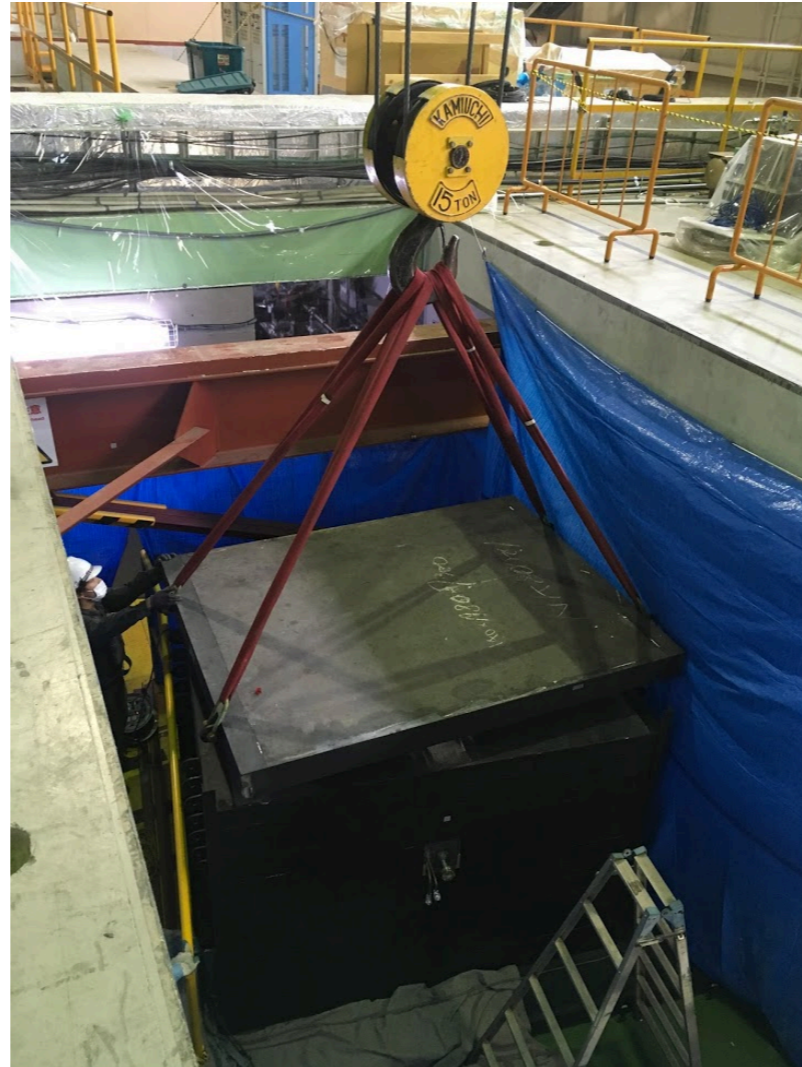
ATF

- Origin of alignment coordinates is a center of DR.
- SETTING ACCURACY
DR Alignment tolerance was evaluated beam tracking simulation.



$$\begin{aligned}\sigma_x &< 90 \mu\text{m} && \text{(transverse)} \\ \sigma_y &< 60 \mu\text{m} && \text{(vertical)} \\ \sigma_{\theta z} &< 0.2 \text{ mrad} && \text{(rotation)}\end{aligned}$$

- EXT Dump was removed in summer 2018
- We brought it to STF
3rd ~6th September

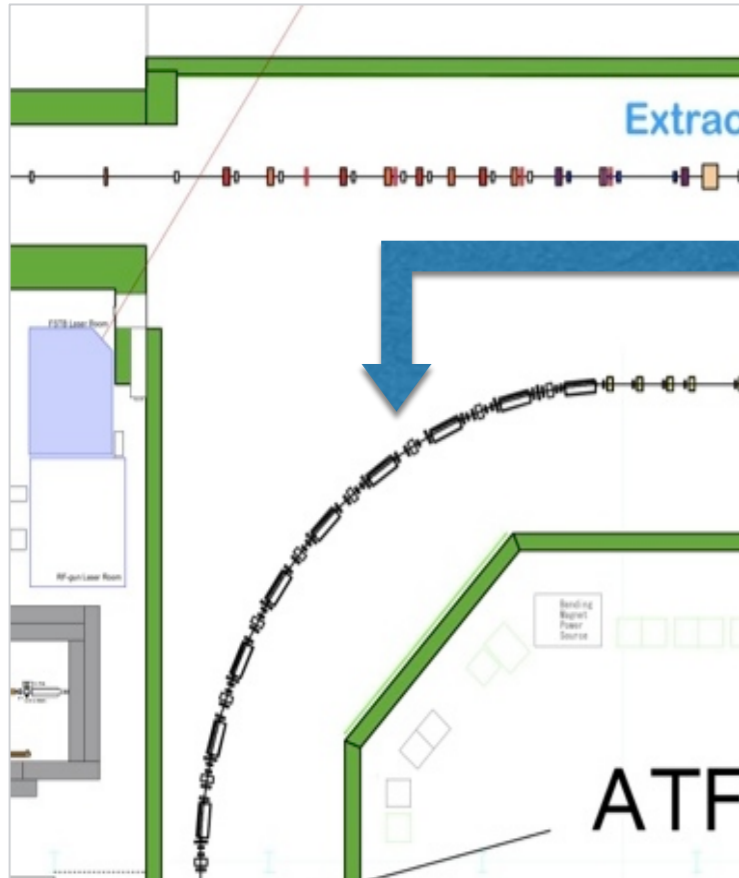


Total weight : 62.5ton

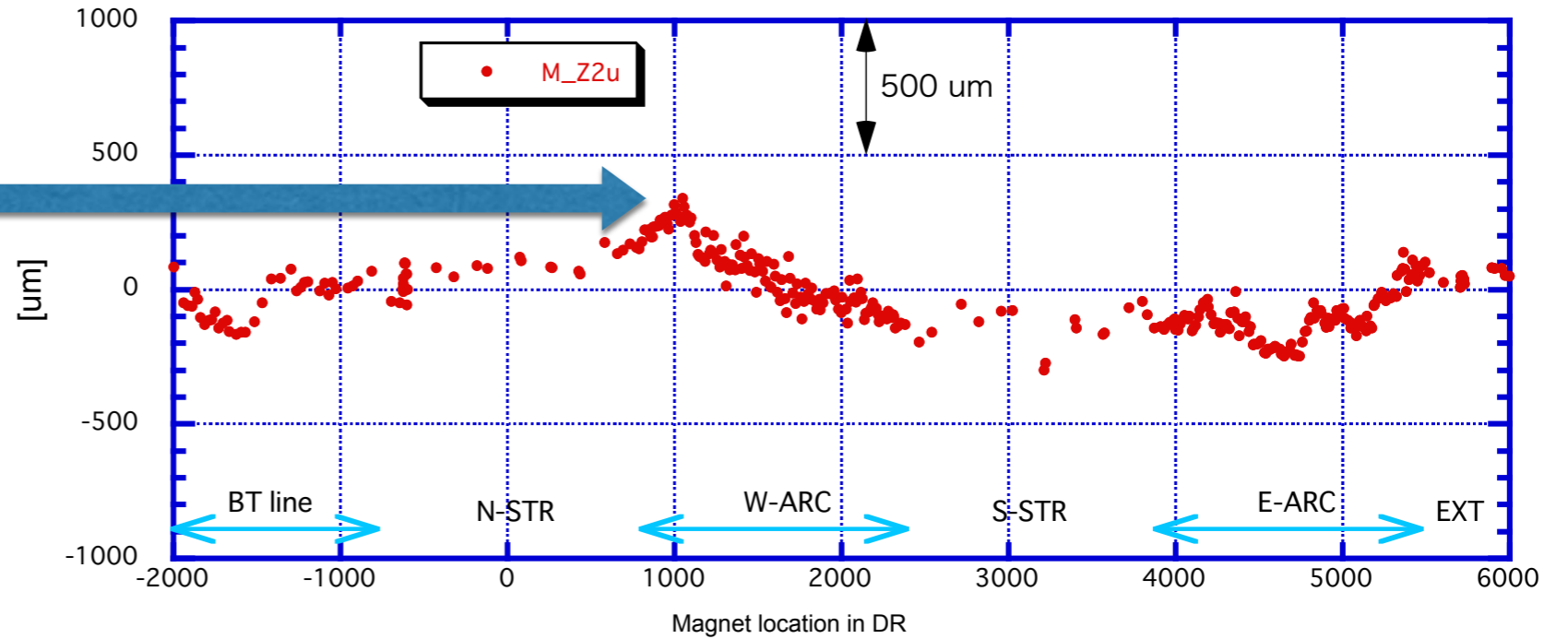


DR survey (Oct. 2018)

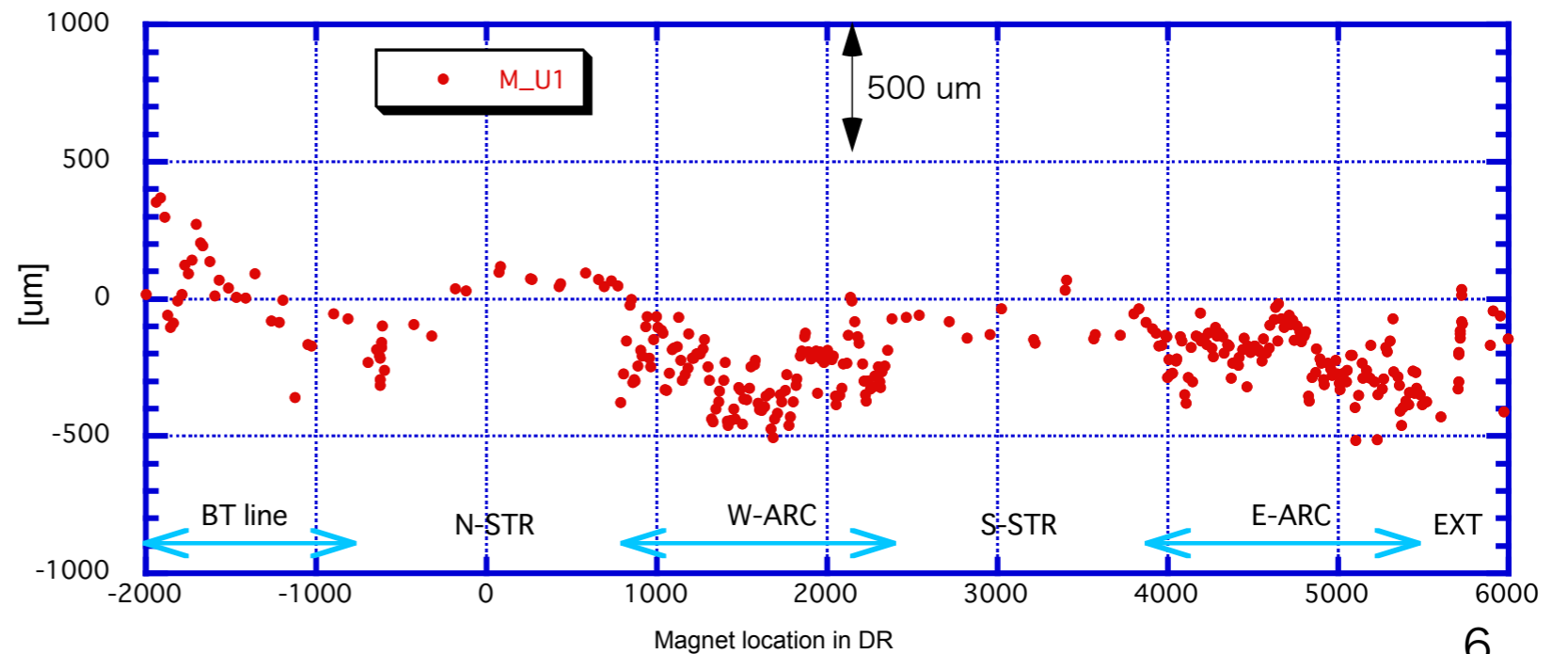
- Measurement after removal of old dump



高さ方向
Survey of DR Height (Oct. 2018)



動径方向 (外側+)
Survey of DR Transvers (Oct. 2018)



Floated up
~200 um

Alignment is shifting
little by little

We have alignment
in the October



DR Alignment (Oct. 2018)

- Main adjustment a vertical direction.

Vertical error (σ)

DR mag : 101 μm

Fitting was done assuming that the orbit was inclined

Diff. : 46 μm

The circumference of DR is shrinking a little

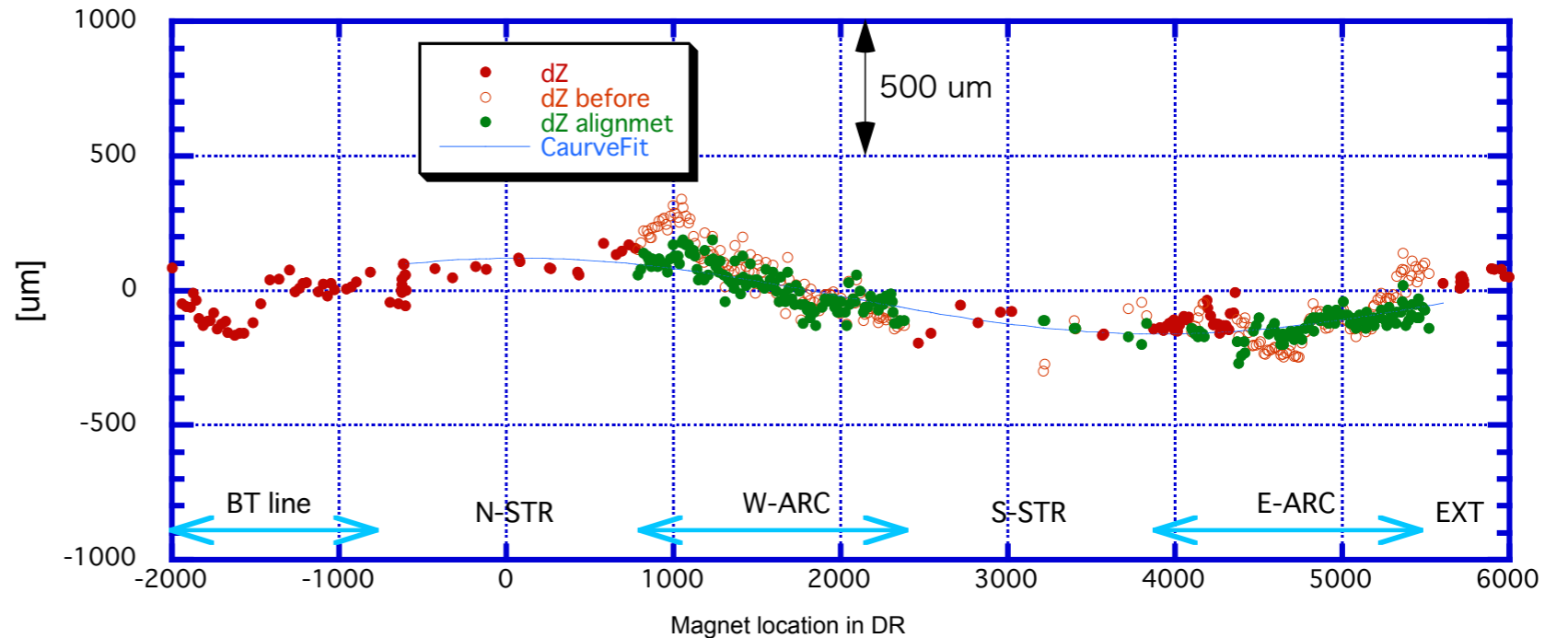
(-2.9 mm Feb 2018)

(-1.3 mm Oct 2018)

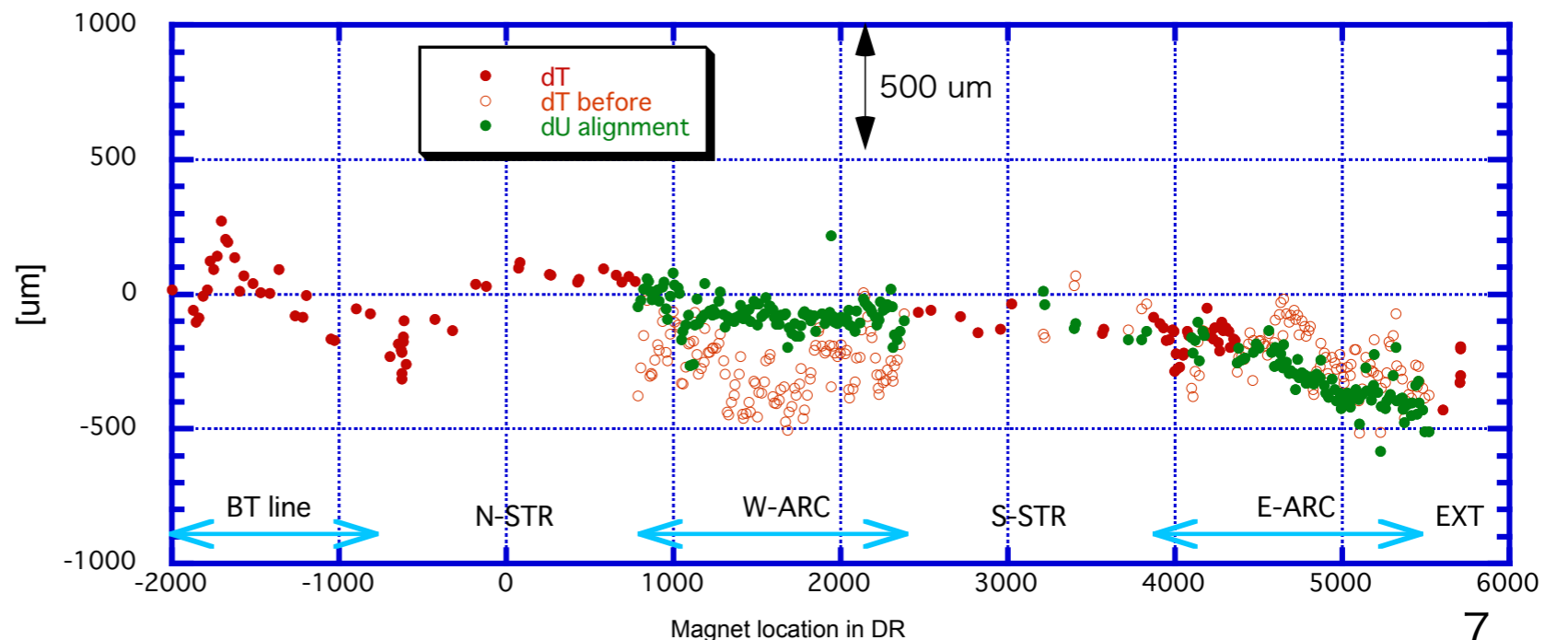
Transverse error

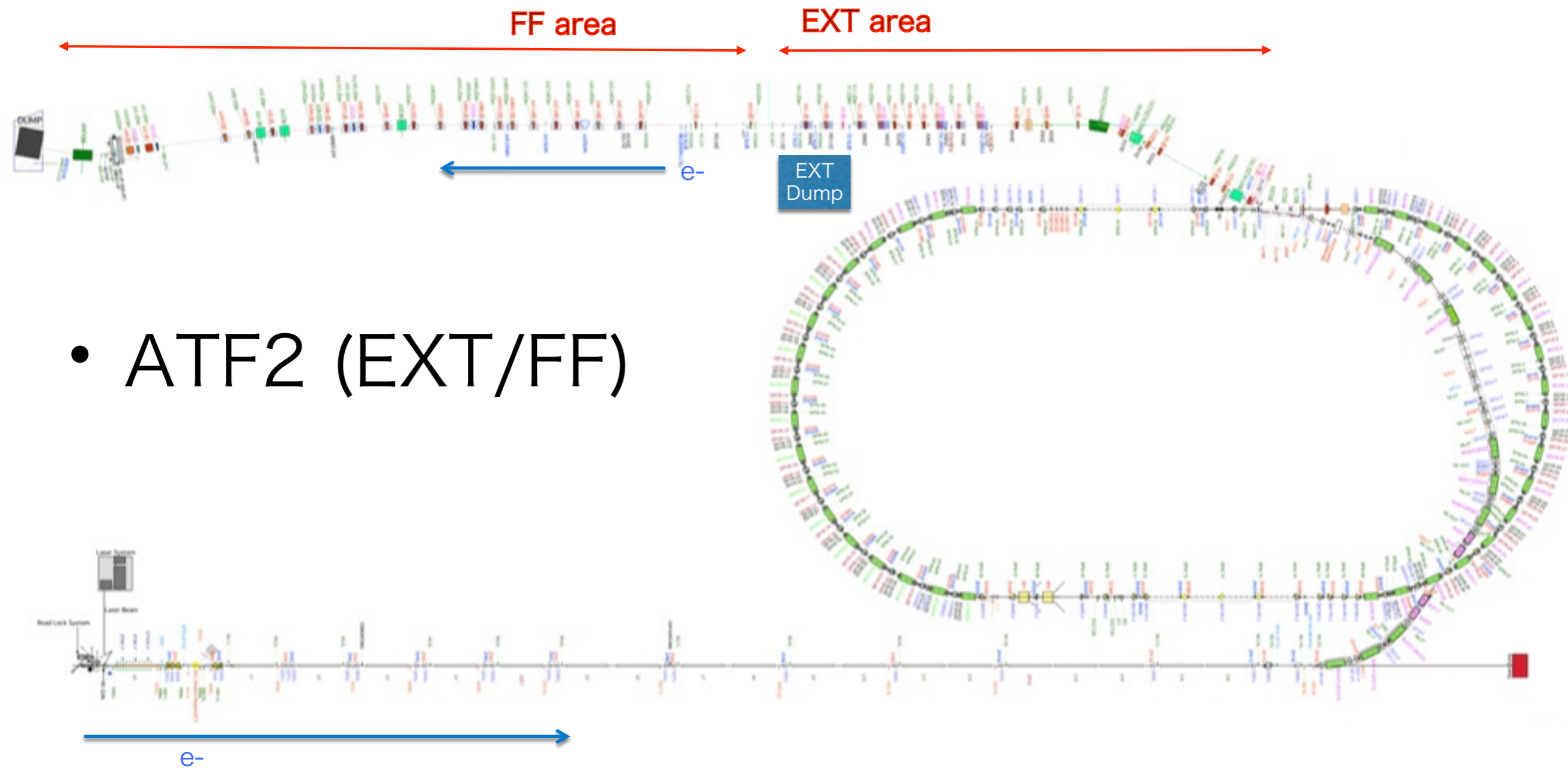
about 120 μm

高さ方向
Alignment of DR Vertical (Oct. 2018)



動径方向 (外側+)
Alignment of DR Transvers (Oct. 2018)



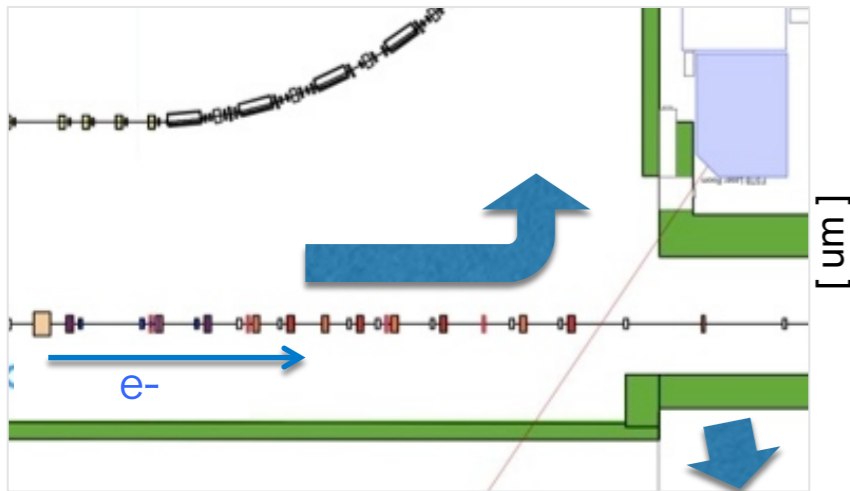


- ATF2 (EXT/FF)



ATF2 survey (Sep. 2018)

Deviation of Magnets



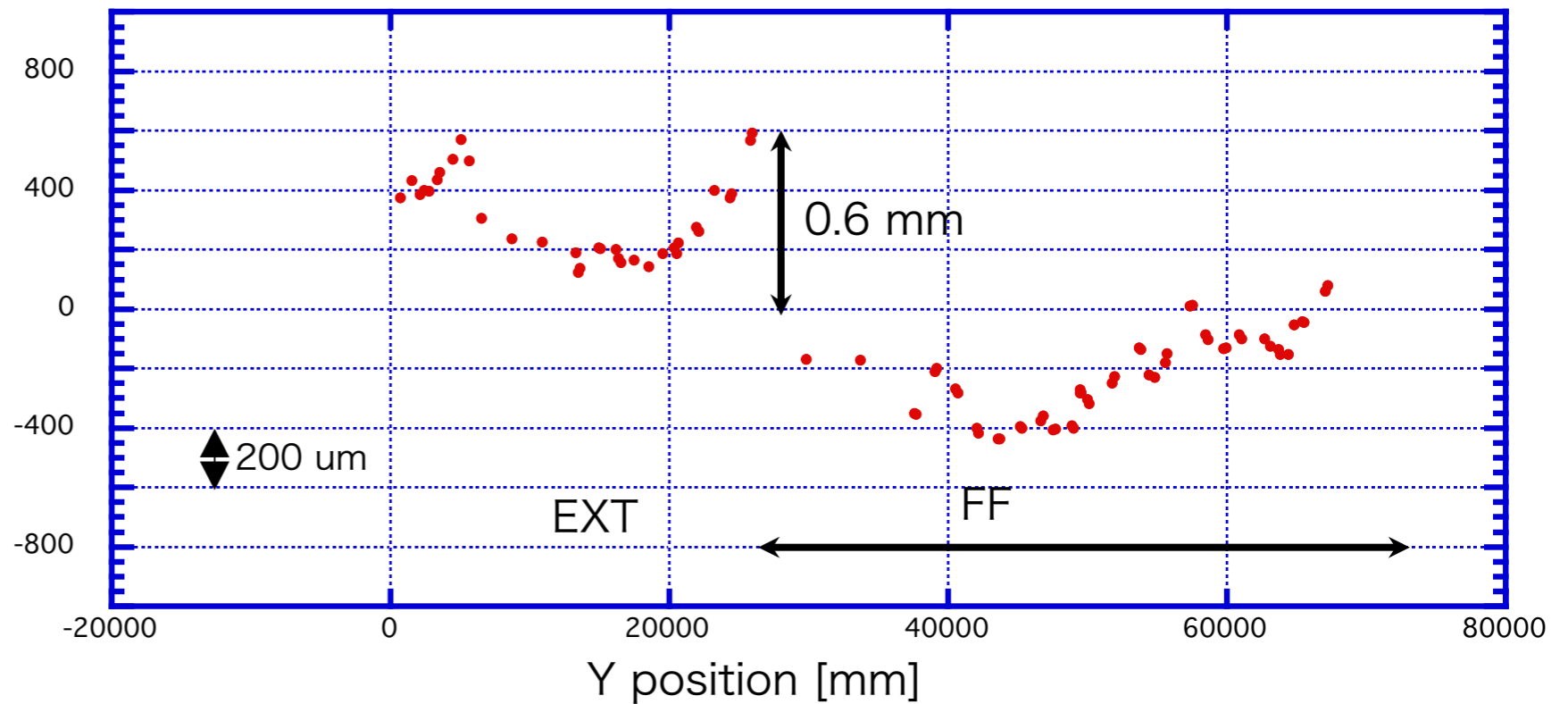
After removing BUMP, we surveyed a week later.

3rd ~6th September brought it to STF

Aligned to be smooth in the September

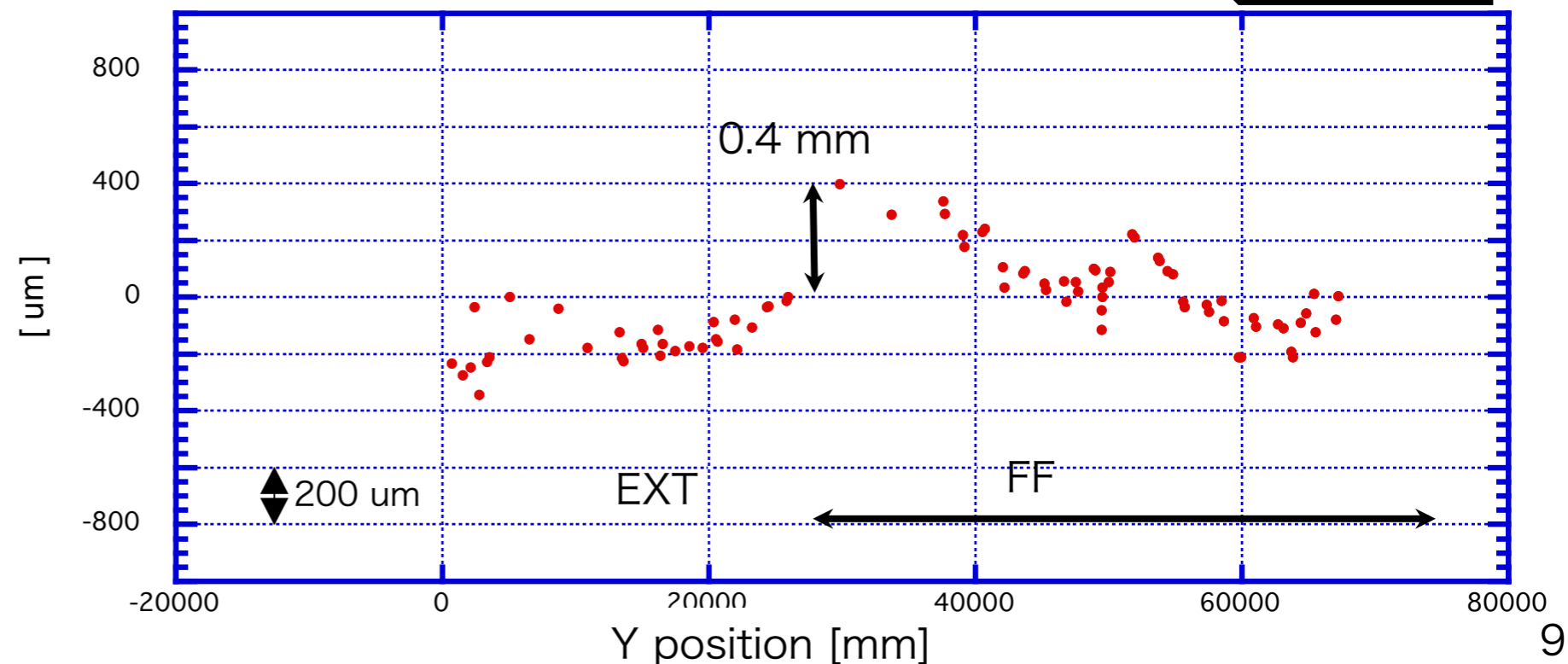
Survey of EXT/FF Vertical

高さ方向



Survey of EXT/FF Transverse

動径方向 (外側+)



ATF2 alignment (Sep. 2018)

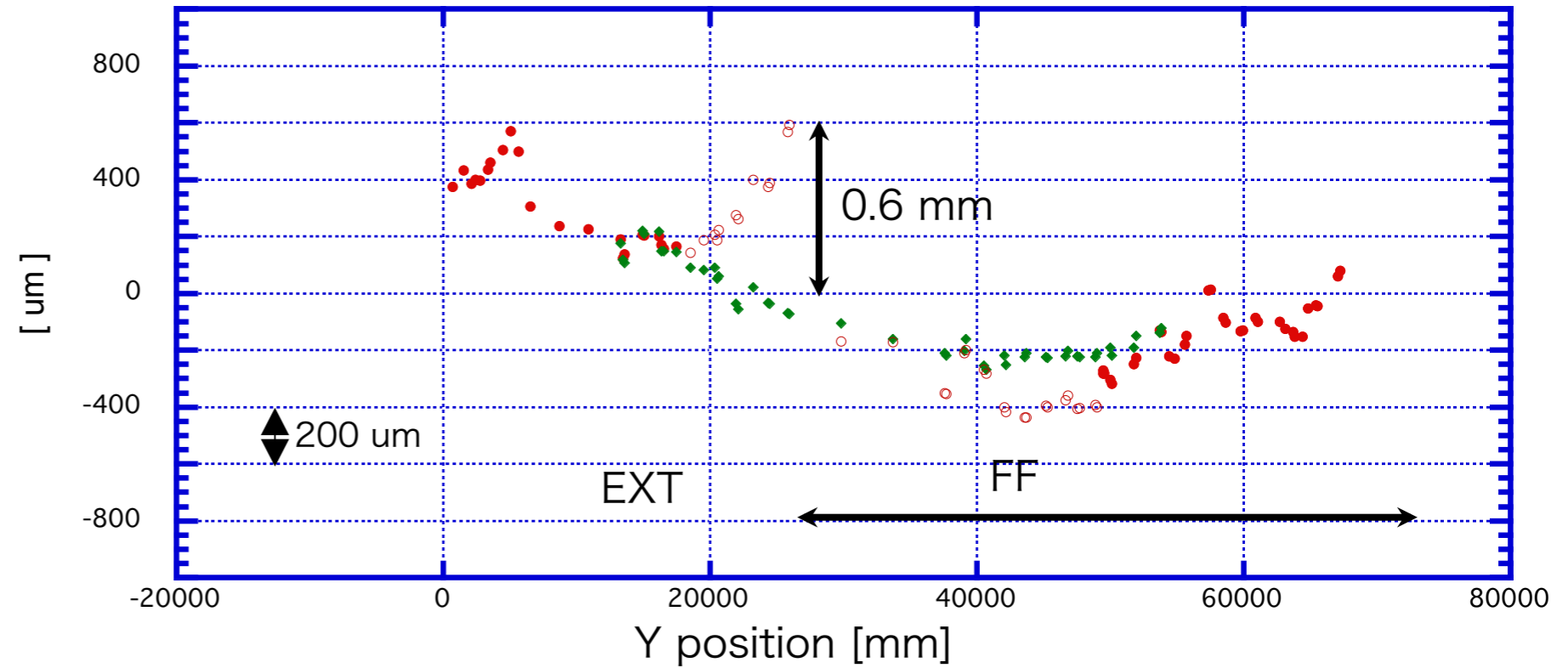
Deviation of Magnets

高さ方向

Alignment of EXT/FF Vertical



Vertical :



Transverse :

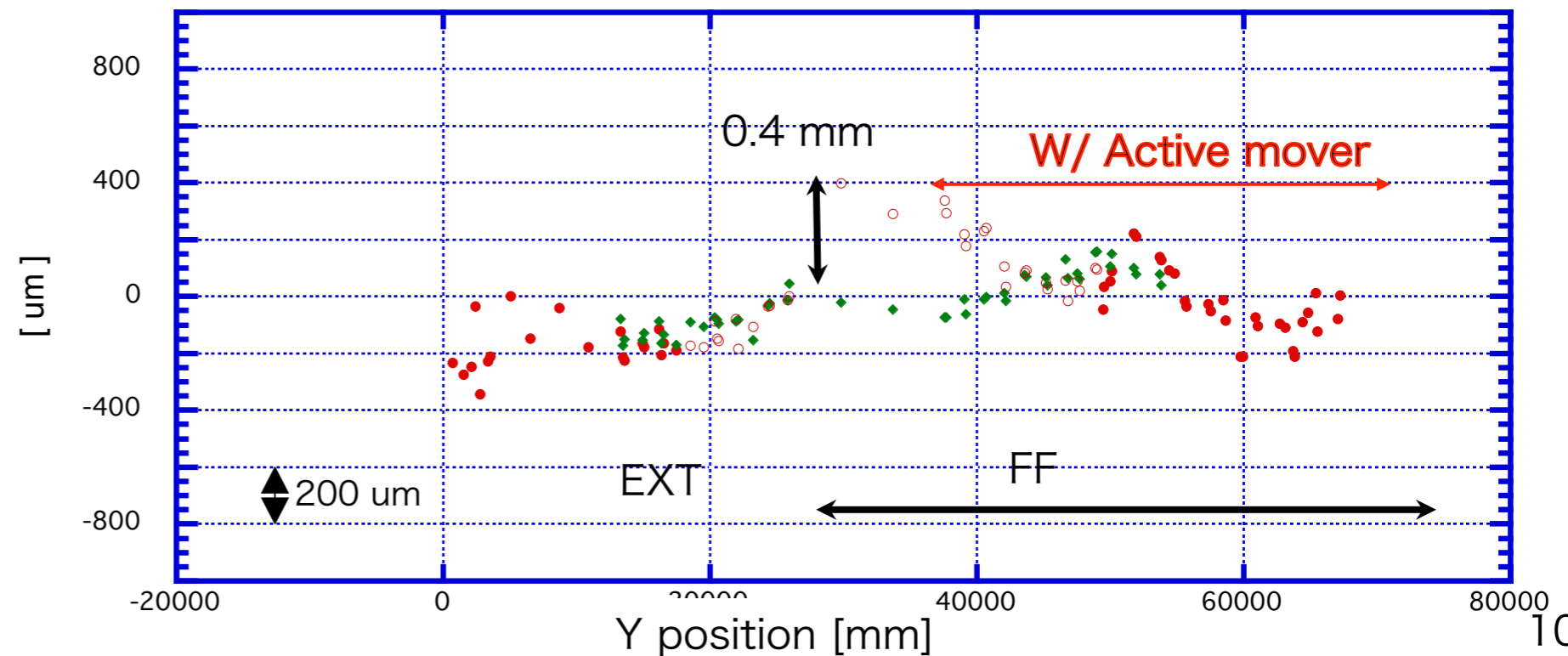
動径方向 (外側+)

Alignment of EXT/FF Transverse



FF mag ware fine-tuned by the correction value to Active mover.

=> within 100um



Summary

- When we removed the old dump , the EXT floor rose a little .
200 μm ~ 600 μm (Sep. 2018)
- DR circumferential length is 1.3 mm shorter than the design as usual . (Oct. 2018)
- DR alignment error was increased. However , we have to smooth all magnets.
- Alignment result of ATF-DR, (Oct. 2018)
 - Vertical fitting error (σ) : 46 μm
 - Transverse error : about 120 μm
- The ATF2 magnet can reduce the error to 100 micron or less by using the Active mover.



- Thanks for your attention!



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