

Integration: P42 line and SHiP skeletons

HI-ECN3 Integration

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30/01/2025



- P42 beamline integration
- SHiP skeleton
- Next steps



P42 beamline integration



Reminder: WP4 integration status

CEA#48_minutes.d		
CEA#48_06-12-2024 [NACONS + HI-ECN3]	► Join	
→ 11:00 [NACONS] Complete integration review of BA81 (underground) Fire Detection System Speaker: Iliasse Derrag (BE-EA-DC)	© 1h	
ICEA48 BA81 Exten ICEA48 BA81 Exten		First proposal of the P42 lin
→ 11:10 [HI-ECN3] New beam line skeleton	©10m 🕑 🕶	presented
New beam line skeleton for HI-ECN3 and impact on current beam line (TDC85, TCC8) Speaker: Beatriz Martinez Sutil (CERN)		
P42Layout_ICEA_4		
→ 11:20 [HI-ECN3] Services rerouting around p42 dump in TT83 Speaker: Beatriz Martinez Sutil (CERN)	©10m 🕑 -	
P42DumpIntegratio		911 new door integration
→ 11:35 [HI-ECN3] New 911 doors final revision Speaker: Beatriz Martinez Sutil (CERN)	© 15m 🕝 👻	validated
B911Door_ICEADec 😥 B911Door_ICEADec		
→ 11:45 [HI-ECN3] 3D models organization Speaker: Beatriz Martinez Sutil (CERN)	© 10m 🖉 🗸	→ HI-ECN3 models location
3DOrganization_ICE 3DOrganization_ICE		
→ 12:00 [HI-ECN3] Relocation of service trench between B.911 and B.912	③ 15m	



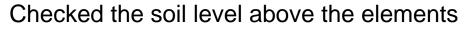
P42 beamline constraints

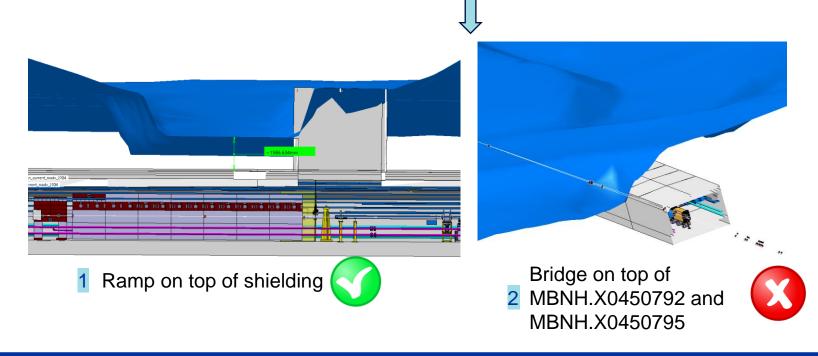
P42 v.1 beamline MADX file received on November 2024 where a few modifications were needed.

New P42 line MADX files will be provided with:

- Last bend: Vertical angle adjusted.
- MBNH.X0450792 and MBNH.X0450795 relocated.
- Beam dilution system.
- BSG upstream the target,

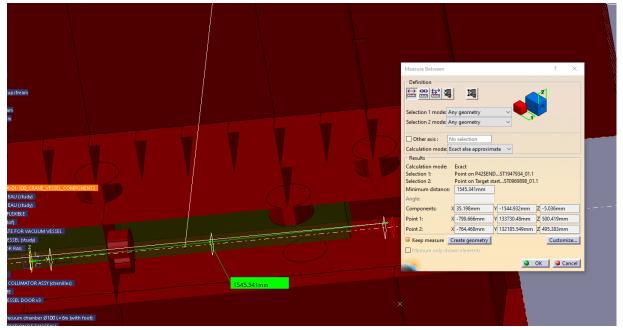


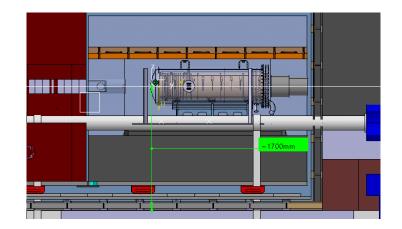




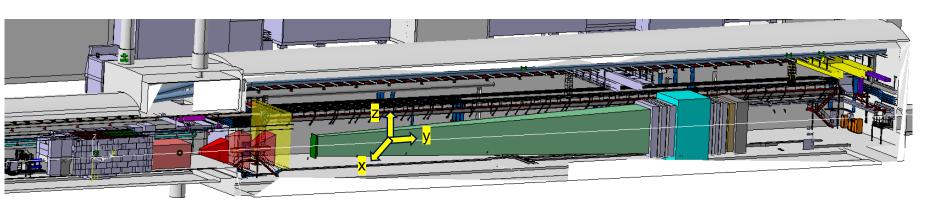


P42 v.1 beamline integration I





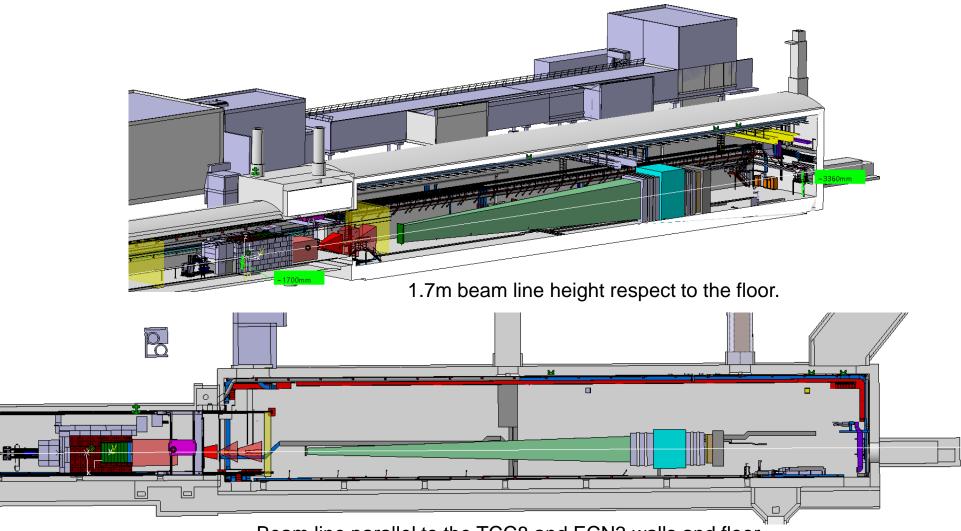
P42 v.1 END is 1.5m downstream respect to **P42 v.0 END** skeleton. In X and Z there is almost no difference.



(Y) along the beam lineto be defineddepending in theintegration constraints



P42 v.1 beamline integration II

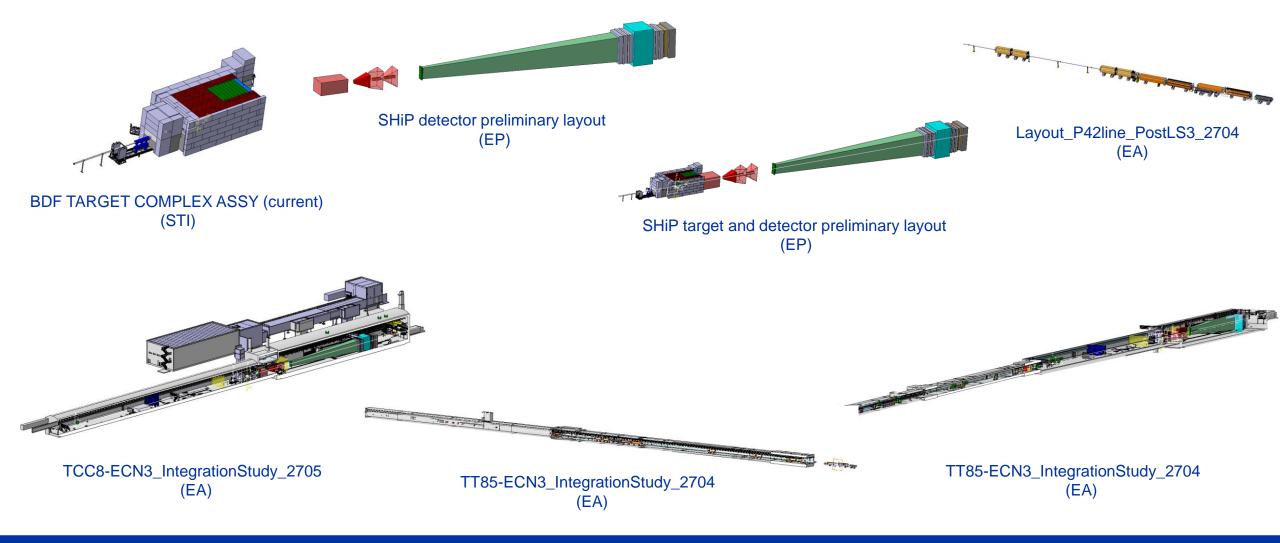


Beam line parallel to the TCC8 and ECN3 walls and floor.



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Overview of <u>baseline</u> models I





Overview of <u>baseline</u> models II

Name	Reference	C.S.	Responsability	Description
BDF TARGET COMPLEX ASSY (current)	ST1884082_01		SY-STI	Study of the new target design.
SHiP detector preliminary layout	ST1718677_01		EP-SME	Study of the detector design.
SHiP target and detector preliminary layout	ST1606501_01	2705	EP-SME	Integration detector + target in the SHiP skeleton.
TCC8+ECN3_IntegrationStudy_2705	ST1967028_01	2705	BE-EA	Integration of "SHiP target and detector preliminary layout" in TCC8-ECN3 cavern. Integration of the new C.Eng. models.
Layout_P42line_PostLS3_2704	ST1949012_01	2704	BE-EA	New P42 line layout study.
TT85+TDC85_IntegrationStudy_2704	ST1950060_01	2704	BE-EA	Integration of "SHiP target and detector preliminary layout" in TT85-TDC85 cavern.
TCC8-ECN3_IntegrationStudy_2704	ST1967062_01	2704	BE-EA	Integration of "TCC8+ECN3" and "TT85+TDC85" studies

Table 1.- Summary of the HI-ECN3 study models



Beamline & SHiP skeletons



Beam skeletons overview

- Understand the different skeleton used in the model.
- Agree on the integration skeletons.



Name	Reference	C.S.	Responsability	Description
P42lineSkeleton_PostLS3_v.2_2704	ST1947934_01	2704	BE-EA	New P42 line imported from MADX files.
Beatch p42_2021	ST1538313_01	2704	BE-EA	Current P42 line imported from beatch files.
SHiP detector preliminary layout	ST1718677_01		EP-SME	Detector design study with the skeleton inside as geometrical set.
CER-699-001-02-001_SKELETON	ST0969898_01		SY-STI	Separate part. Used in the BDF target.
Beam SHiP Skeleton - 2705	ST1987588_01	2705	BE-EA, EP-SME	Simplified skeleton used to place SHiP inside ECN3 respect to 2705 origin.

Table 2.- Summary of the skeletons used in TCC8-ECN3.



SHiP skeleton definition

- Proposal:
 - Target skeleton inserted in BDF TARGET COMPLEX ASSY.
 - Detector skeleton in an independent part from SHiP detector preliminary layout
 - Relation of SHiP respect to the P42 line, can be integrated in the MADX P42 beamline in 2705?

١î	ST1606501_01 (ST1606501_01.2) SHiP target and detector prelimin	hary layout	Contraction of the second second second	the second se
	ST1606501_01 (ST1606501_01.2) SHiP target and detector prelimin ST1718677_01 (ST1665376_01.1) SHiP detector preliminary layo	ut 📉 🕅		the second contraction of the second
	-6 ST1718677_01		No.	
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	- wy yz plane			
	- Zx plane		S Martin IT	E IM .
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	A ST DECAY VOLUME			
	SURROUND BACKGROUND TAGGER			
	STRAW TRACKER TANDEM 1			
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	STRAW TRACKER TANDEM 2			
	A STIMING DETECTOR			
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	№ 5T1381708_01 (ST1381708_01.3) BONHOMME			
	Mur separation (Product1.13)			
	ST1714600_01 (ST1714600_01.1) simplified vacuum chamber Ø	100 L = 6m (with foot)		
	* 511714123_01 (ST1714123_01.1) INSTRUMENTATION DE FAISCI	AU		
	Ligne chambre a vide Ø200 (Product1.17)			
	ST1612724_01 (ST1612724_01.1) Ventilation_doors_draft			
	511884062 01 (ST1884062 01.1) BDF TARGET COMPLEX ASSY (urrent)		
	★ 📆 ST1987588_01 (ST1987588_01.1) Beam SHiP Skeleton - 2705			
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	Constraints			
	ST1950060_01 (ST1950060_01.1) TT85+TDC85_IntegrationStudy_270	1		
	5T1947934_01 (ST1947934_01.2) P24line_Skeleton_PostLS3_2704			
	ST0963836_01 (ST0963838_01.1) CER-699-001-02-001_SKELETON			
	5T 1987588_01 (Part1.2) Beam SHIP Skeleton - 2705			
- 2	Constraints			



Detector skeleton

	🕂 🏂 ST0969898_01 (ST0969898_01.1) CER-699-001-02-001_SKELET
	4-# ST0969898_01
	🖅 xy plane horyzontal
	🗝 yz plane vertical
	🖛 🖛 zx plane target start (vessel)
	♣-Ĵ+ Axis Systems
	– 🗱 <u>PartBody</u>
	📥 😤 Geometrical Set. 1
	🗭 🖞 Target start
	🕈 🍯 Target end
	🕶 🖉 Beam Axis
2	🕈 🛹 Floor level
•	– 🛹 Traget end (vessel)
	🕶 🛹 Start of passive cast iron shielding
	🕂 🛹 End of passive cast rion shielding
	🕶 🛹 Start of cooled cast iron shielding upstream
	🕈 🛹 End of cooled cast iron upstream
	🕶 🖛 Start of cooled cast iron downstream
	🕈 🛹 End of cooled cast iron downstream
	🕶 🛹 Start of US1010 shielding
	🕶 🖛 End of US1010 shielding
	🕂 🛹 Front face first plate of the target
	🕶 🖛 Rear face last plate of the target
	🕈 🖛 Hot Cell Start
	🕶 🛹 Centre of Target/Hot Cell
	🖙 🛹 Hot Cell Floor
	Target skeleton
	今 ¹ 茨 ST1987588_01 (ST1987588_01.1) Beam SHiP Skeleton -
	← 🖓 sT 1987588_01
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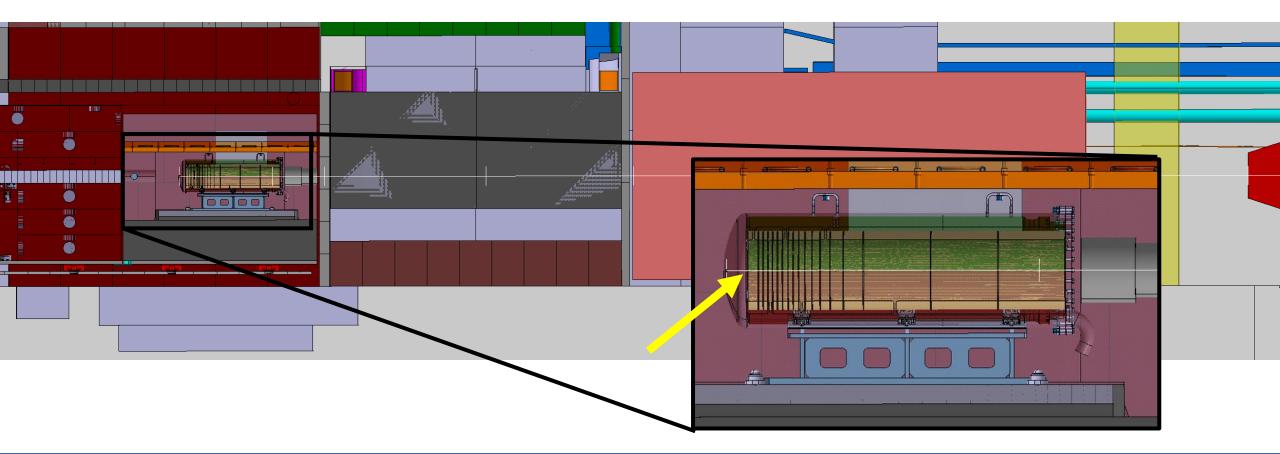
Relation of SHiP respect to the P42 line

SHiP beam skeleton



SHiP origin

• SHiP origin at the target front face centered in the target first disc.





Next steps



Next steps

- Define the target SHiP origin position along the beamline.
 - Integrate the ECN3 drainage system.
 - Update spectrometer magnet pit dimensions.
 - Look at the ventilation doors position.
- Reorganise the SHiP & target skeletons.
- Implement then the new P42 MADX files with the updated SHiP origin and all the mentioned changes.



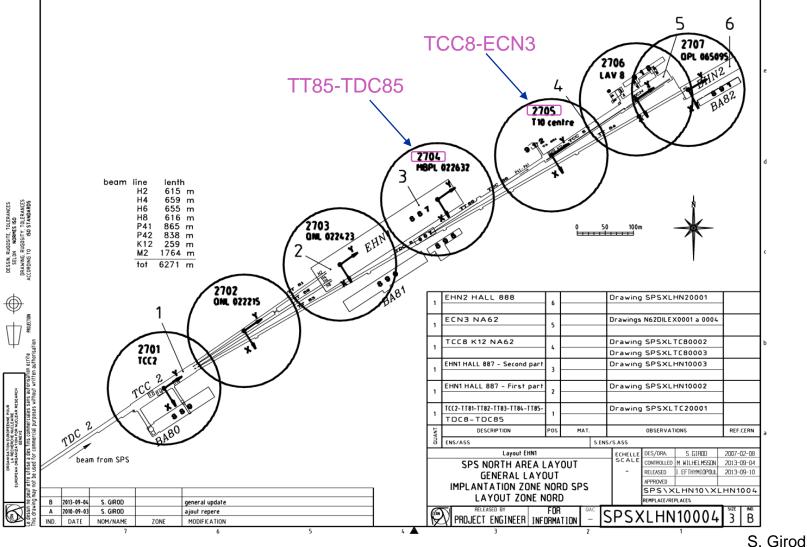


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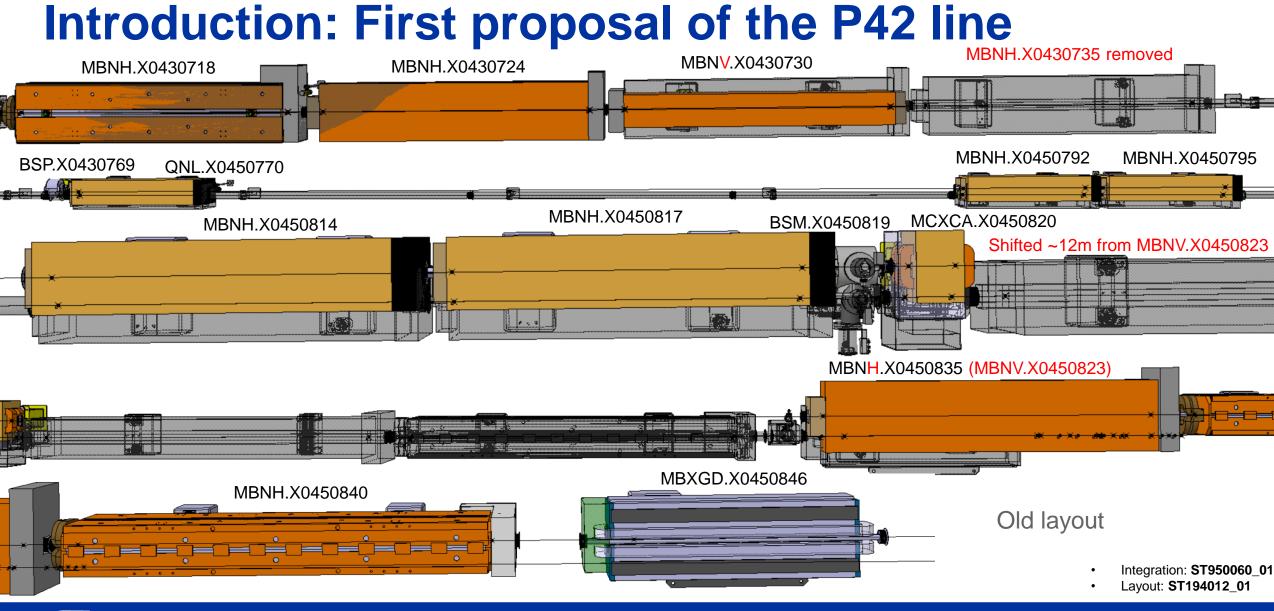
BACK UP SLIDES



Introduction: NA CATIA coordinate systems







30th January 2025

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