

IP BPM alignment plan

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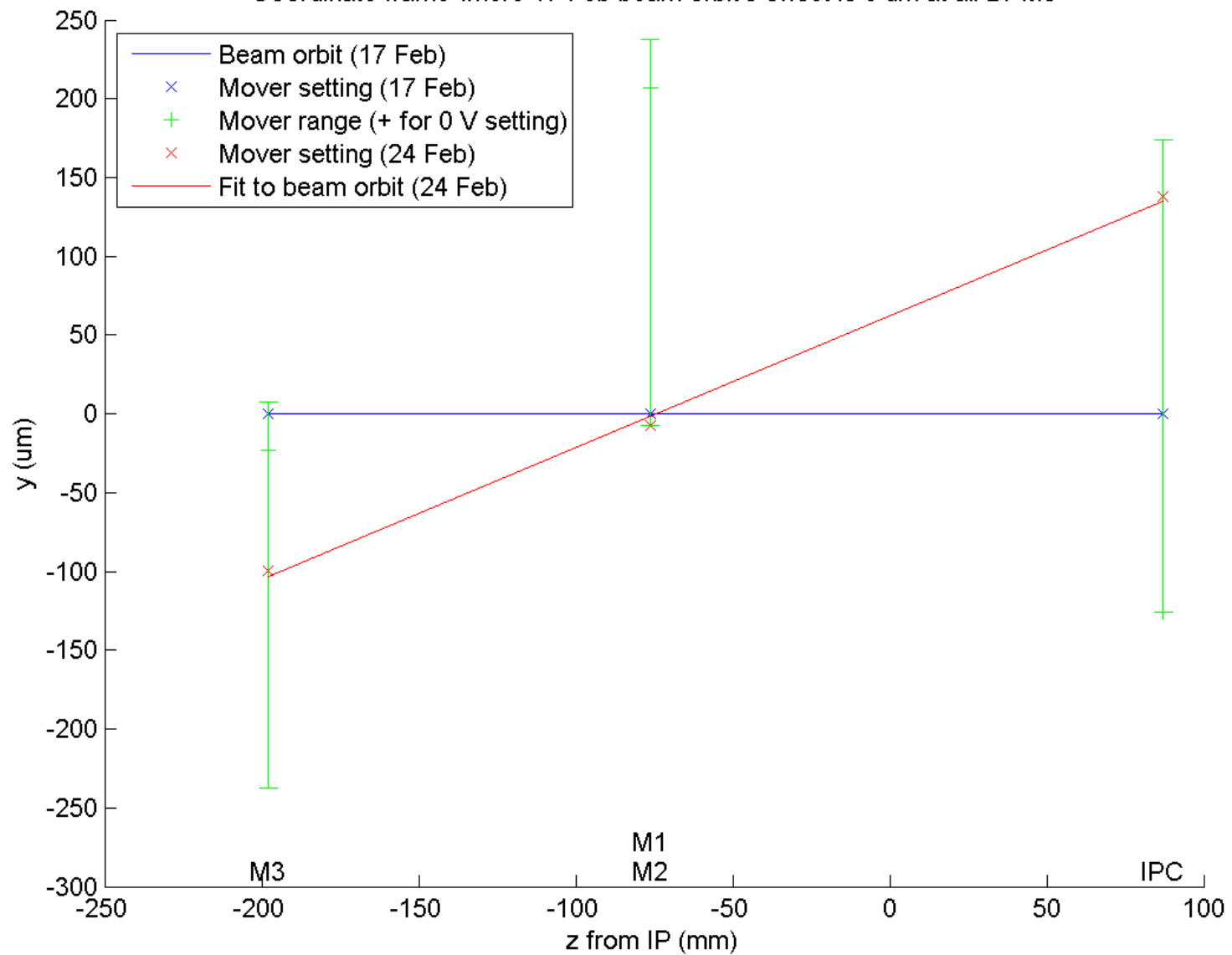
IP BPM alignment in February

- IP BPMs were aligned relative to each other using high- β optics in February 2017
- On-shift alignment achieved requires adjusting:
 - IPAB's M3 sub-mover (close to IPA)
 - IPAB's M1 and M2 sub-movers (close to IPB)
 - IPC mover (no mover pitch introduced)

Beam-based measurements

- Results presented on next slide:
 - Blue line: beam on 17 Feb taken as reference
 - Green lines: full mover dynamic range (deduced from mover setting on 17 Feb)
 - Red crosses: mover settings on 24 Feb
 - Red line: deduced beam orbit on 24 Feb (movers set so that beam is centred in BPMs)
- Straight-line beam orbit reconstructed for both 17 & 24 Feb data (blue & red lines)

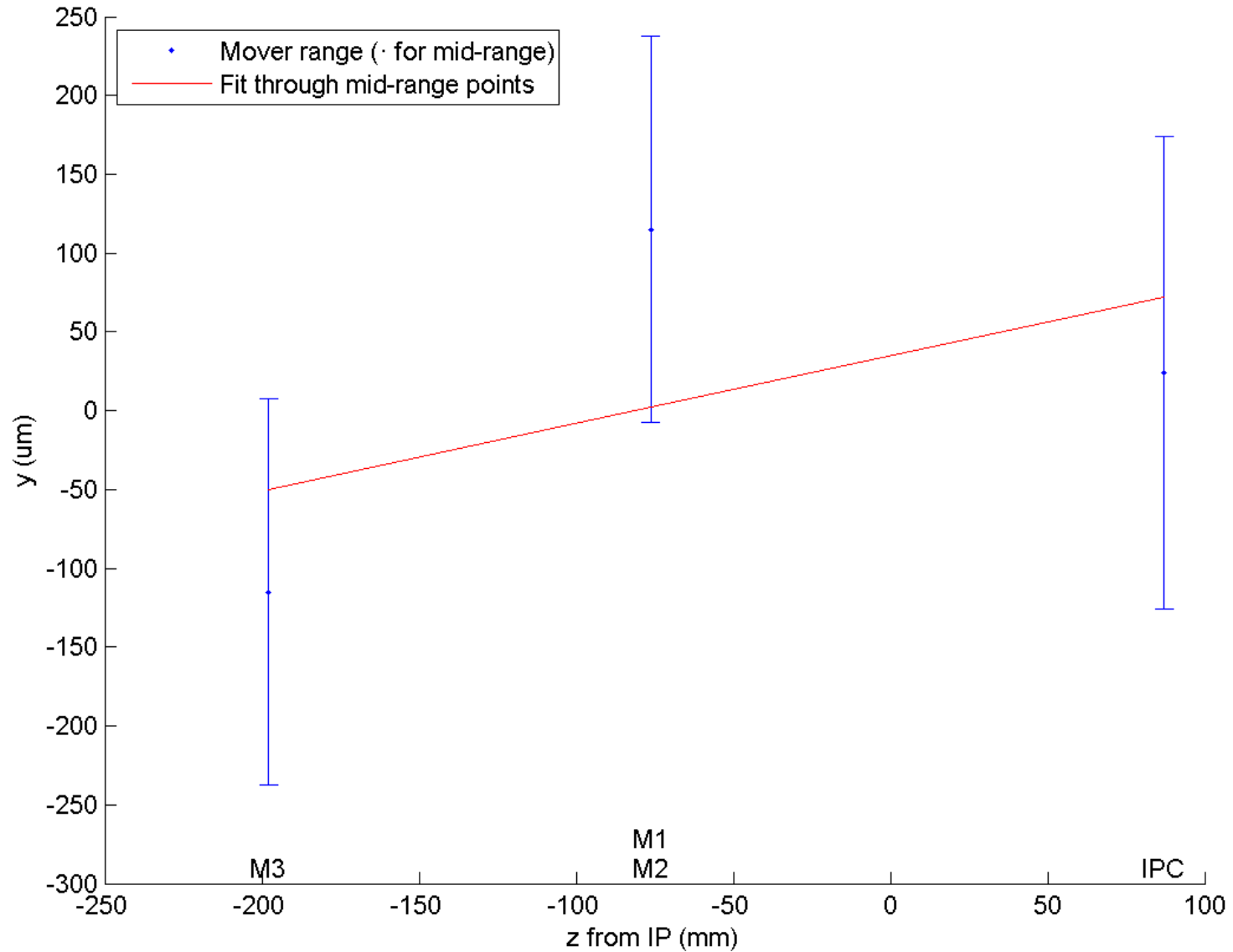
Coordinate frame where 17 Feb beam orbit's offset is 0 um at all BPMs



Mover dynamic ranges

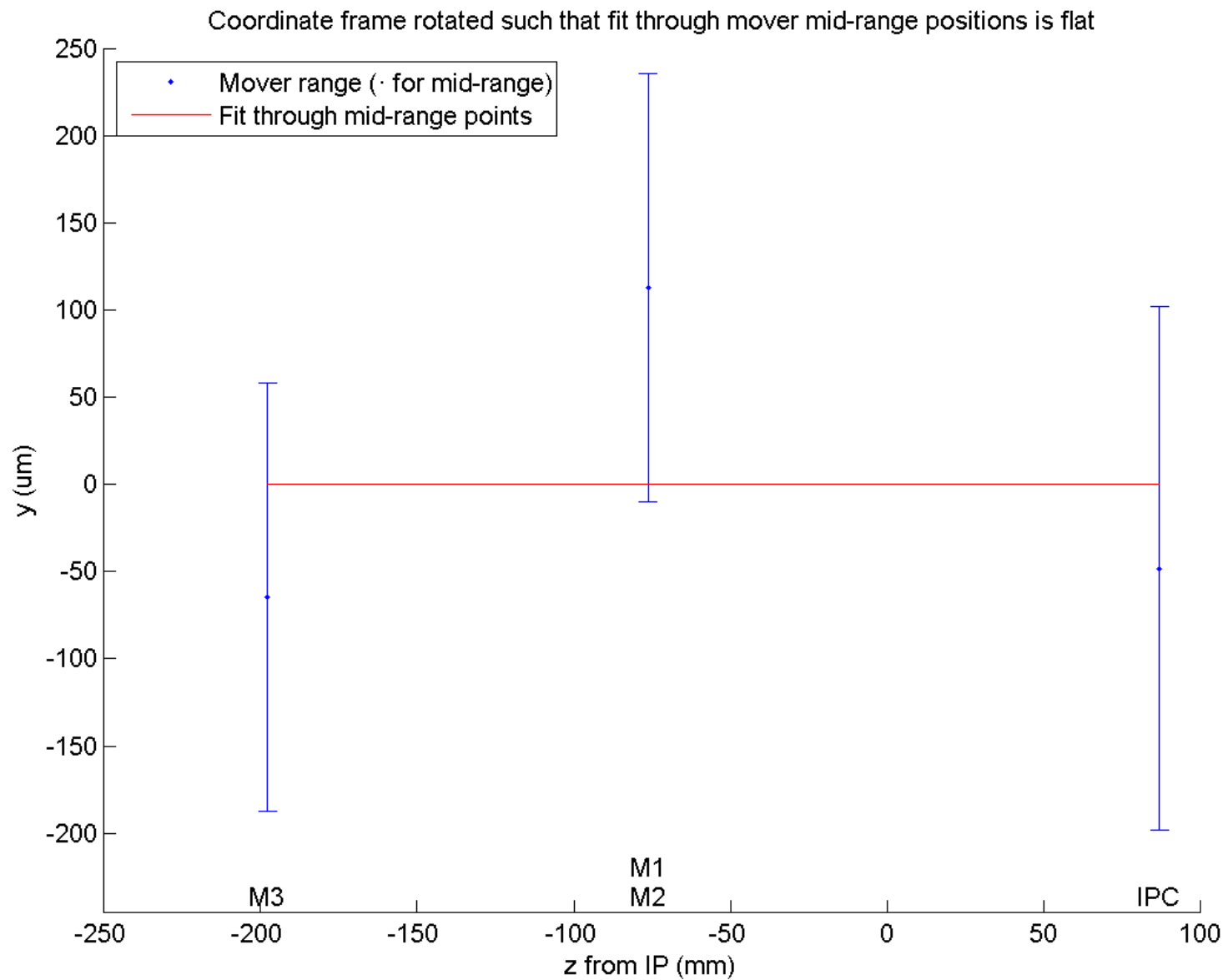
- Next slide:
 - Plot IP BPM mover dynamic ranges alone
 - Coordinate system as on previous slide
 - Straight-line fit through mid-range mover settings constitutes 'ideal' beam orbit

Coordinate frame where 17 Feb beam orbit's offset is 0 μm at all BPMs



Mover dynamic ranges

- Next slide: rotate plot such that 'ideal' beam orbit is horizontal
 - In practice at ATF, this requires re-steering the beam or re-positioning the IP chamber
- M3 and IPC movers are well aligned
- M1 and M2 movers are 180 um too high



IP BPM alignment plan for May

- ‘Internal alignment’ (alignment of IP BPMs relative to each other)
- ‘Global alignment’ (alignment of IP BPM system for beam size tuning operation)

Internal alignment

- To confirm relative alignment of the IP BPMs after their re-installation
- Requires high beta optics for small beam jitter at IP BPMs
- Request 1-2 dedicated shifts for this study
- Results may require re-alignment inside the IP chamber

Global alignment

- Given larger position jitters and possible position offset, work with attenuated IP BPM signals (e.g. 40 dB attenuation)
- Use nominal optics
- Work with the beam-size tuning team to find a beam orbit common for both IP BSM and IP BPM operation
- Results may require repositioning of the IP chamber

Suggested schedule

- 1-2 shifts for internal alignment study
- 1 shift for global alignment study
- Access to perform internal and global re-alignment (help from Sandry/Araki-san)
- If internal re-alignment is performed, 1-2 shifts for internal alignment study
- 1 shift for global alignment study during a beam-size tuning shift

Appendix

Settings used for IP BPM alignment study
in February

BPM mover settings on-shift

- Mover settings to centre beam in all BPMs

Date	Mover setting (V)		
	M1 & M2	M3	IPC (Y)
17 Feb	6.75	-0.75	4.20
24 Feb	7.00	2.75	8.80

- BPM mover calibration (-30.65 um/V for IPA & IPB; 29.99 um/V for PI) assumes coordinate system where positive y is up