

Sextupolar RDTs in the ramp analysis

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Thanks to E. Maclean and the rest of the OMC team

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Key settings during the ramp (2023&24)

- See details in:

[OMC logbook 24/03/24](#)

[OMC logbook 06/04/23](#)

$$Q_x = 0.28, \Delta q_x = -0.010$$

$$Q_y = 0.31, \Delta q_y = 0.012$$

- 3 bunches

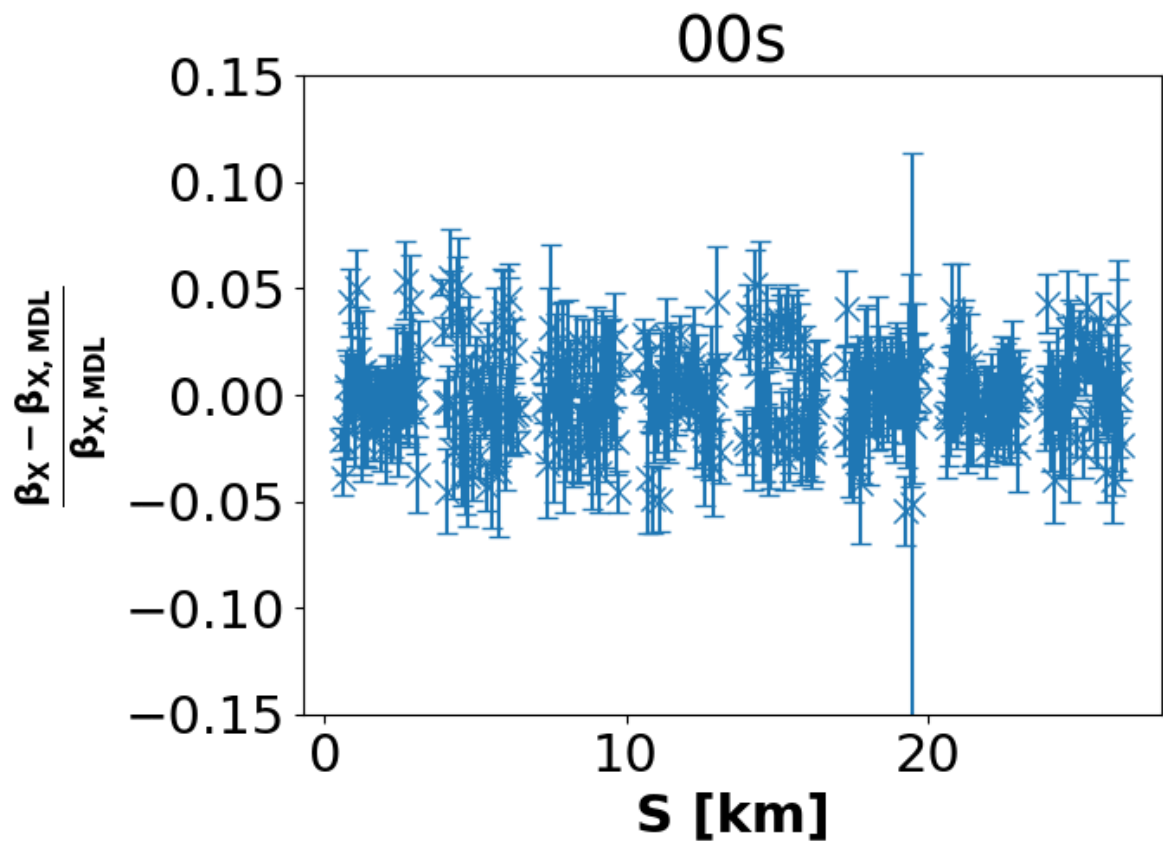
- For more information on

2023 see: [04/08/23 OMC Meeting](#)

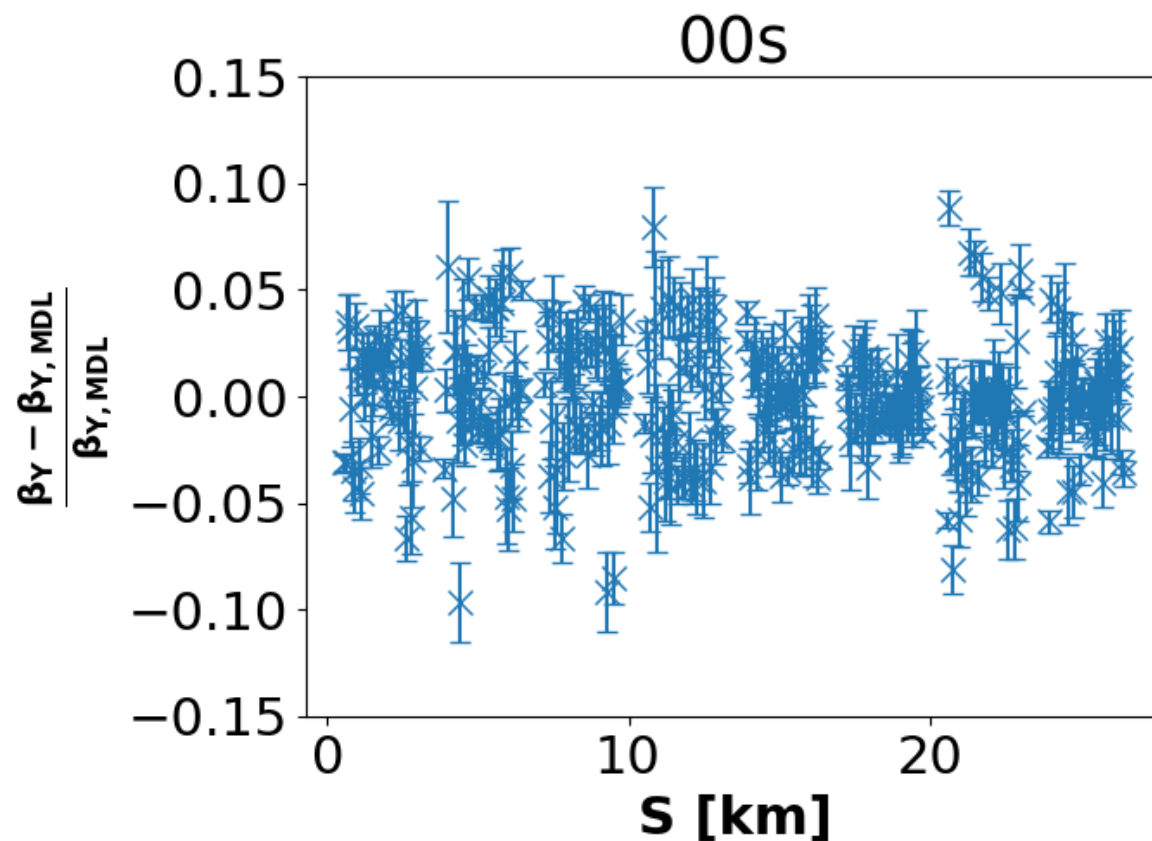
Time [s]	Energy [TeV]	Phase-knob [%]	ATS	Betas [m]				Kick [%]
30	0.46	100	1	11	11	10	10	3
240	1.0	50	1	11	11	10	10	7
405	1.9	0	1	10	10	10	10	13
500	2.9	0	1	7	7	10	7	19
720	3.7	0	1	3.7	3.7	10	3.7	24
860	4.5	0	1	2	2	10	2	30
1010	5.5	0	0.72	2	2	10	2	36
1160	6.2	0	0.57	2	2	10	2	41
1247	6.6	0	0.5	2	2	10	2	45

Linear Optics

B1 beta-beating in the ramp

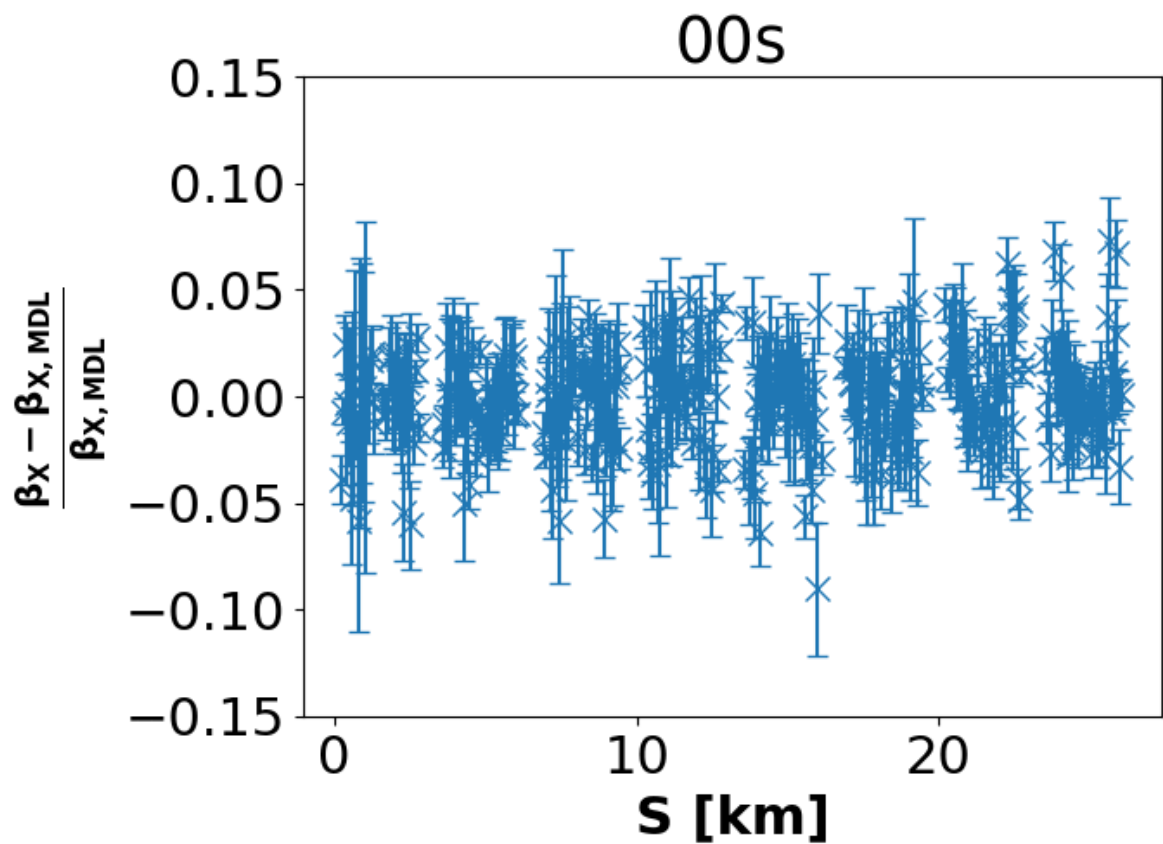


x

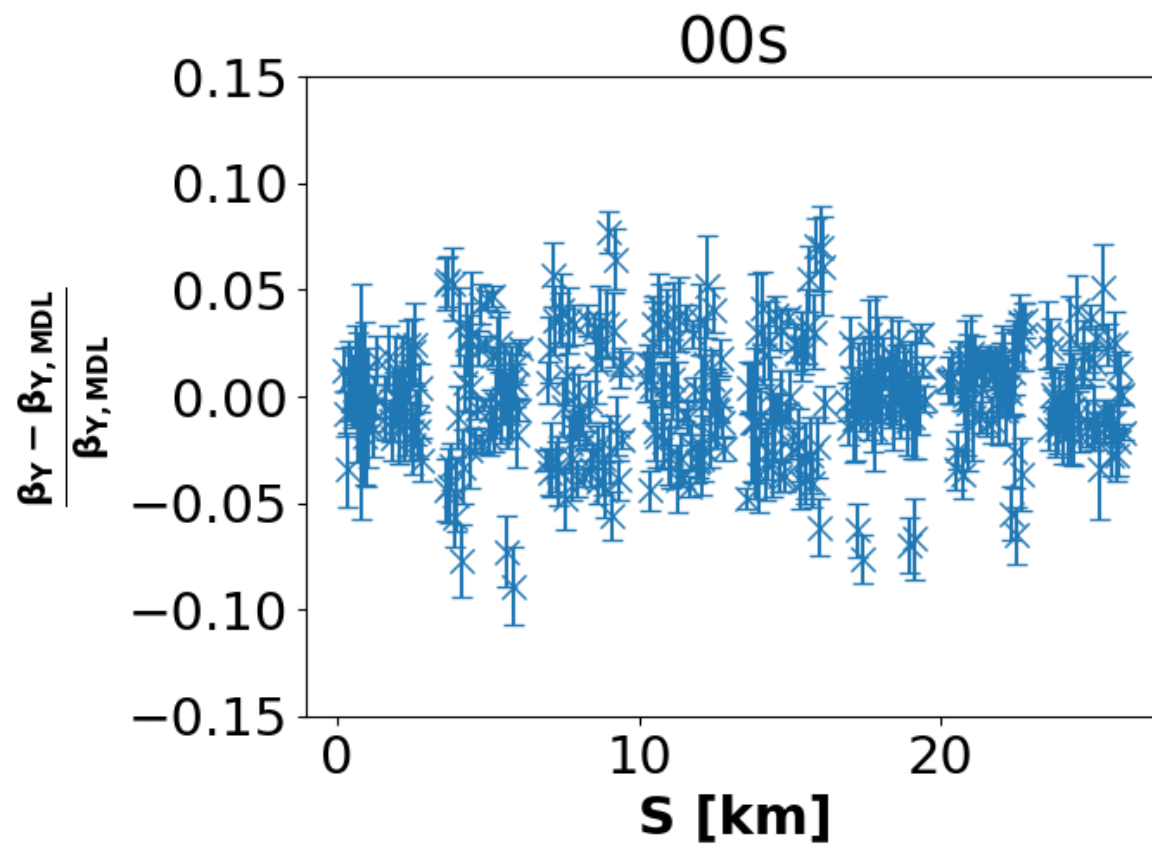


y

B2 beta-beating in the ramp

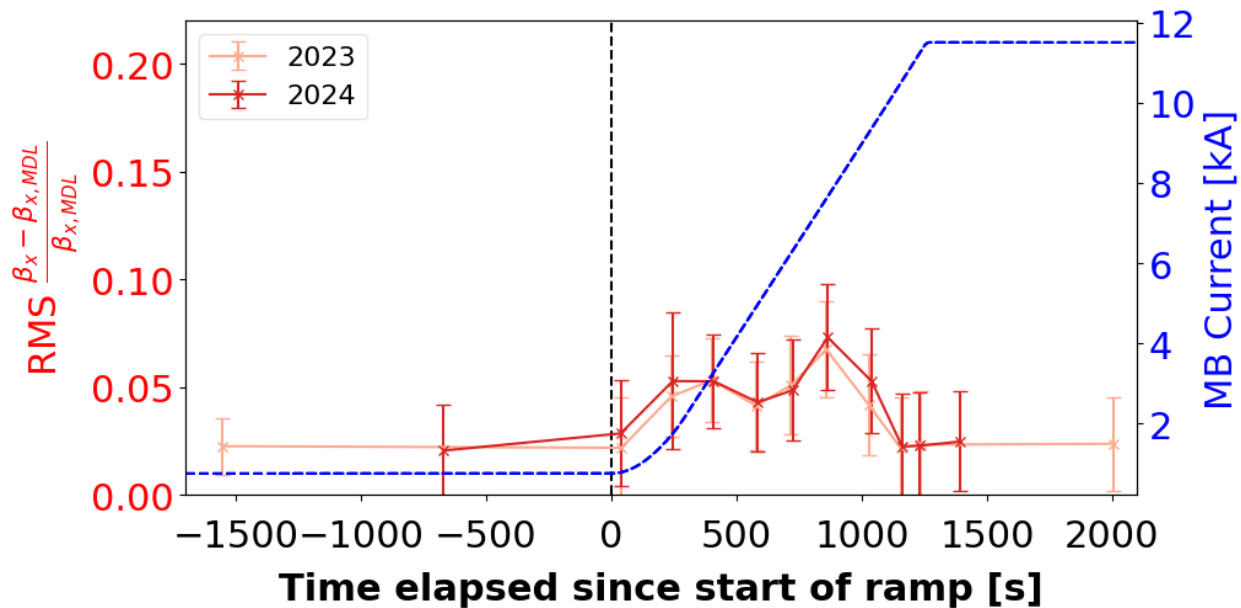


x

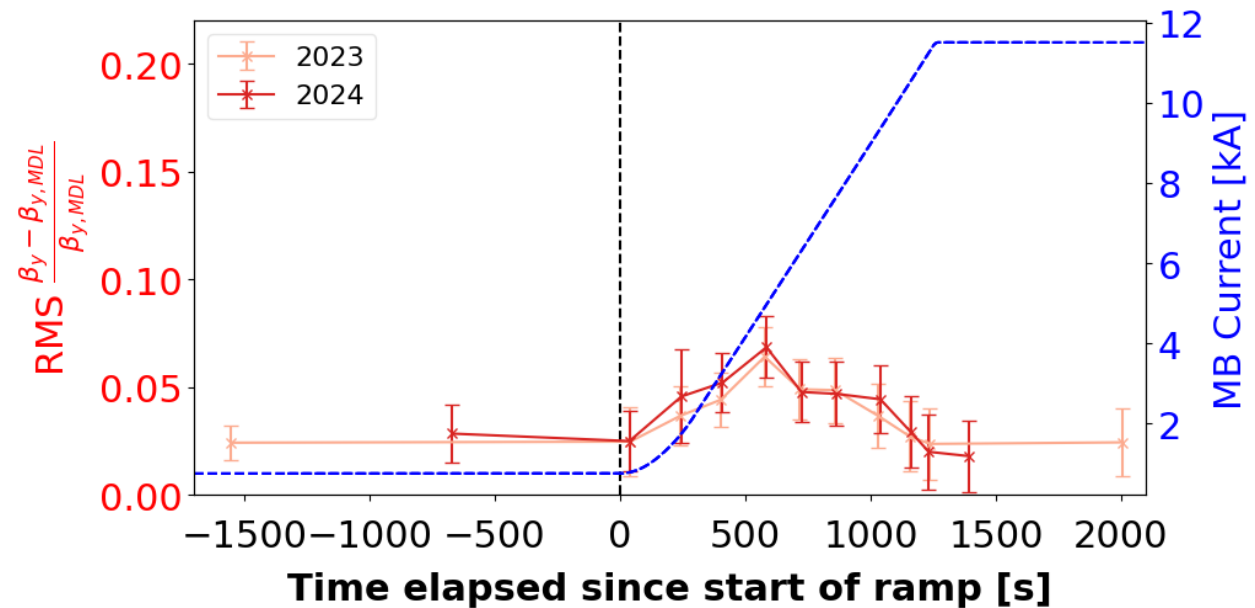


y

RMS beta-beat B1 comparison

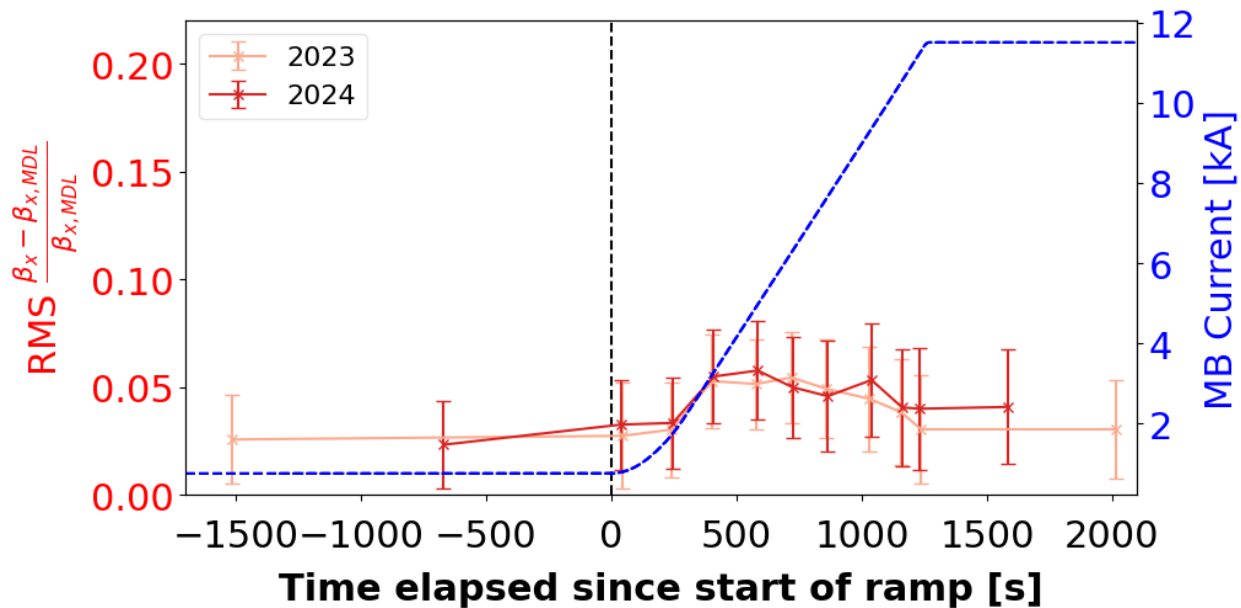


x

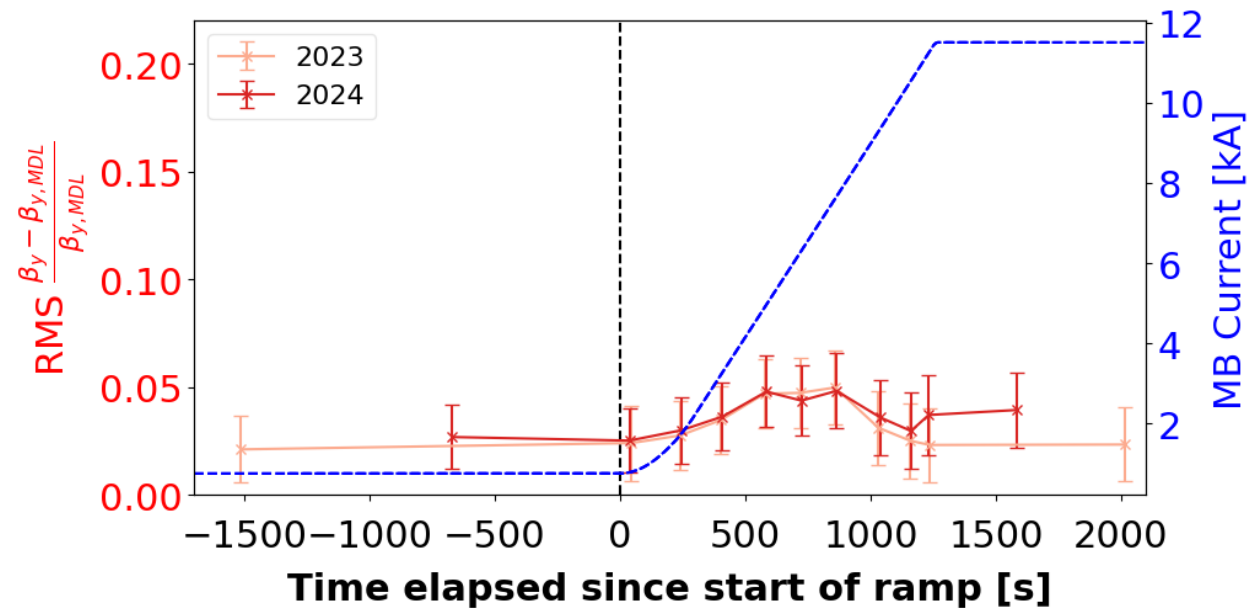


y

RMS beta-beat B2 comparison

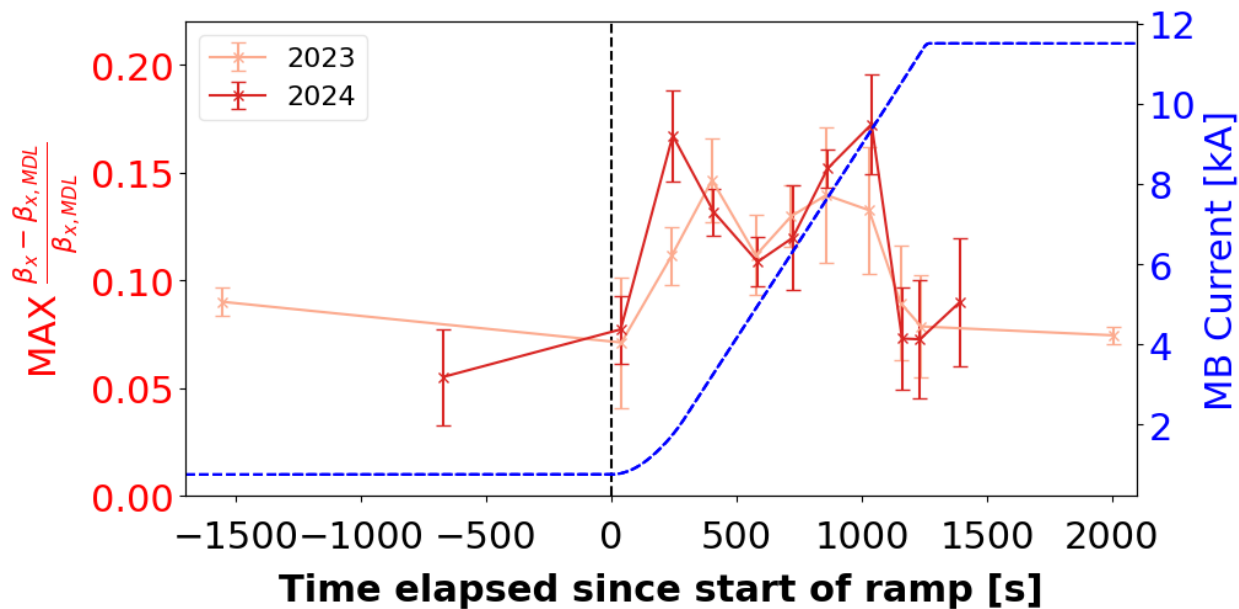


x

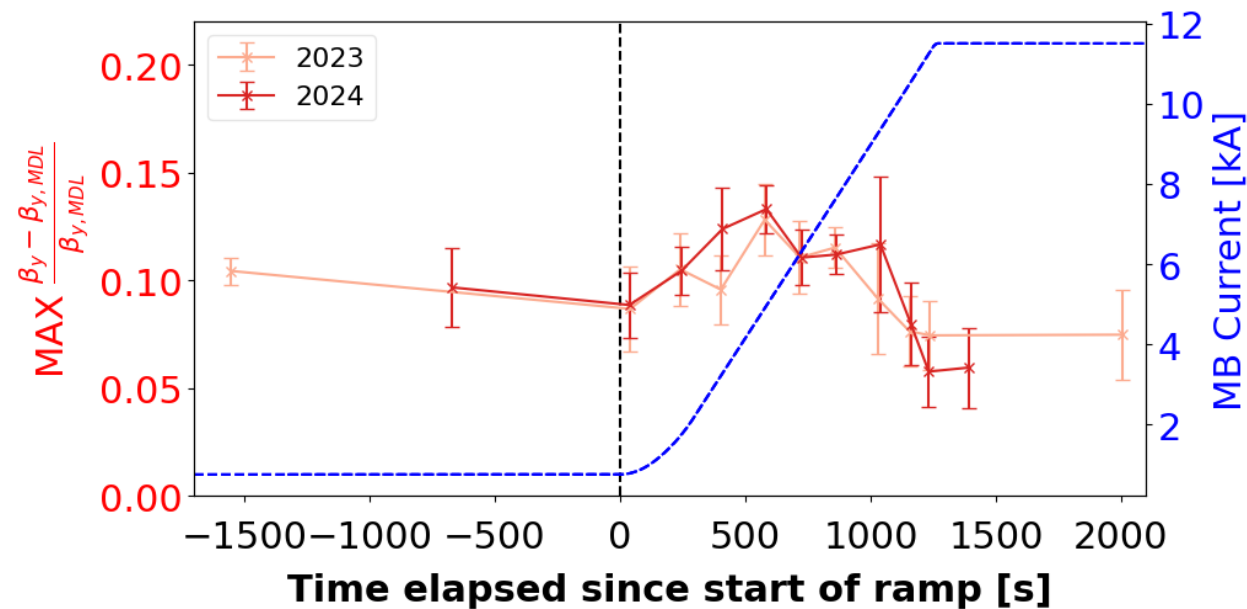


y

Max beta-beat B1 comparison

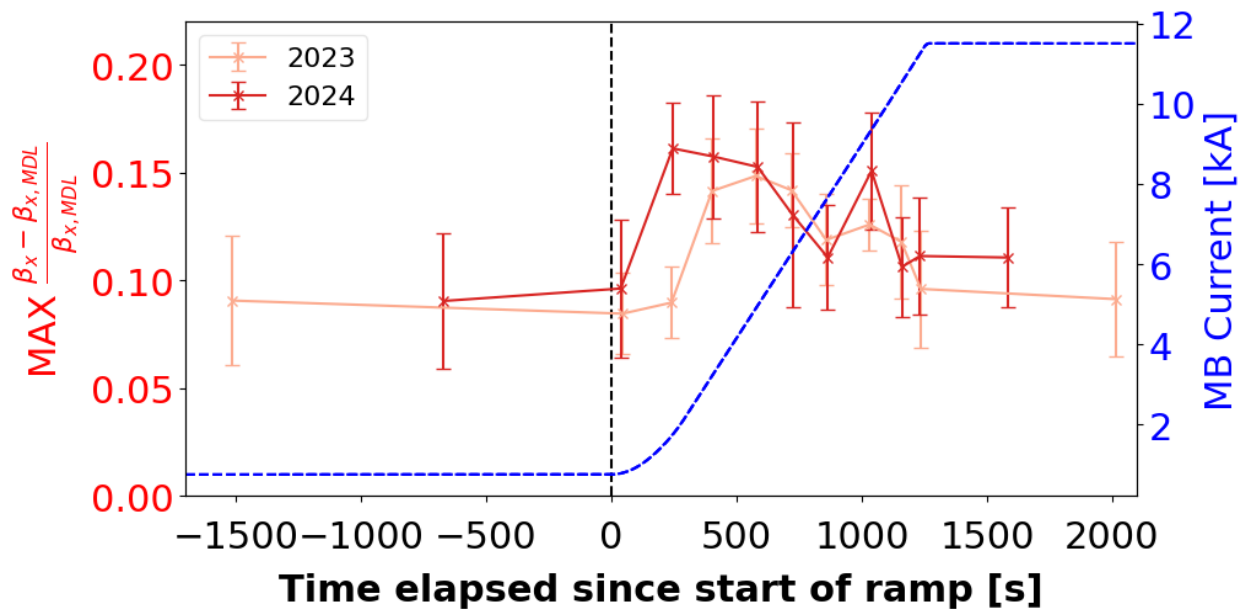


x

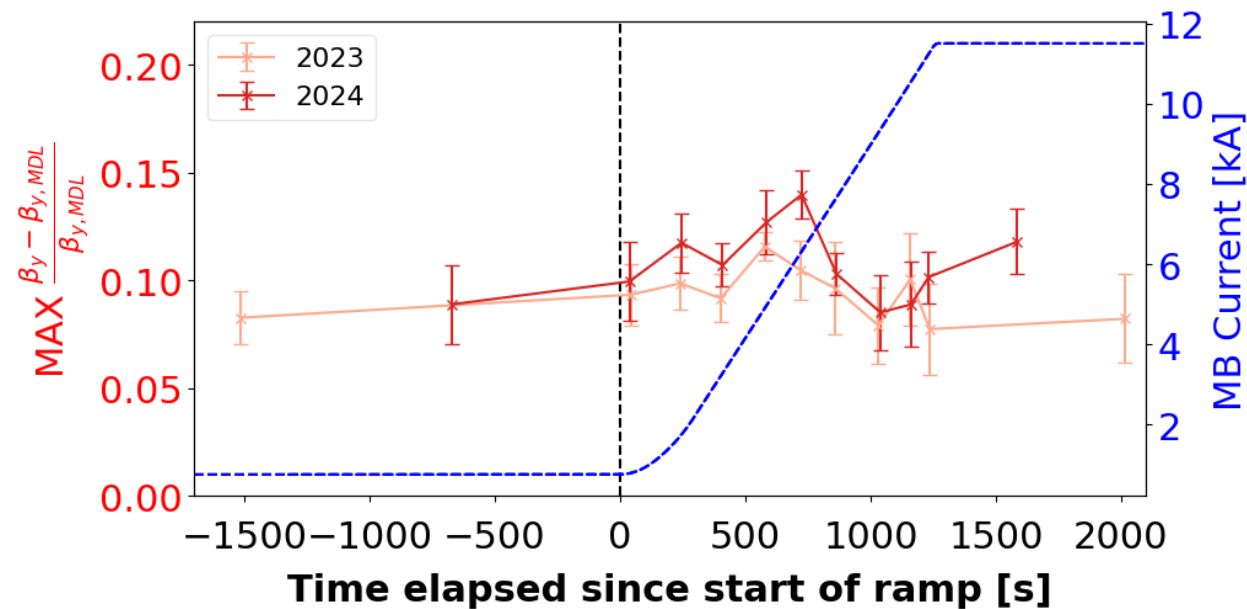


y

Max beta-beat B2 comparison



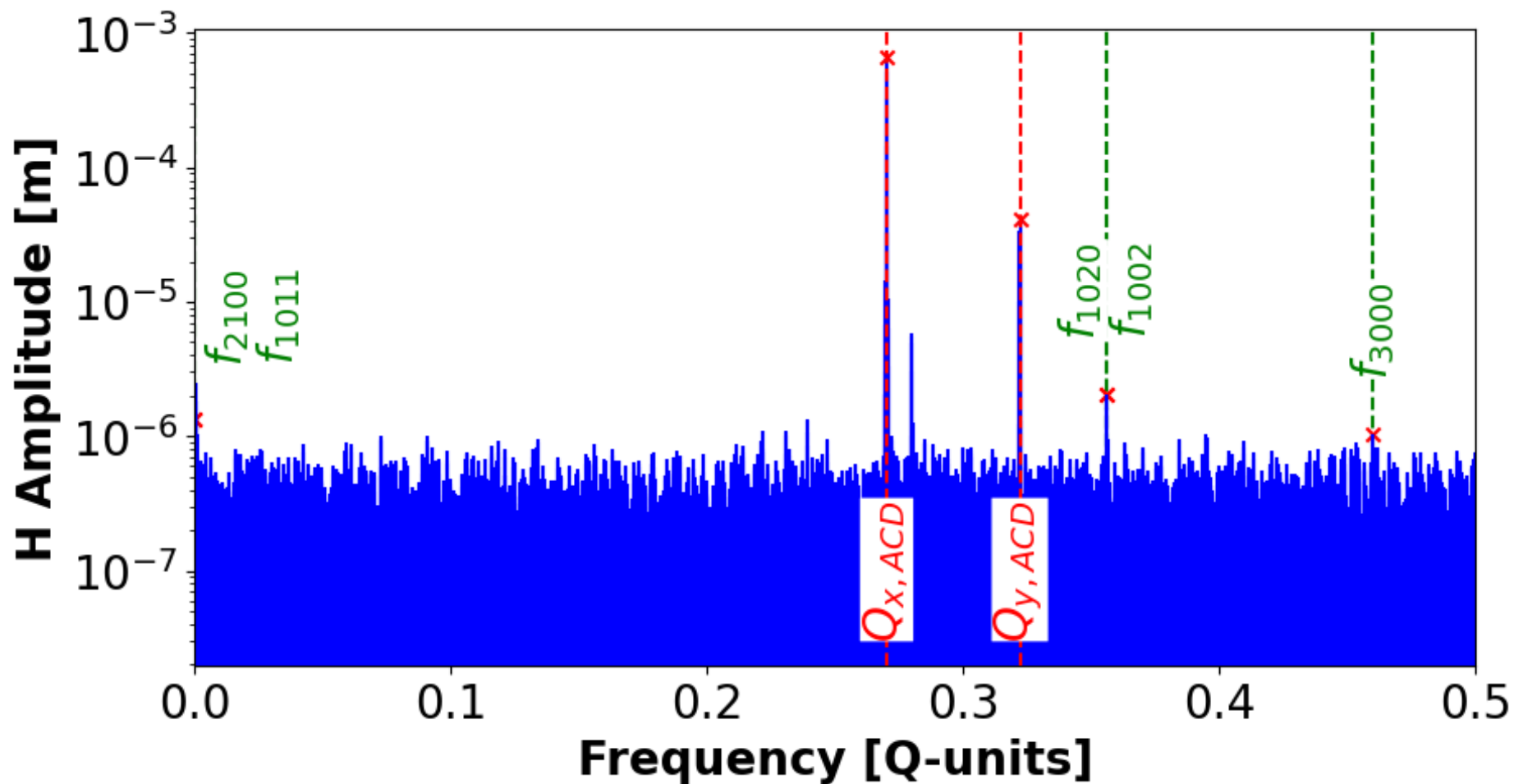
x



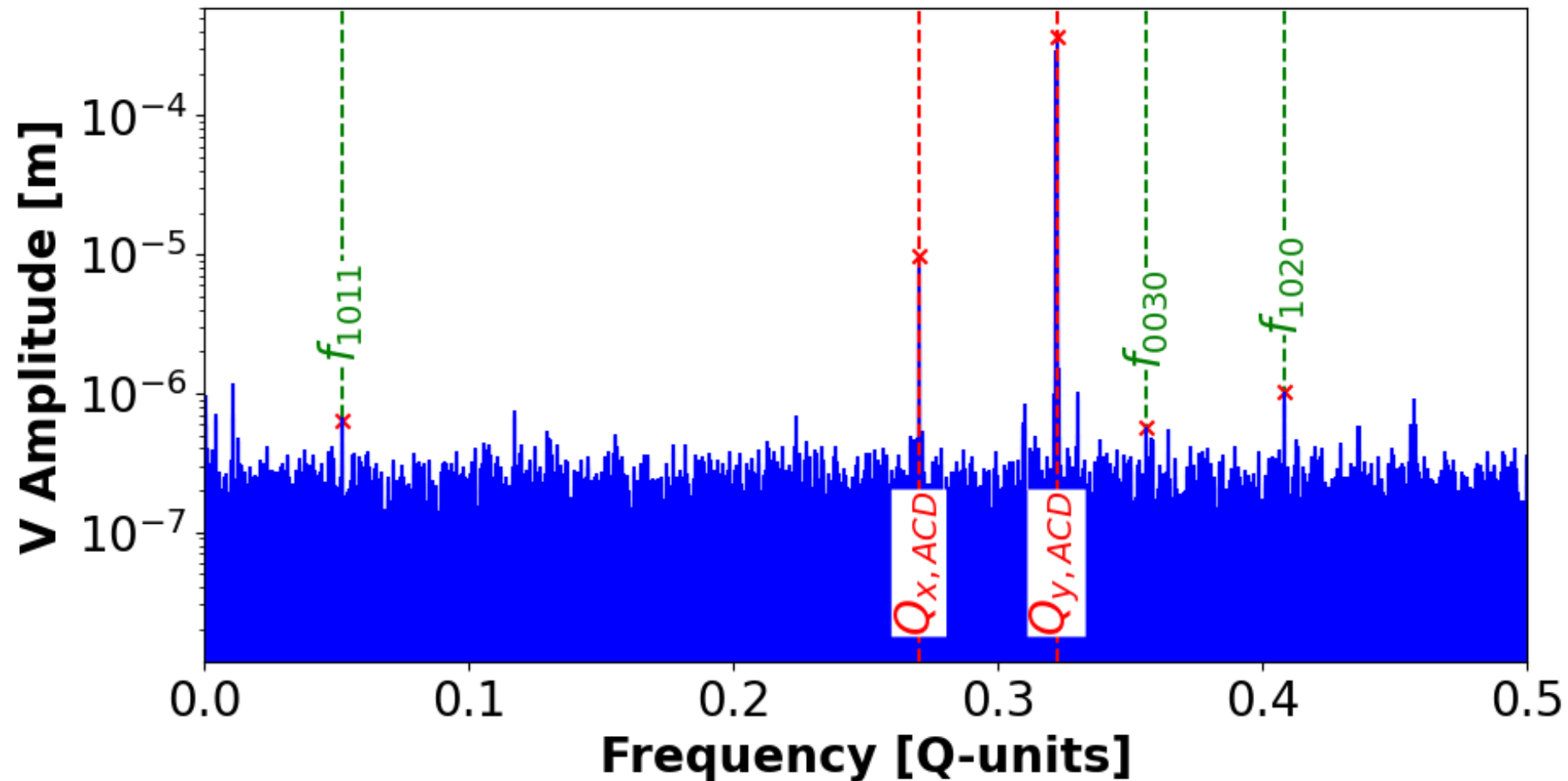
y

Non-linear optics

Example horizontal spectrum

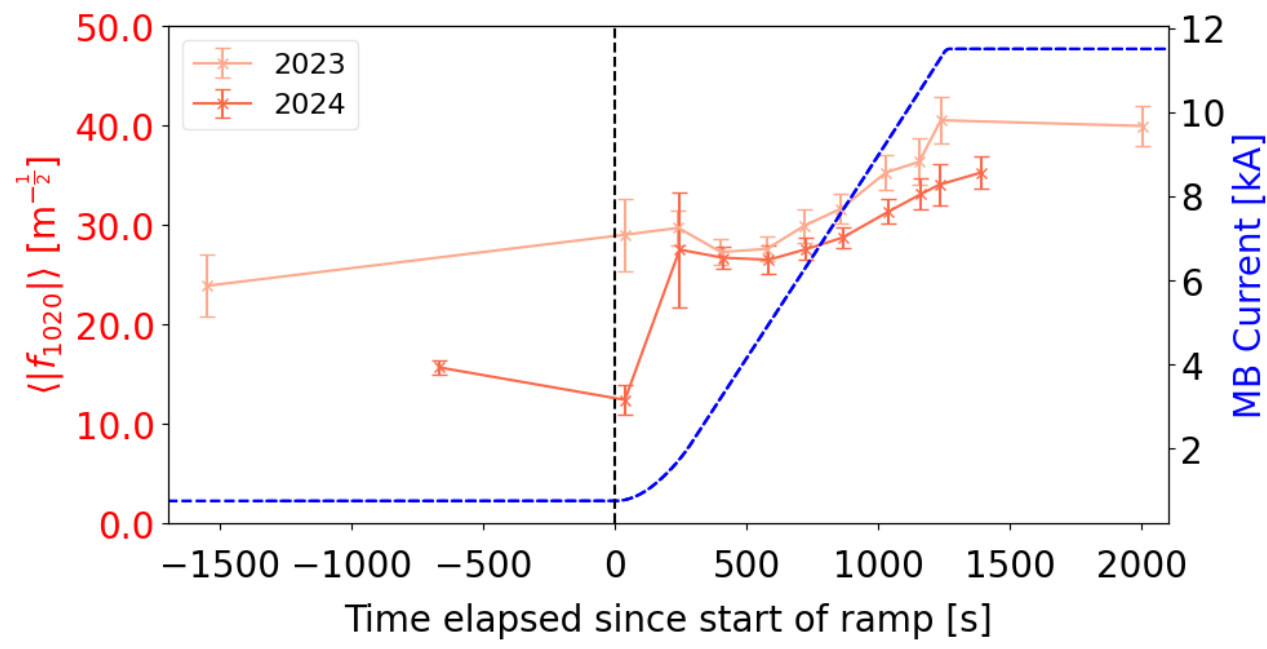


Example vertical spectrum

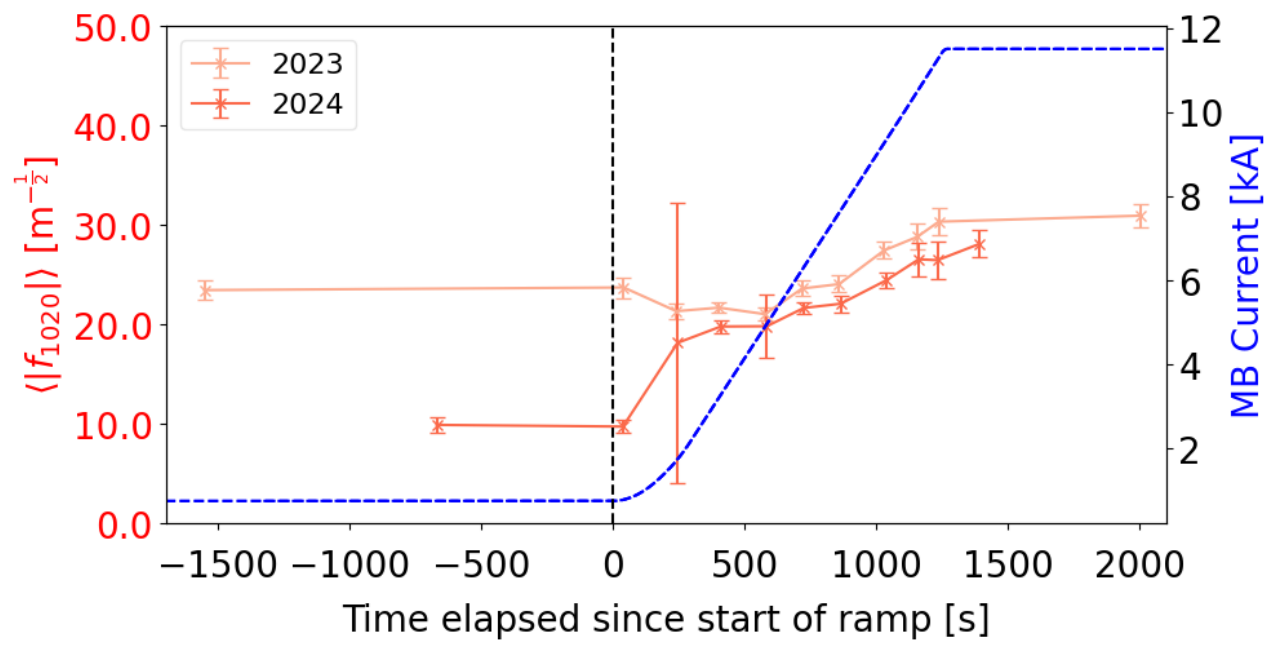


f_{1020} vs time for B1 comparison

N.B. For 2nd kick during 2024 ramp the amplitude was wrong

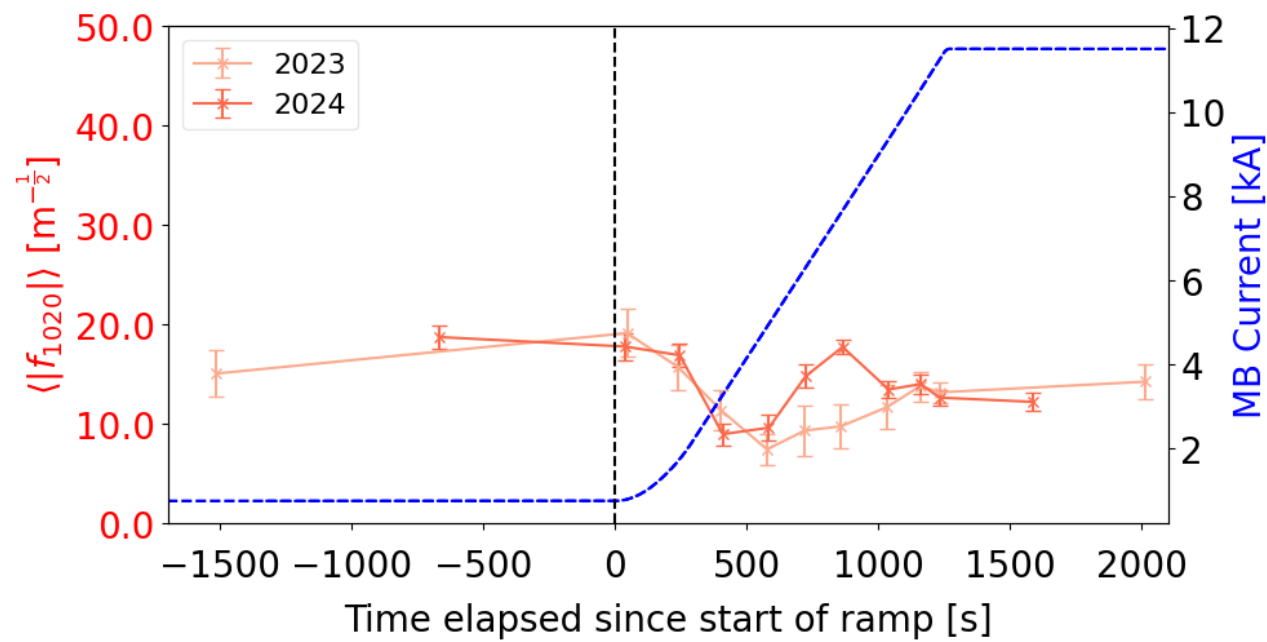


x

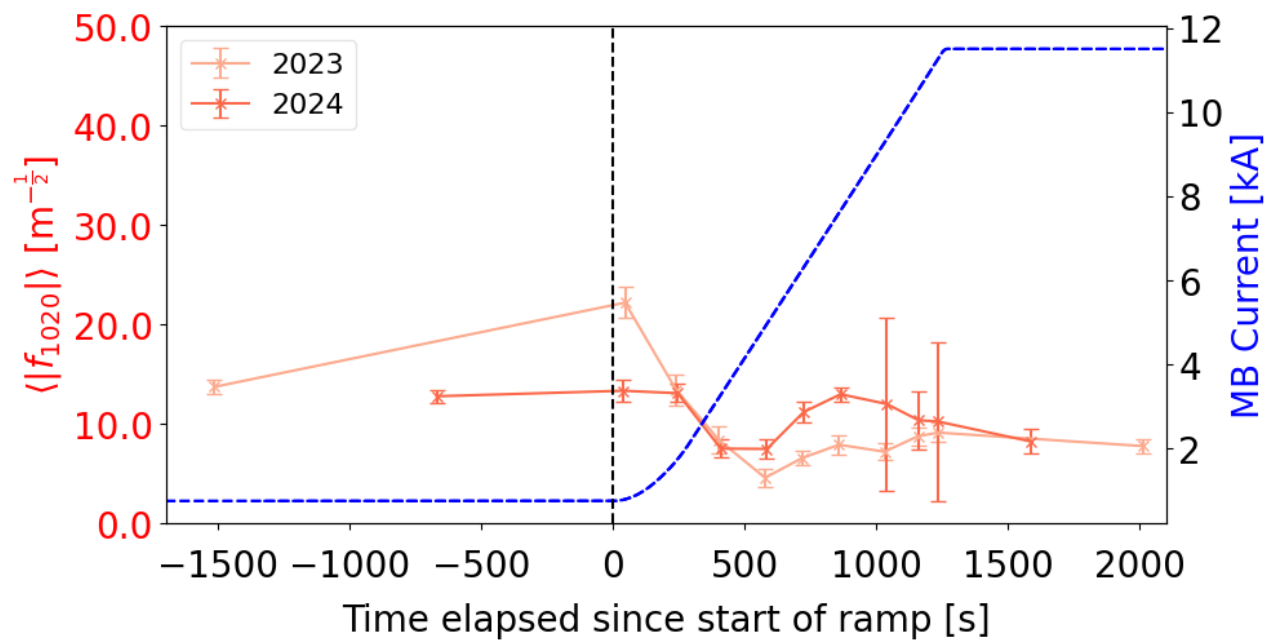


y

f₁₀₂₀ vs time for B2 comparison

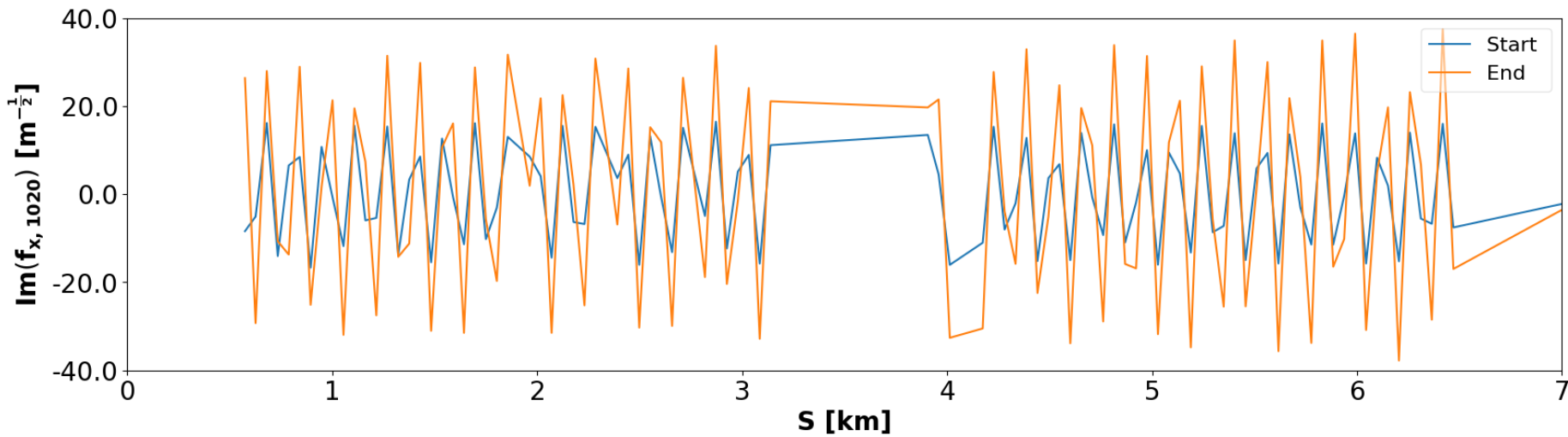


x

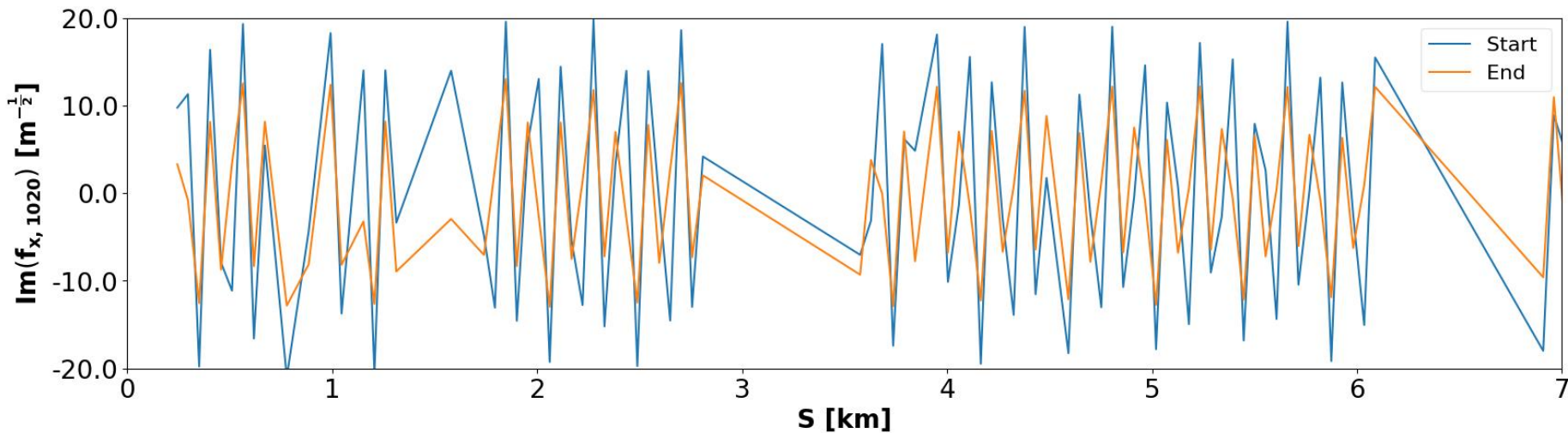


y

$$\underline{\text{Im}(f_{x,1020})}$$

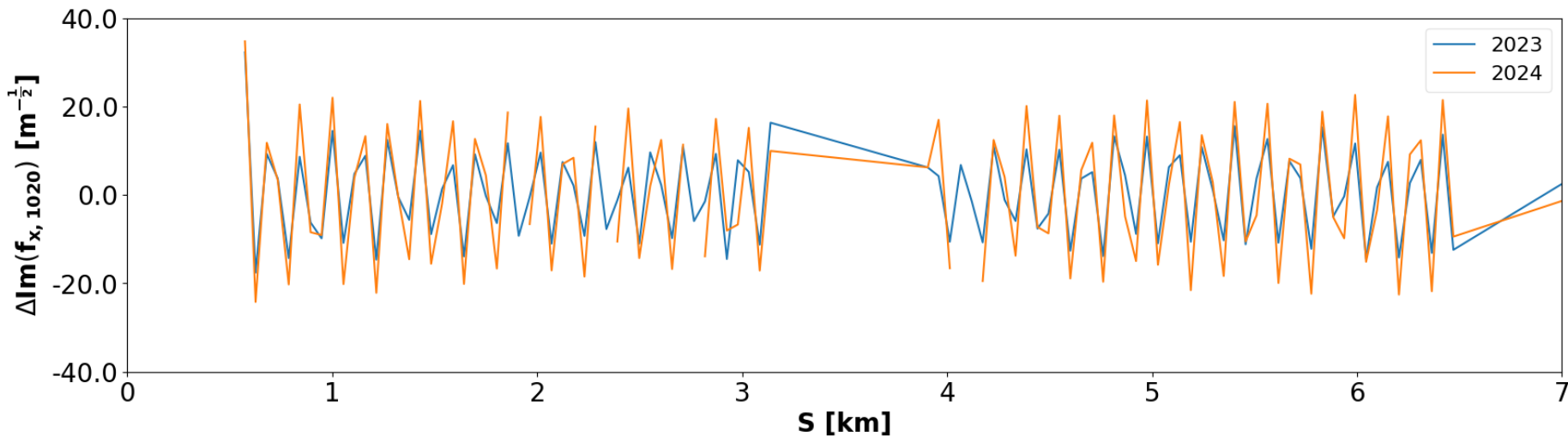


LHC B1

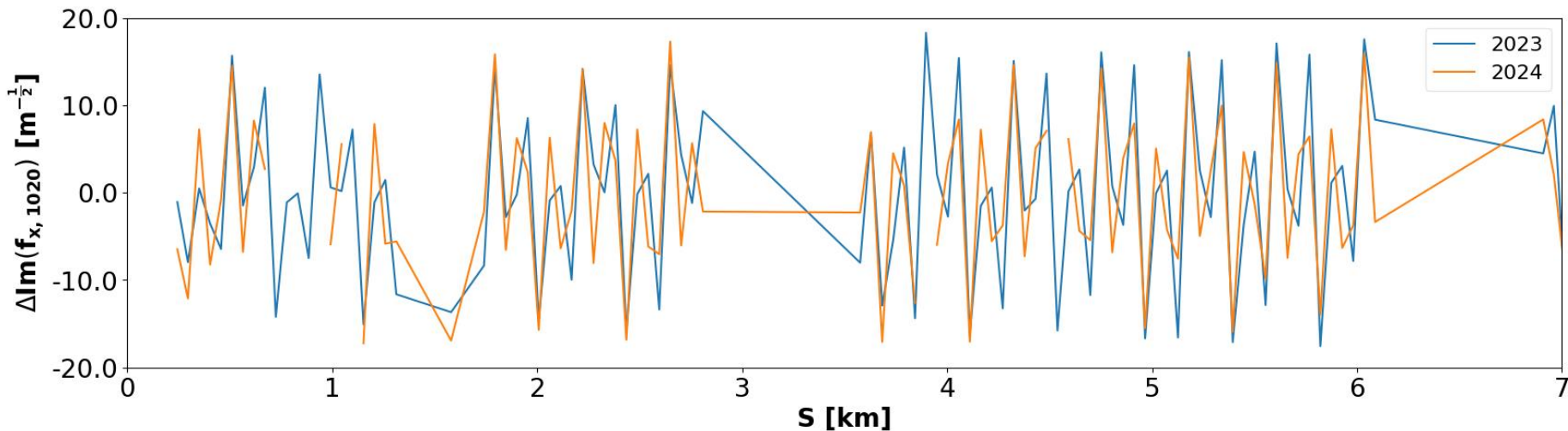


LHC B2

$\Delta \text{Im}(f_{x,1020})$



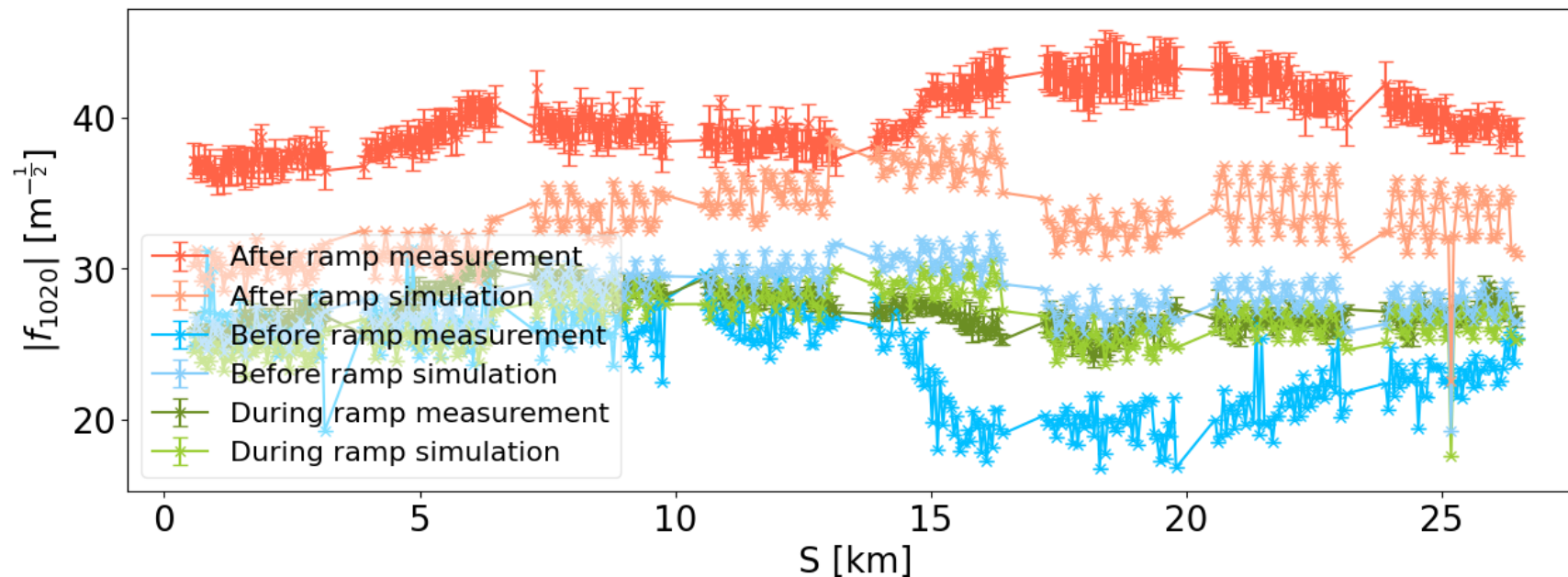
LHC B1



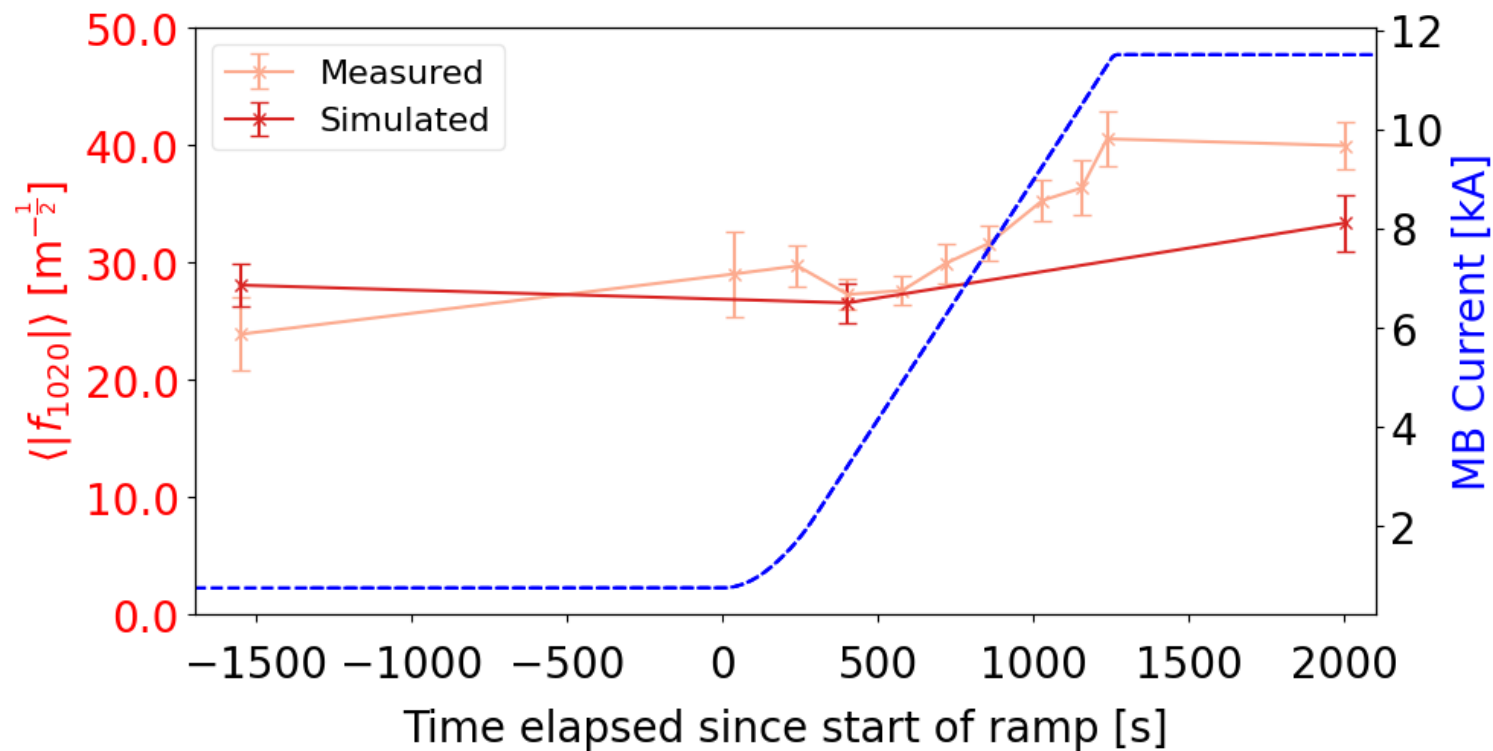
LHC B2

Comparison to simulation (2023 LHCb1)

N.B. No error model included



Comparison to simulation (2023)



Conclusion

- Beta-beat during ramp remained below the threshold of 15s%
- Can see the effect of the correction again at injection
- Otherwise, same trends seen in both 2023 and 2024
 - Implies that the IR1 polarity reversal had no impact on f_{1020}