

Integration P42 line BDF-SHiP

HI-ECN3 Integration

Beatriz Martinez Sutil (BE-EA-DC)

07/11/2024

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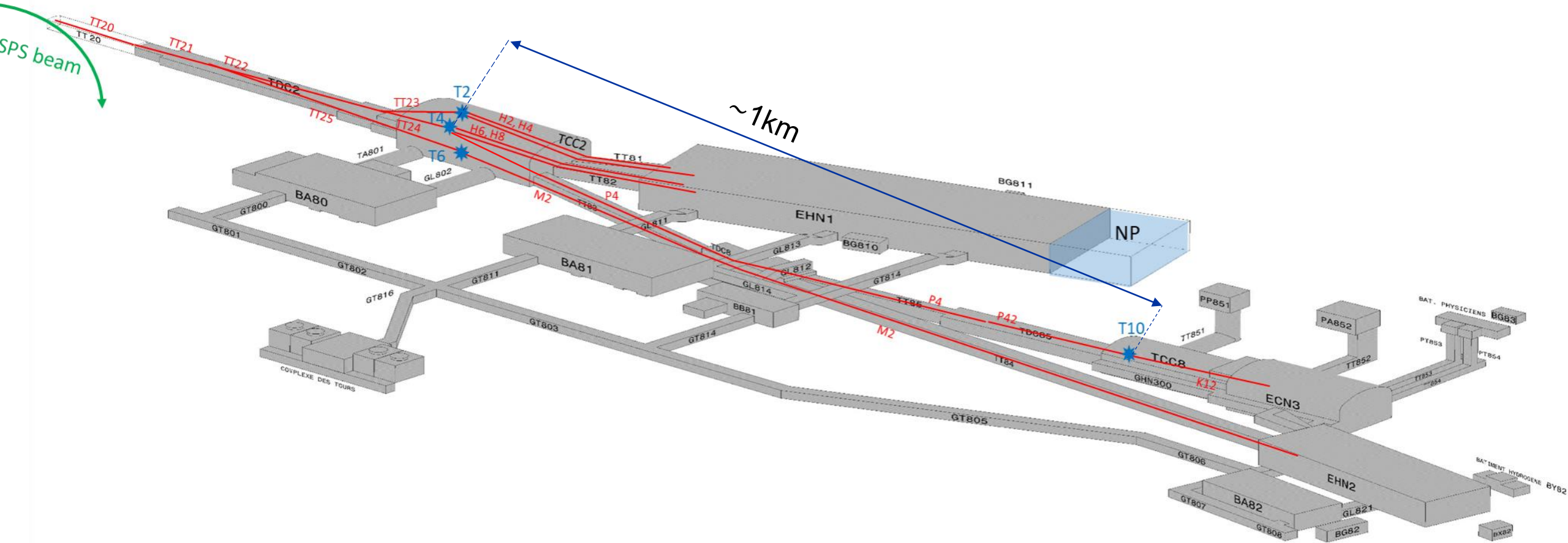
➤ **Beam skeleton study:**

- Analysis of the madx files for the current layout.
- Analysis of current vs new layout in madx files.
- Analysis of the new layout vs SHiP skeleton.

➤ **P42 line changes**

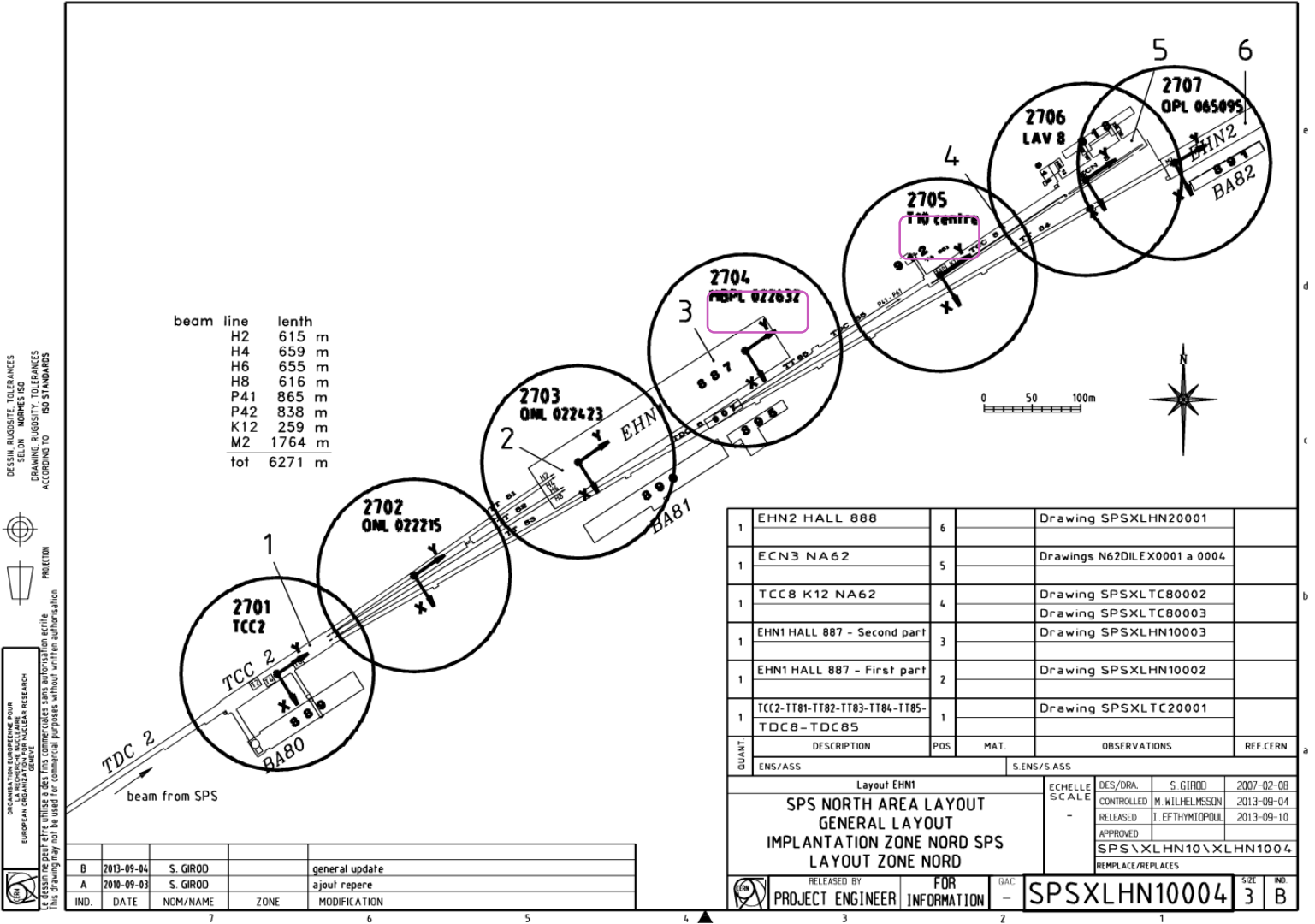
- Changes requested.
- New layout.
- Integration of the new layout.

Introduction: Definition of the P42 line



S. Girod

Introduction: NA CATIA coordinate systems



S. Girod



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➤ Beam skeleton study:

- Analysis of the madx files for the current layout. → Check the accuracy of madx files
- Analysis of current vs new layout in madx files. → Check that the new layout is achieving the objective.
- Analysis of the new layout vs SHiP skeleton. → Check the connection P42-SHiP

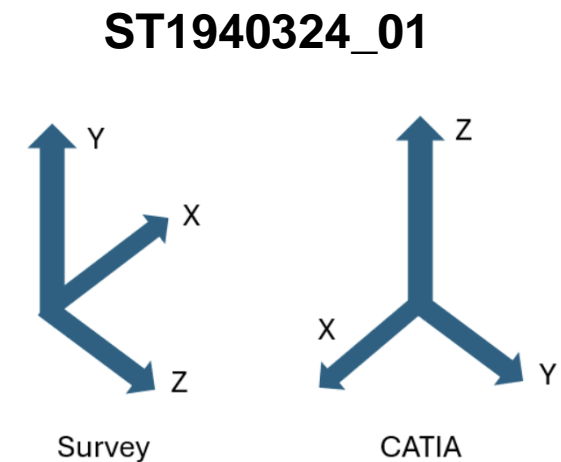
➤ P42 line changes

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Beam skeleton study: Analysis of the current beam line

Analysis of the accuracy of the madx files respect to the current beach files:

- **Old files (beatch, 2021)**
- **New files (madox, 2024)** —————> 2 types of data import



Beam skeleton study: Analysis of the current beam line

	Distance (mm)					Distance (mm)					Distance (mm)			
	Data import 1	Data import 2 v1	Data import 2 v2	Data import 2 v3		Data import 1	Data import 2 v1	Data import 2 v2	Data import 2 v3		Data import 1	Data import 2 v1	Data import 2 v2	Data import 2 v3
QNL0430111	0.267	0.267	0.267	0.267	MBN0430565	0.589	0.59	0.59	0.59	QNL0450817	0.965	0.965	0.965	0.965
MCX0430171	0.401	0.401	0.401	0.401	TCX0430631	0.209	0.209	0.209	0.209	MCX0450820	0.901	0.902	0.902	0.902
QNL0430169	0.48	0.481	0.481	0.481	XCHV0430683	0.584	0.548	0.548	0.548	MBN.X0430823	8.467	0.92	8.647	0.92
QNL0430226	0.223	0.224	0.224	0.224	XFFH0430708	0.583	0.583	0.583	0.583	MBN0450829	9.765	0.246	9.965	0.246
MCX0430228	0.149	0.15	0.15	0.15	MCX0430715	0.182	0.182	0.182	0.182	MBX0450834	0.728	5.177	3.831	0.706
QNL0430399	0.419	0.419	0.419	0.419	MBN0430724	0.792	0.792	0.792	0.792					
XFFV0430515	0.435	0.435	0.435	0.435	MBN0430735	0.357	0.357	0.357	0.357					

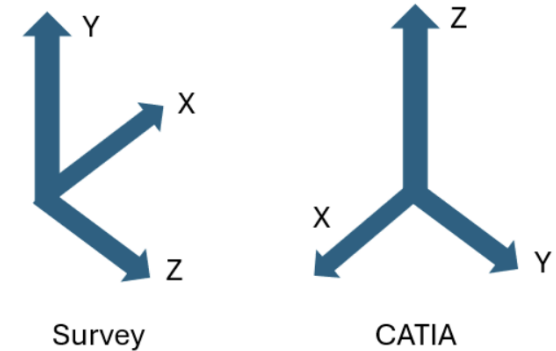
Data provided by Fabian and Dipanwita

Table 1. Distance in each reference point between the madx and the beach out files.

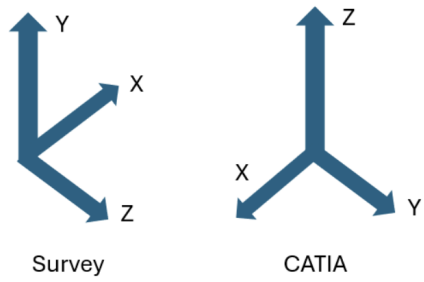
Beam skeleton study: Analysis of the new layout

Analysis of current vs future beam skeleton:

- **Current beam line (madx, 2024).**
- **Post LS3 beam line (madx, 2024).**



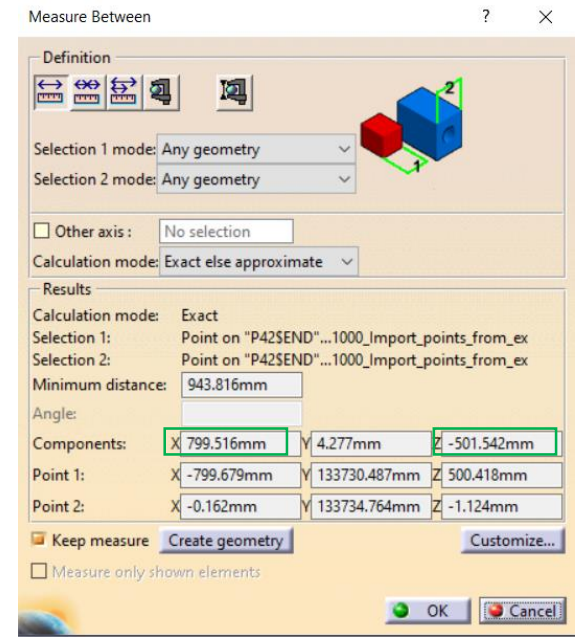
Beam skeleton study: Current (survey) vs Post LS3



P42 beam line end



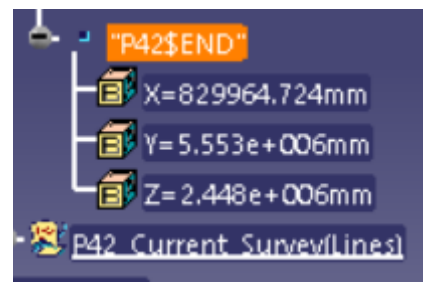
Offset of 0.5m in Y and 0.8m in X (survey coordinate system)



CATIA

Madx files

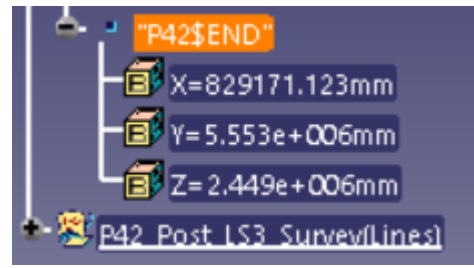
Current beam line



"MBXGD.X0450834"	835.9280007	3.00000139	-0.0033351
"DRIFT_92"	971.795	135.8669993	0
"ENDP42"	971.795	0	0
"P42\$END"	971.795	0	0

-812.6014131	2448.316679	5418.144281
-829.9647239	2448.247895	5552.897211
-829.9647239	2448.247895	5552.897211
-829.9647239	2448.247895	5552.897211

Post LS3 beam line



"MBXGD.X0450834"	847.9280013	3.00000139	0.0033351
"DRIFT_90"	971.7950006	123.8669993	0
"ENDP42"	971.7950006	0	0
"P42\$END"	971.7950006	0	0

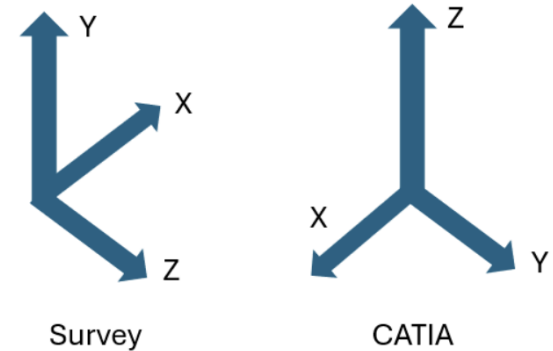
-813.7722976	2448.710192	5430.089311
-829.1711234	2448.749238	5552.995406
-829.1711234	2448.749238	5552.995406
-829.1711234	2448.749238	5552.995406



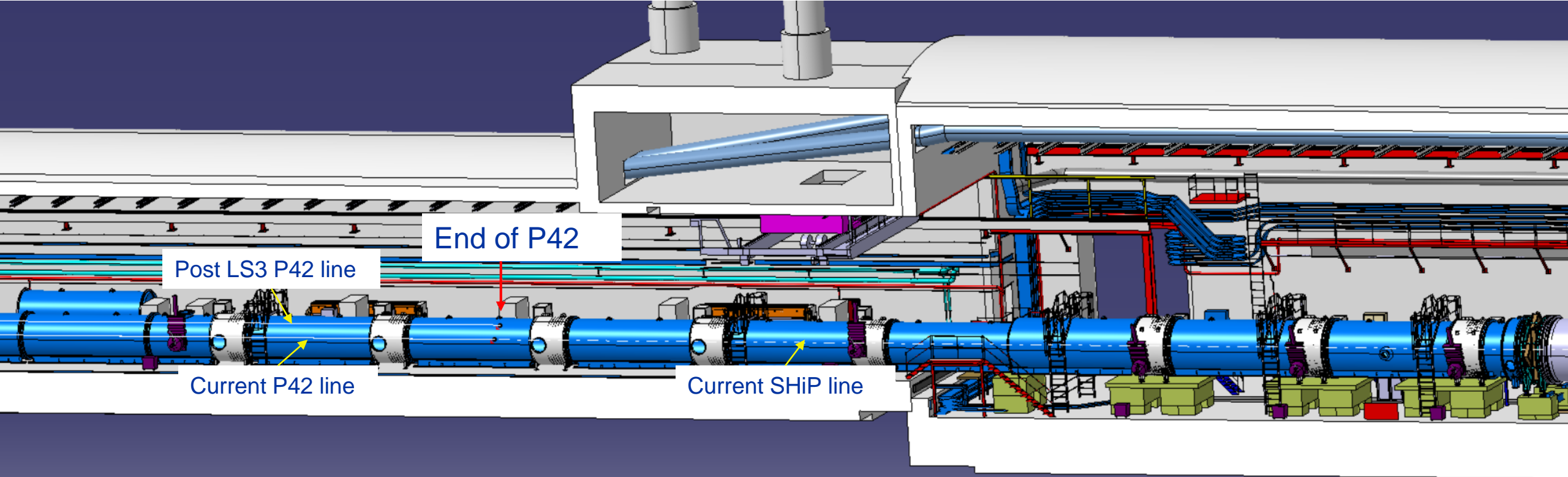
Beam skeleton study: SHiP skeleton

Beam skeleton P42, analysis of the SHiP beam skeleton:

- **New files (madx, 2024).**
- **SHiP skeleton (?).**



Beam skeleton study



Beam Skeleton Detector vs P42

Beam skeleton of the detector NOT UPDATED: Needs follow up

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Changes in the P42 layout

TCC2



TDC85

TCC8

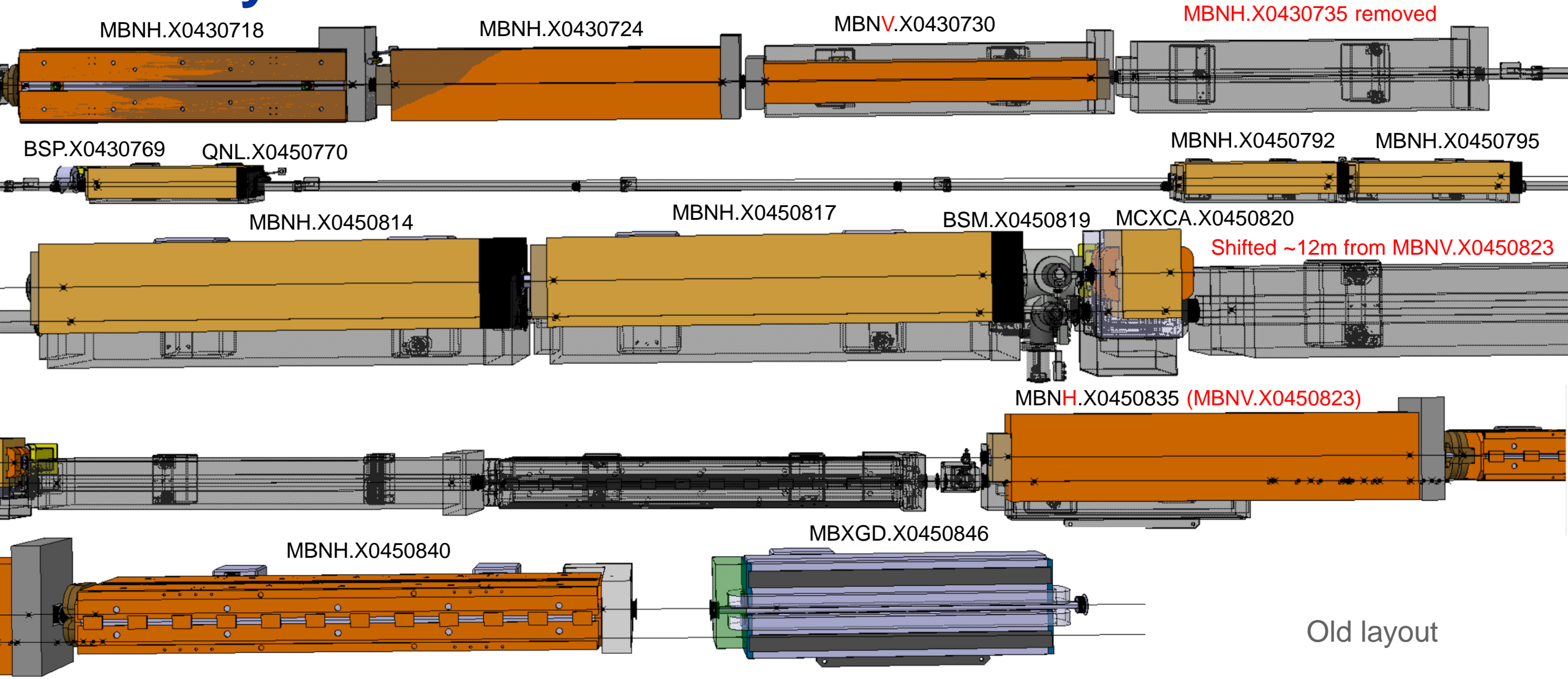
Element	Original position	New position	Original bending angle	New bending angle	Original tilt	New tilt
MSN.X0430029	31.030	47.8950	0.0028	0.00311	-0.0002618	-0.0002618
MSN.X0430022	24.0500	24.0500	0.0014	0.0000441 (for the 10 mm bump case)	-0.0002623	-0.0002623
MBNH.X0430718	720.73013	720.73013	-0.0071455	-0.0059	9.632e-05	9.632e-05
MBNH.X0430724	726.390146	726.390146	-0.0071455	-0.0059	0.0001617	0.0001617
MBNH.X0430730	732.050148	732.050148	0.0029436	-0.001804 (turned vertical)	0.000227	0.5 * pi
MBNH.X0430735	737.710150015	Not used	0.0029436	Not used	0.0002	0.0002
MBNV.X0450823	825.56016	837.56016	0.006963100	-0.000111 (turned horizontal)	1.570969525	0.0
MBNV.X0450829	831.220167	843.220167	0.006025400	0.007300	1.5709695	1.5709695
MBXGD.X0450834	835.928169	847.928169	-0.0033351	0.0033351	1.5709695	1.5709695

Dipanwita Banerjee

[BDF / SHiP line design - CodiMD \(cern.ch\)](https://cern.ch)

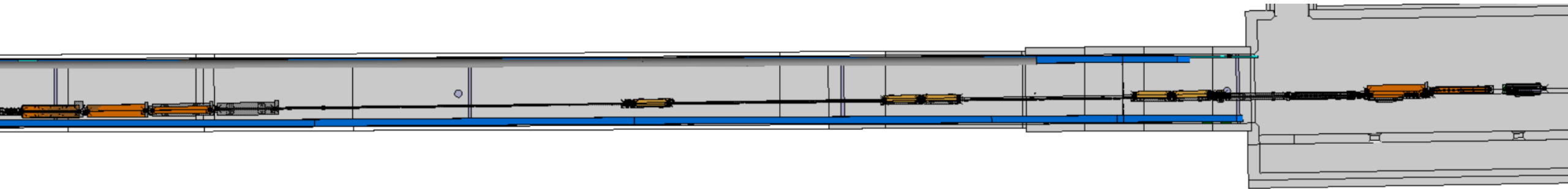
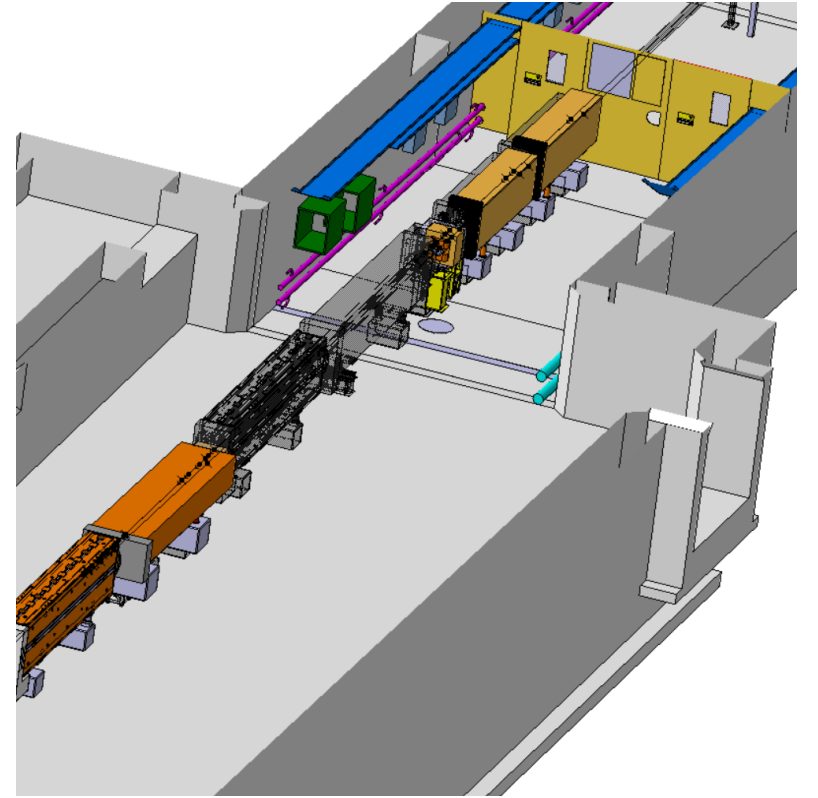
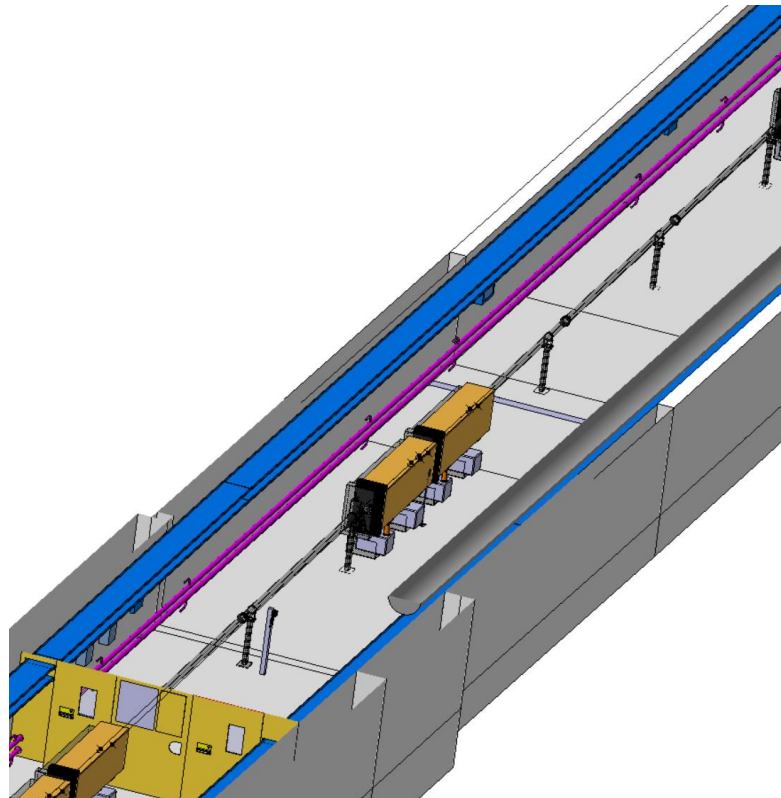
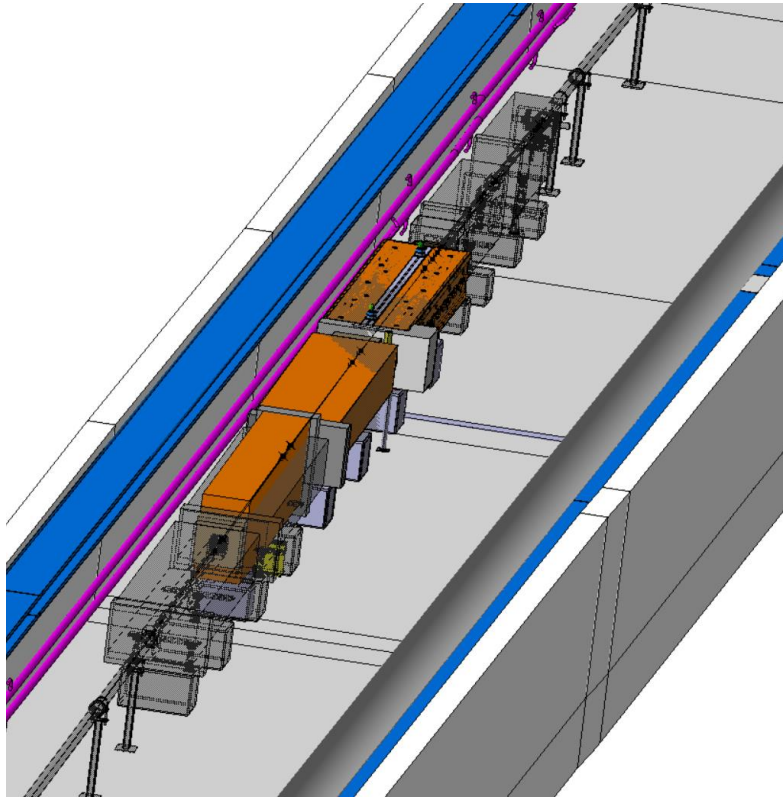


New layout

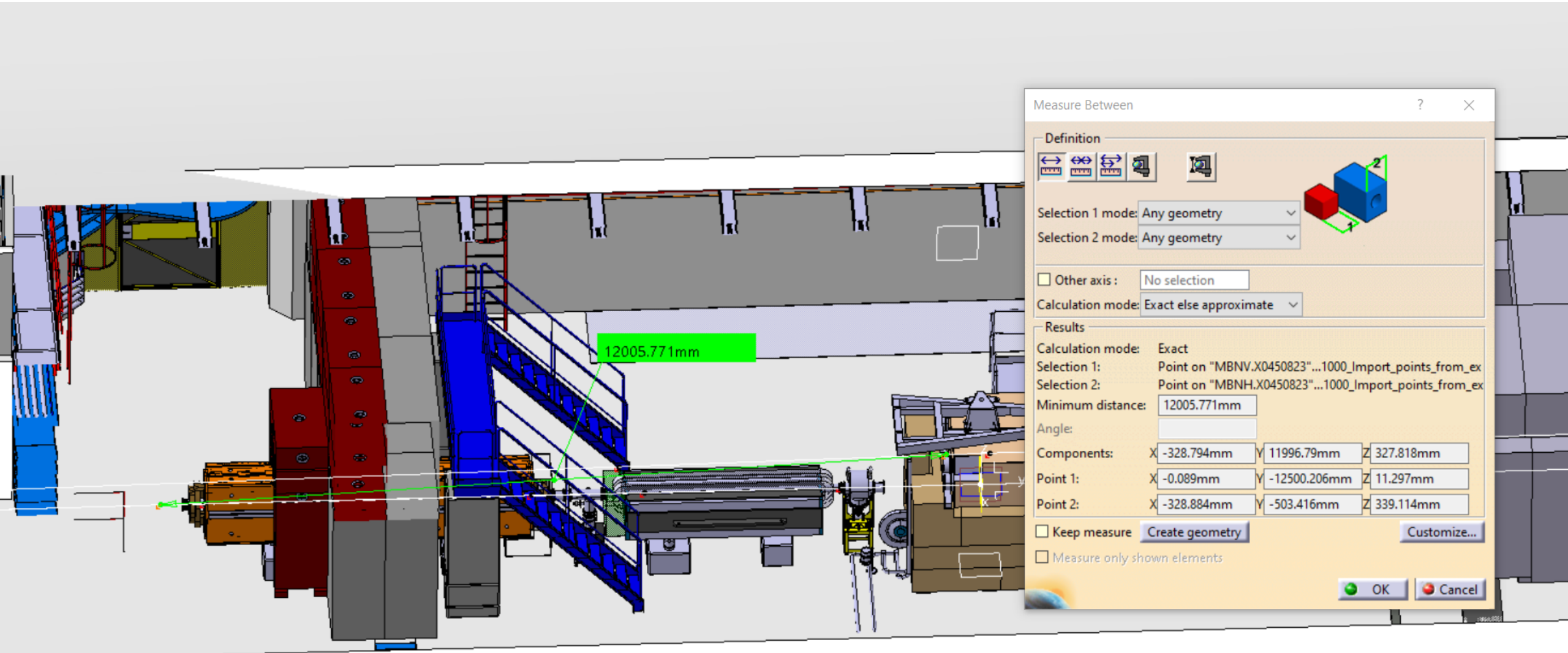


Integration

- Integration: **ST950060_01**
- Layout: **ST194012_01**



Integration

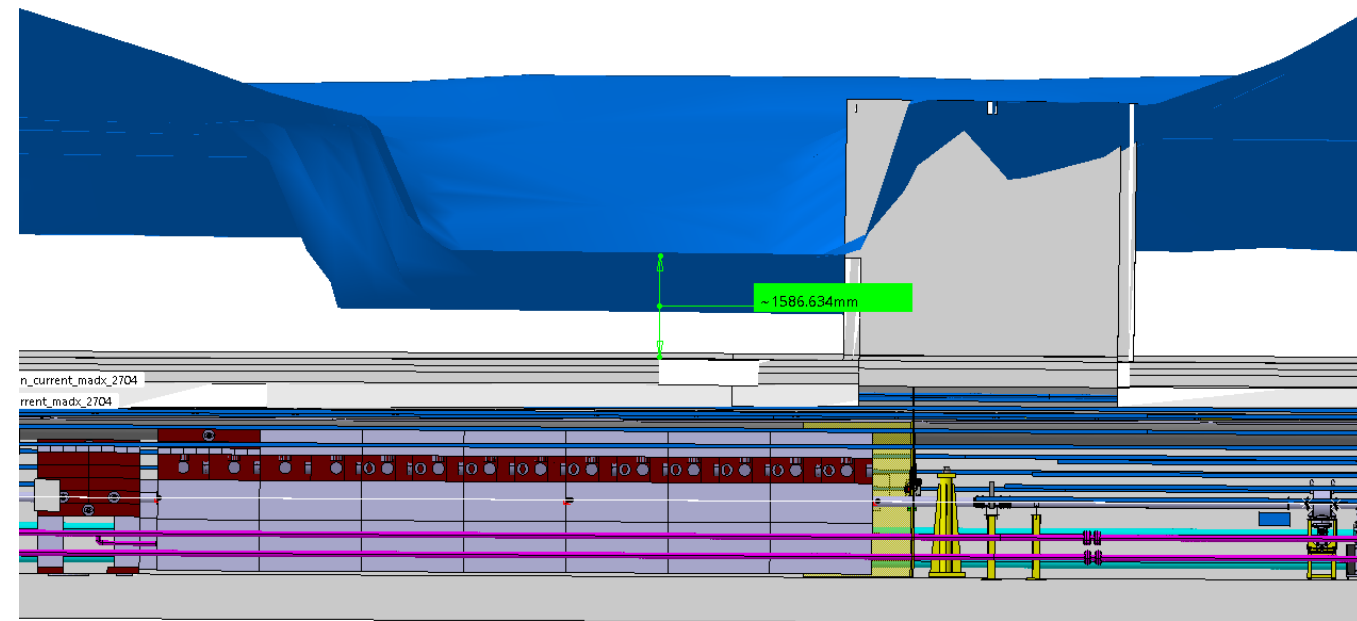


Integration

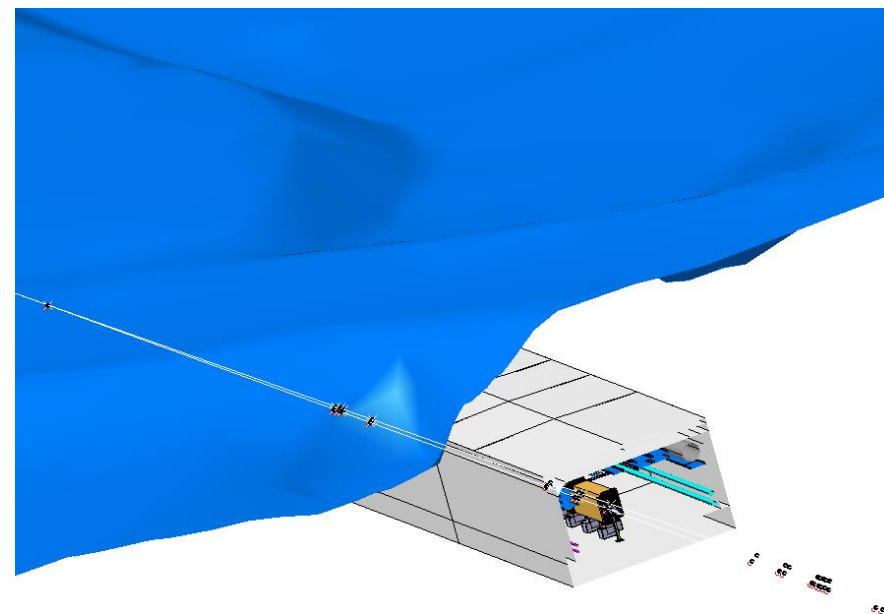


North area soil mesh – ST1949012_01
K.Buffet

Integration



Ramp on top of shielding



Bridge on top of MBNH.X0450792 and MBNH.X0450795



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