

FAIR

400 mm Beam Diagnostics

for pBar Separator and HEBT

Version 6

presented at the

5th BINP-FAIR Collaboration Coordination Workshop

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11th November 2020

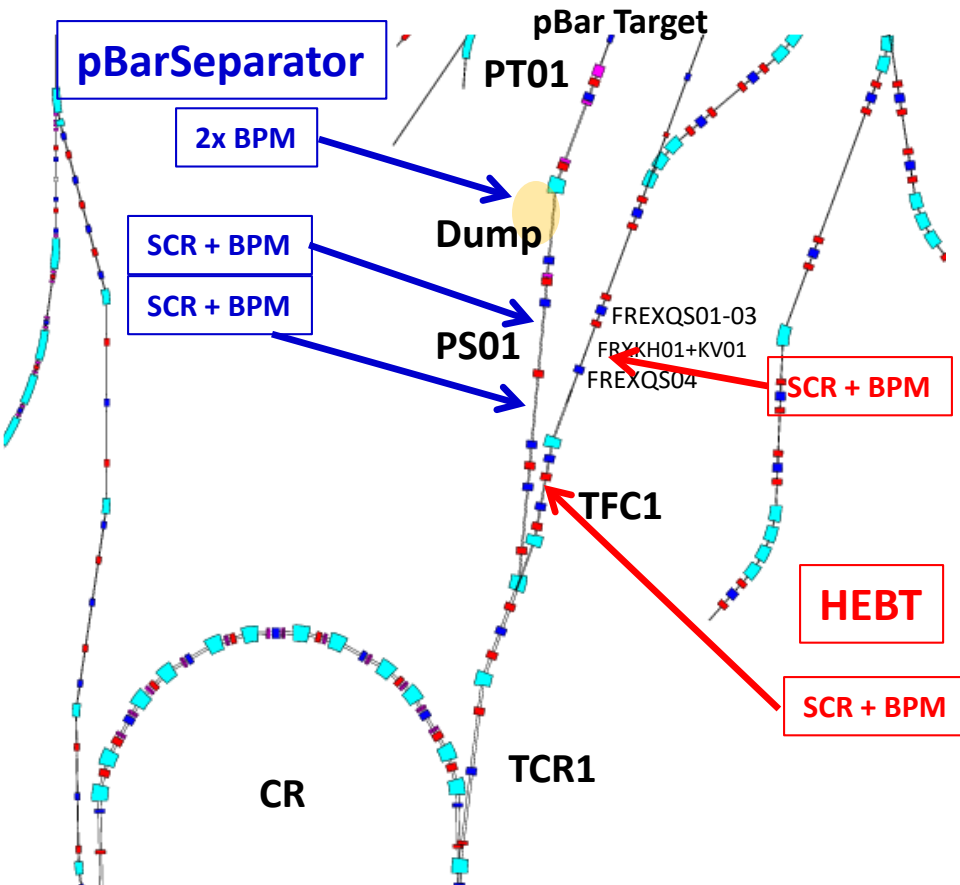
Overview 400 mm Beam Diagnostics

pBar Separator PS01:

- 2x SCR, large design „Type 1“
- 3x BPM (400 x 200) mm, large design „Type 1“
- 1x BPM (400 x 400) mm, as SFRS unit

HEBT beam lines FREX and TFC1

- 2 SCR, large design „Type 1“
- 2x BPM (400 x 200) mm, large unit „Type 1“



5x BPM (400 x 200) mm without corrector
1x BPM (400 x 400) mm

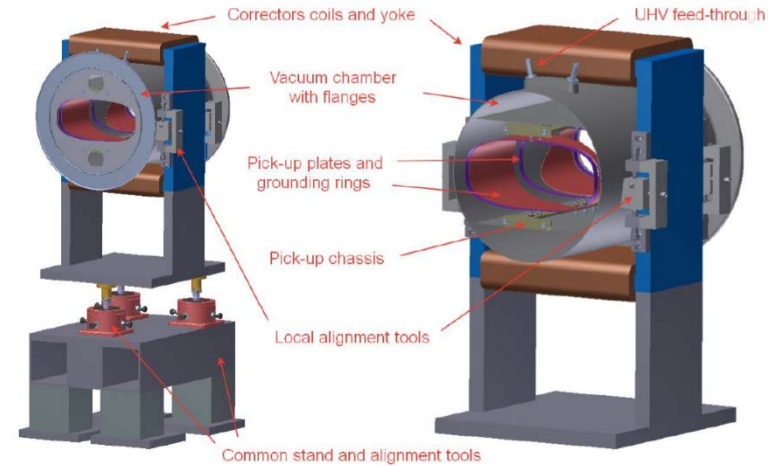
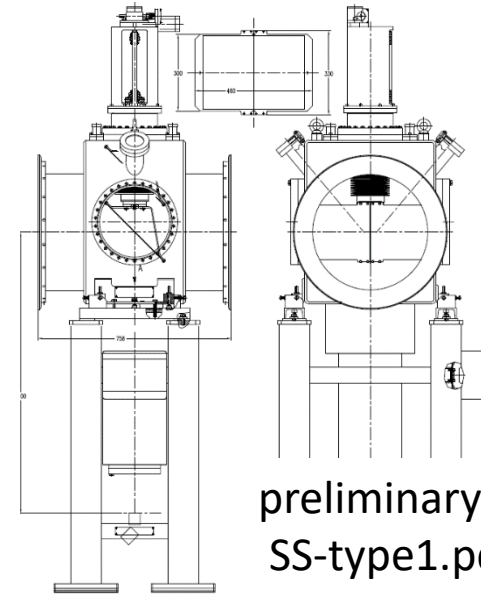


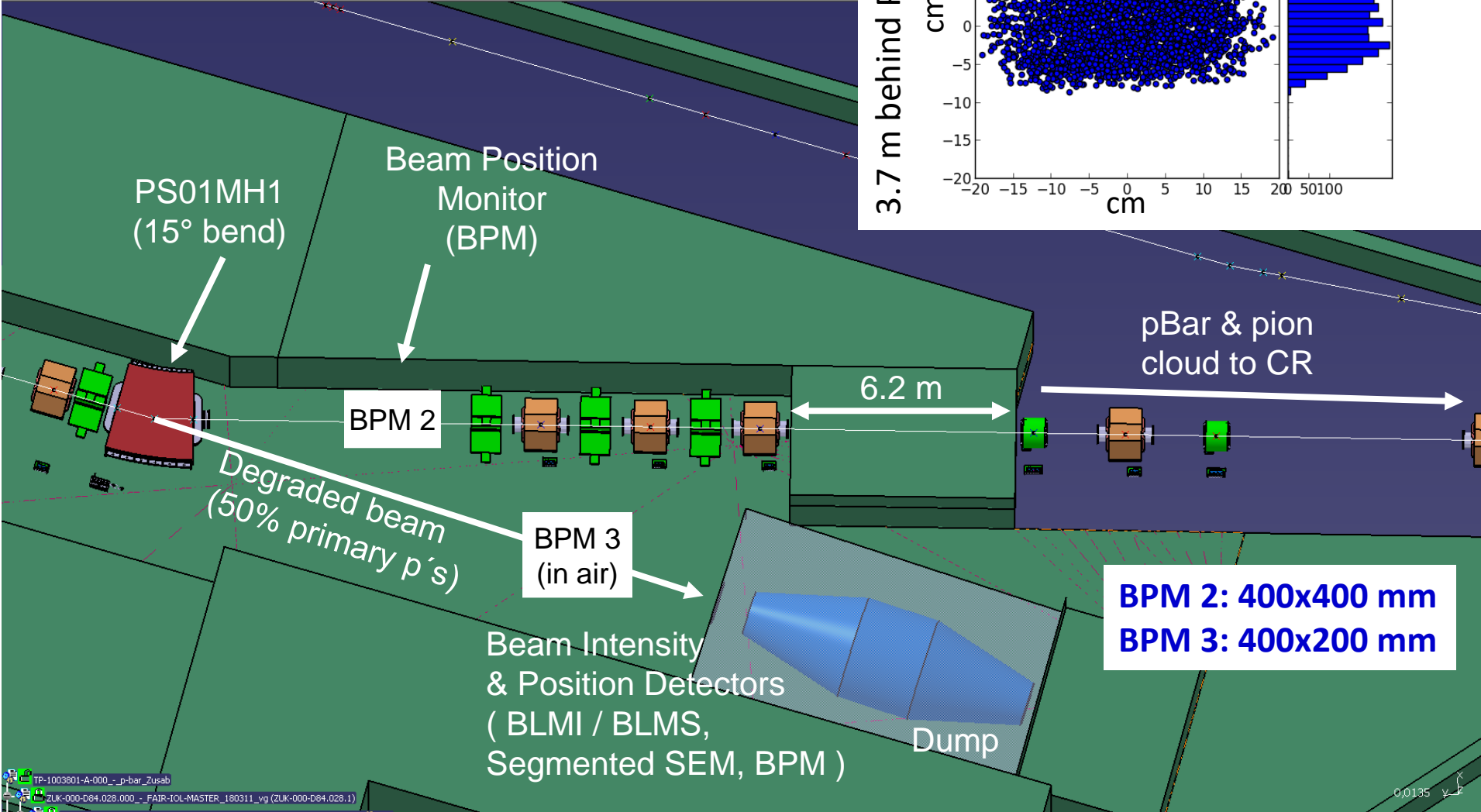
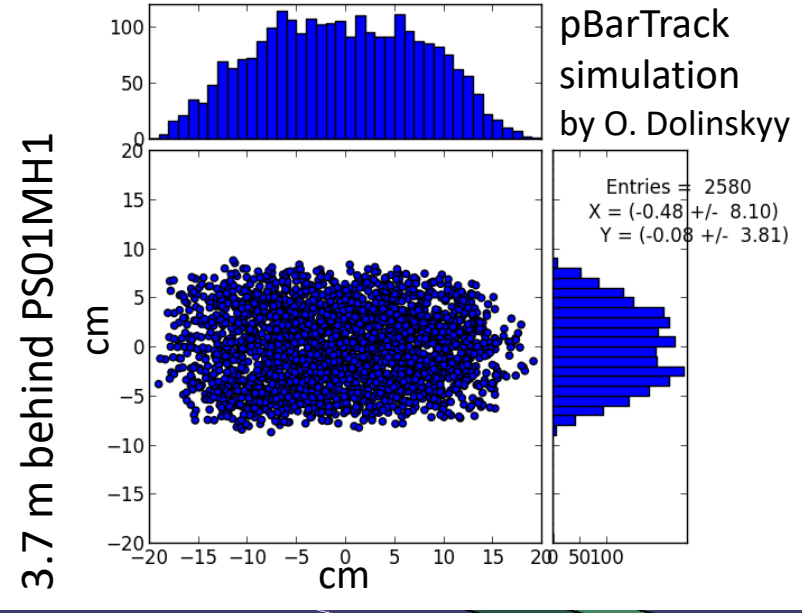
Figure 7: Preliminary 3D model of BPM "Type 1" inside corrector with vacuum vessel and stand.

4x SCR, large design with scintillator

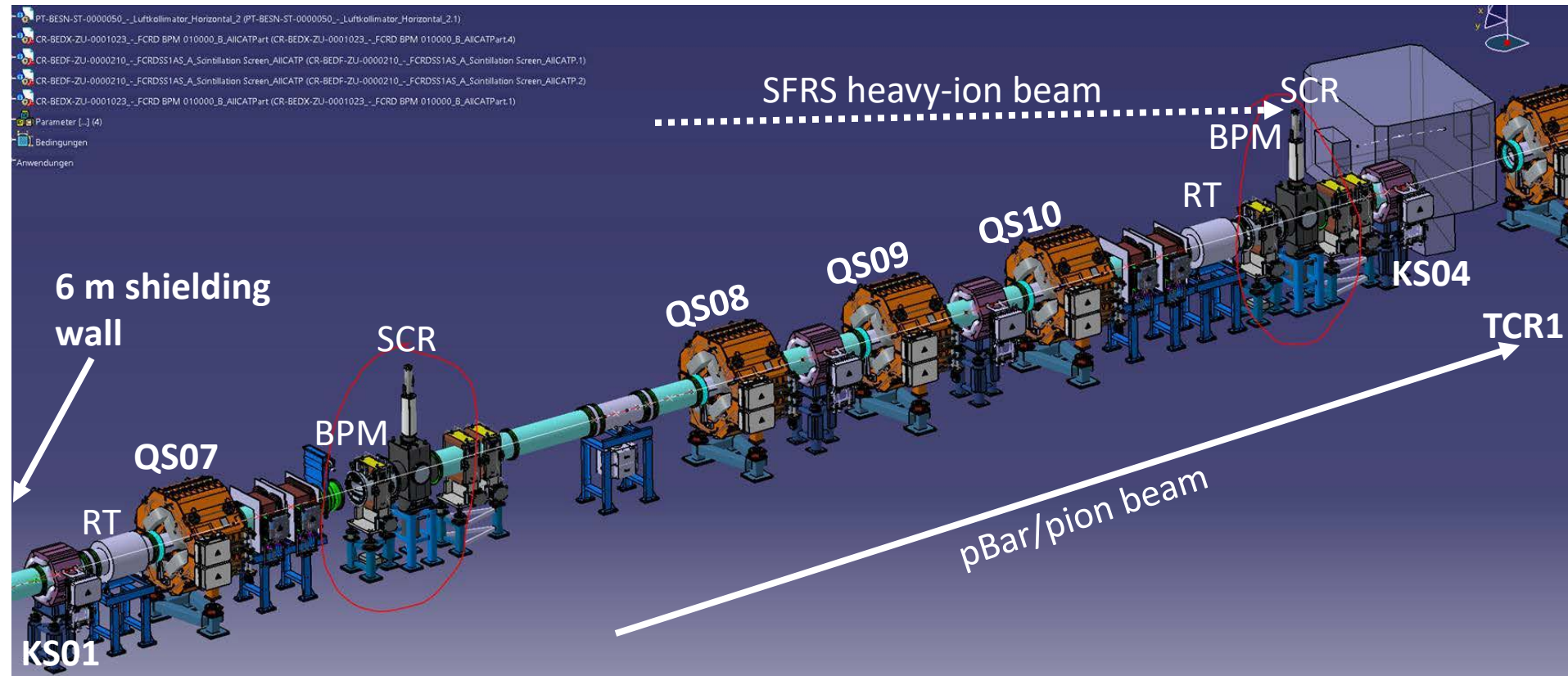


preliminary 2D drawing:
SS-type1.pdf

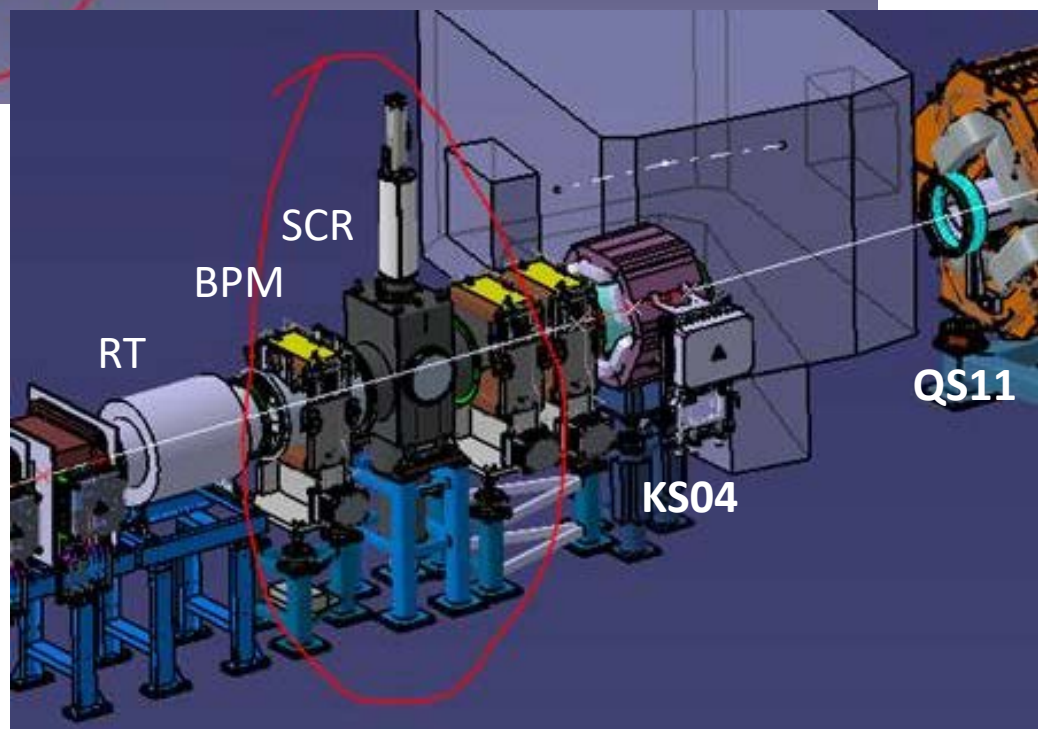
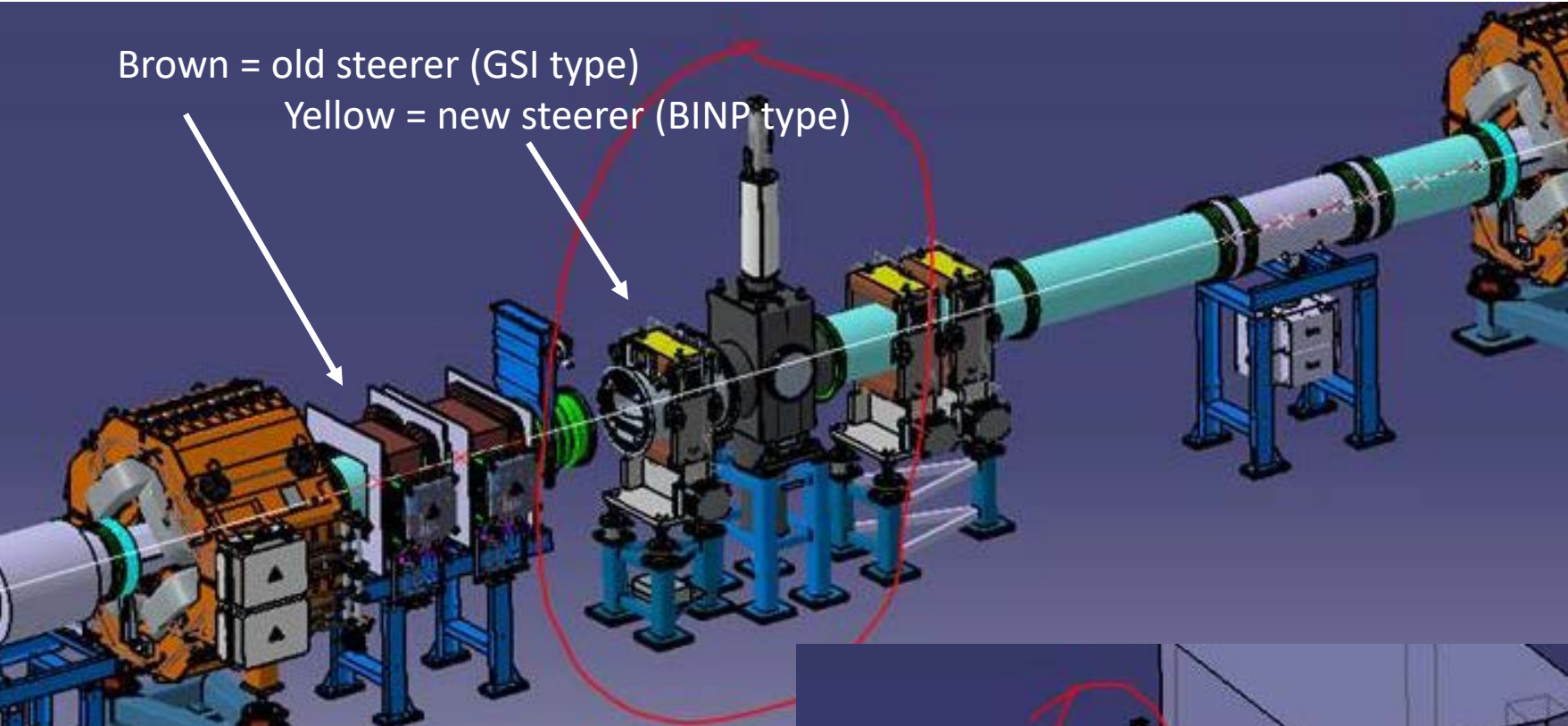
pBar Target Hall „Dipole 1“ PS01MH1 & Tunnel 103 (H0209A)



PS01 Beam Line with 3D models of BPM and SCR



- **DMU check:** 3D models provided by BINP (email Y. Rogovsky, 26th June 2020) were included into the current layout by R. Hettinger. Their positions are indicated by red circles.
- Correction steerers are shown in GSI design (brown) and new BINP design (yellow). **The GSI steerers will be replaced by BINP-type steerers.**
- **It seems an option to install the two TCR1-type PS01 BPMs in the corrector magnets.**
- In this case the BPM positions would move up- or downstream into the vertical correctors.
- The Resonant Transformers (RT) will be shorter than 1050 mm as in the drawings.



Notes:

- a) Some steerers in the 3D model are to be replaced by shorter BINP version.
- b) Near both BPM installation locations a pair of corrector magnets is foreseen.
- c) Installation, especially at the 2nd position near the end of PS01, will help to reduce component density.
- d) RT will be shorter than shown here.

Updated Table of 400 mm Beam Diagnostics (BPMs and Screens) / Nov. 2020

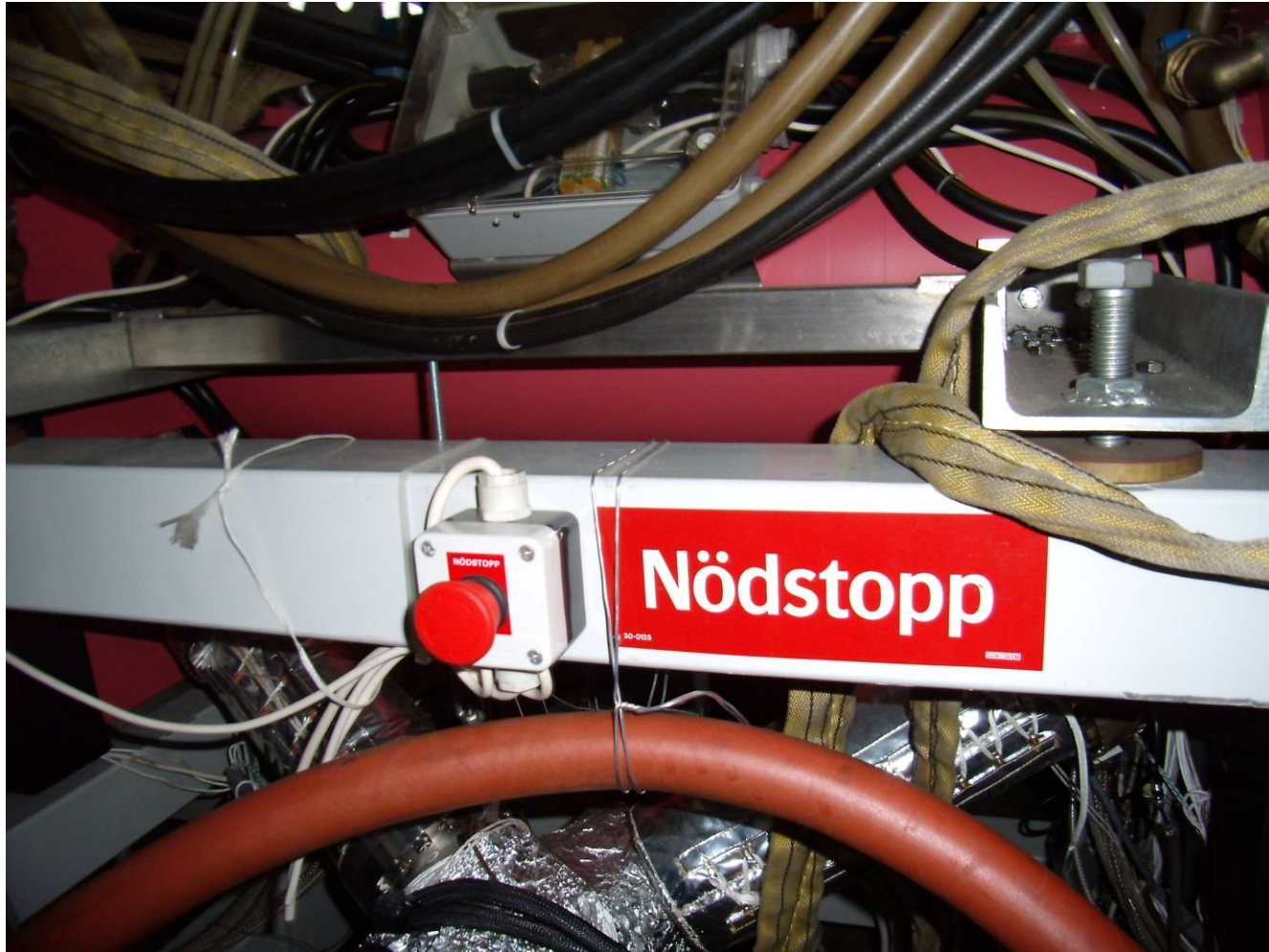
A. Reiter 10th November 2020

Subproject	Det. type	No. of devices	PSP Code acc. to V7.16	Component	Aperture (mm x mm)	Comments	
pBar Diagnostics	BPM	1	2.9.6.2.1.1	Pick-up	400 x 300 => 400 x 400	GSI in-kind, vertical aperture > 300 mm sufficient, => same type as for SFRS target area OK	
		1	2.9.6.2.2	vacuum chamber		GSI in-kind	
		1	2.9.6.2.3.0	Mechanics others		GSI in-kind	
		1	2.9.6.2.3.3	Other		GSI in-kind	
	BPM	3	2.9.6.2.1.1	Pick-up	400 x 200 (TCR1 type 1)	GSI in-kind	
		3	2.9.6.2.2	vacuum chamber		GSI in-kind	
		3	2.9.6.2.3.0	Mechanics others		GSI in-kind	
		3	2.9.6.2.3.3	Other		GSI in-kind	
	SCR	SCR	2	2.9.6.3.2.1	Detector	450x300 (TCR1 type 1)	GSI in-kind
			2	2.9.6.3.2.2	vacuum chamber		GSI in-kind
2			2.9.6.3.2.3.0	Mechanics		GSI in-kind	
2			2.9.6.3.2.3.2	Pneumatic Drive		GSI in-kind	
HEBT	BPM	2	2.3.6.4.1.1.1.1	Pick-up	400x200 (TCR1 type 1)	FAIR, there is no separate PSP code for 400 mm HEBT BPMs and its sub-components!	
		2	2.3.6.4.1.2.1	vacuum chamber		FAIR	
		2	2.3.6.4.1.3.2	Mechanics		FAIR	
	SCR	SCR	2	2.3.6.5.2.1	Detector	450x300 (TCR1 type 1)	FAIR, there is no separate PSP code for 400 mm HEBT SCRs and its sub-components!
			2	2.3.6.5.2.2	vacuum chamber		FAIR
			2	2.3.6.5.2.3.0	Mechanics incl. pneumatic drive		FAIR

Summary

- DMU check done:
 - BINP components fit in PS01; feedback sent to Y. Rogowsky in July 2020
 - Space in HEBT beam lines was checked in May 2019: OK
 - **Simplification I:** If steerers are delivered by BINP, the two BPMs in PS01 may be integrated into those magnets as for TCR1
 - **[Simplification II: Focus on detector hardware.** No electronics needed as high-impedance amplifiers of HESR type from FZJ will be used.]
 - **Main modification:** DN 400 CF flange; without impact on design
 - **FAIR in-kind office:** Session 6 on contract matters
- ⇒ **There are no technical problems using TCR1 components in pBar Separator or HEBT. Using the same components would be very advantageous!**
- A final technical comment:
 - Electronics for PS01 detectors is installed in CR electronics room.
 - The cable lengths are rather long according to previous planning (~200 m).
- ⇒ If possible, please include me in updates/notifications, if there are planning dead lines.

Thank you for your kind attention !



The End