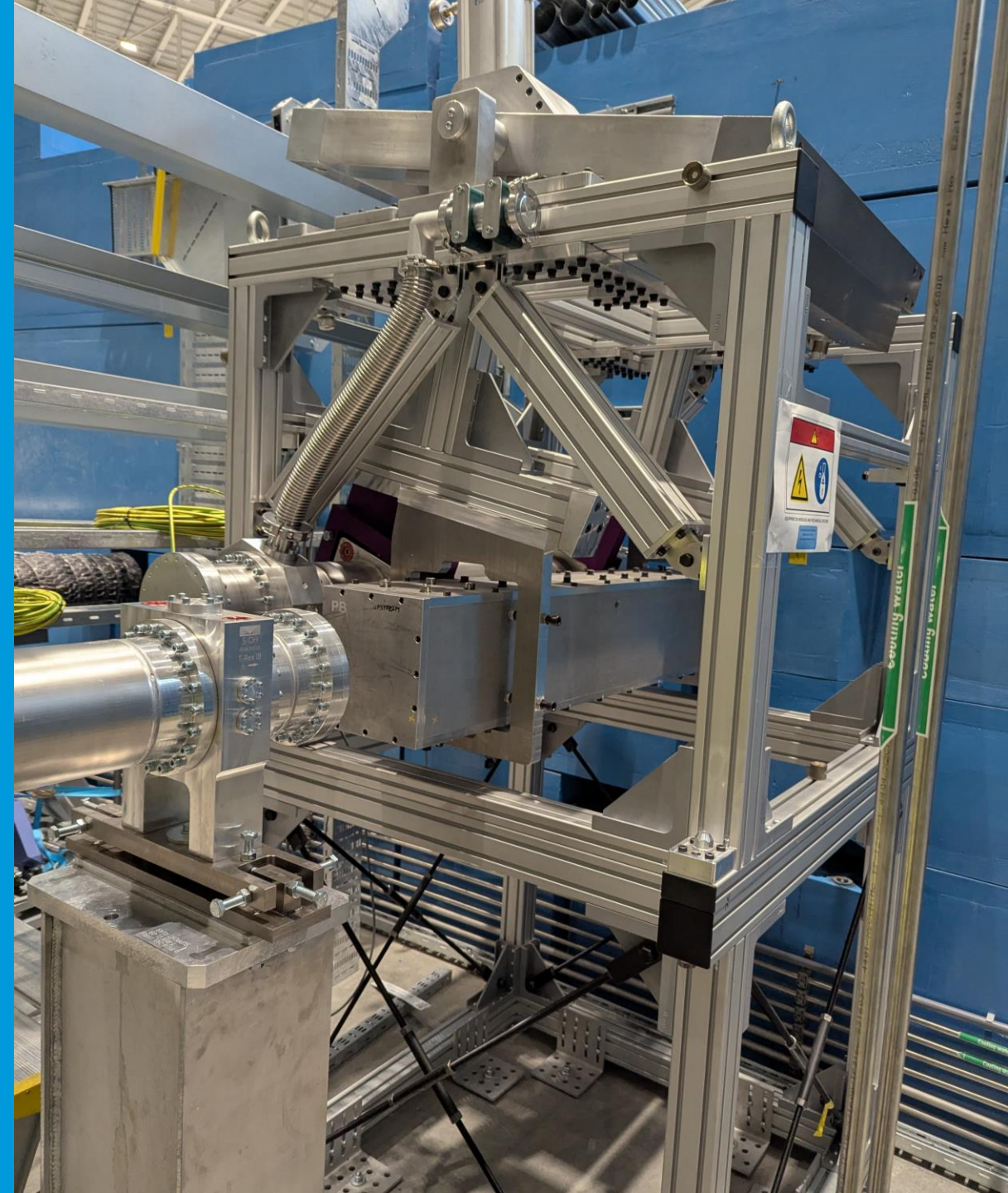


Instrument Safety Shutter

A overview for the review committee

HANNES LARHEDEN

Technical Overview

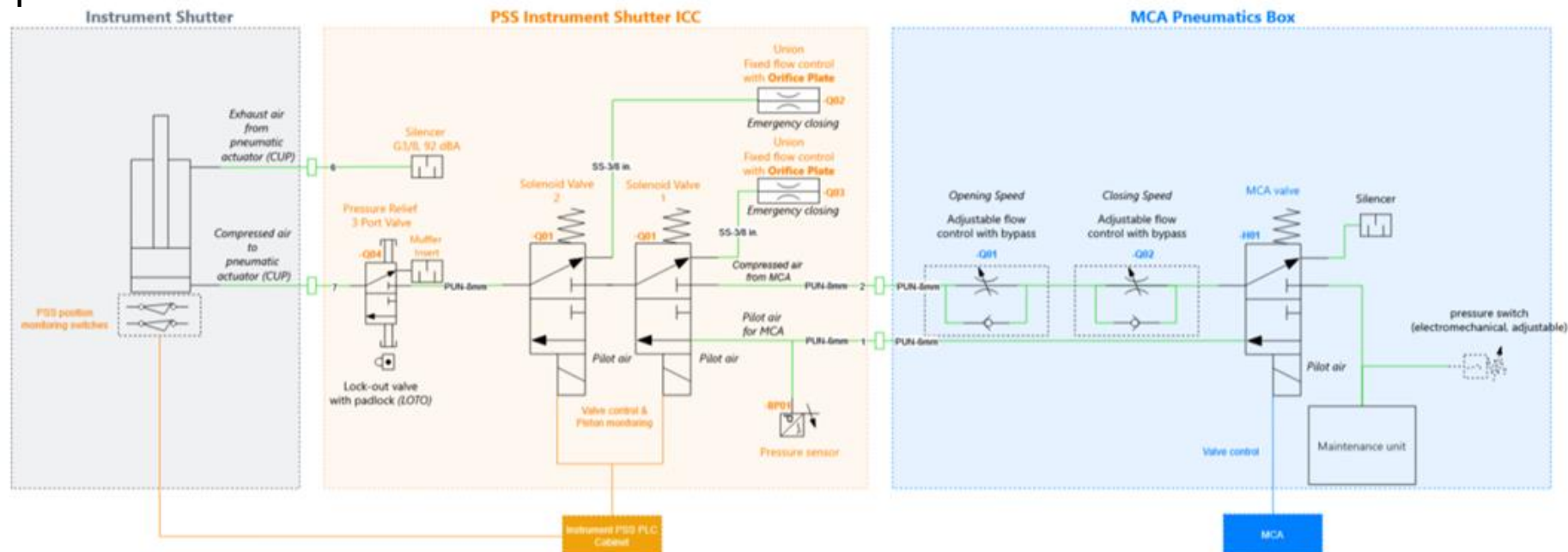


Instrument Safety Shutter overview



Shutters are critical safety devices installed upstream of sample positions on beamlines. They serve to isolate the beam and prevent unintended exposure during maintenance, commissioning, or fault conditions. Each shutter integrates mechanical, pneumatic, and control components to ensure reliable operation.

- Radiological Safety functions: Shield personnel from radiation; prevent beam propagation during interlock faults.
- RSF-P-NSB-L1-026-Shield Inert Shutter
- WRSF-P-NSI-L1-002-Shield Active Shutter



Breakdown



15 beam shutters composed with mechanical assembly a pneumatic actuator and a control system linked to PSS and MCA. A shutter is fitted to each beamline of the sample position.

Most of the shutters are located inside the bunkers but others are housed within the shielding of individual beamlines.

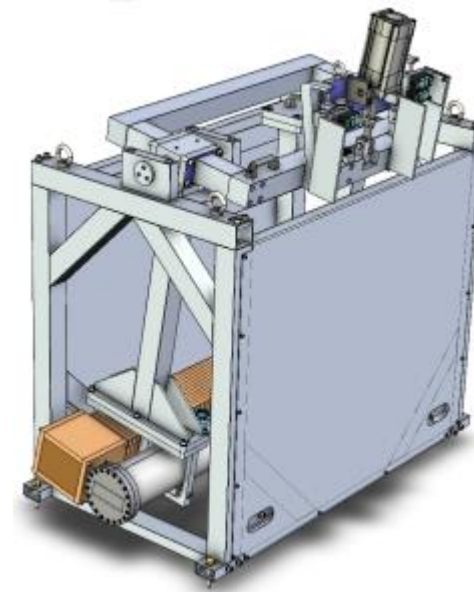
The shutter contains of:

- Absorber

- Beam guide(most of them)

- Mechanical frame

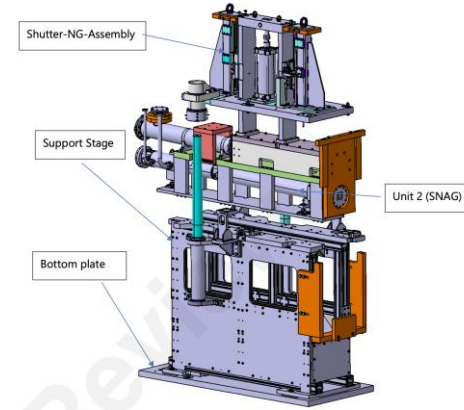
- Actuator(controlled by PSS)



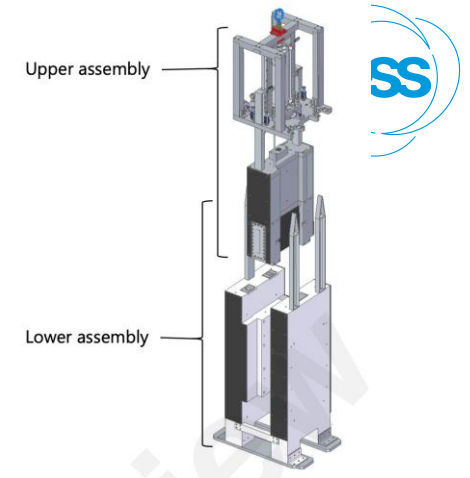
Variants



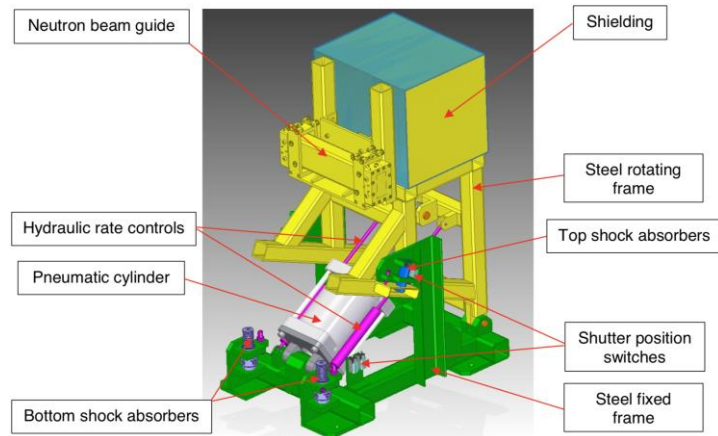
- MAGIC



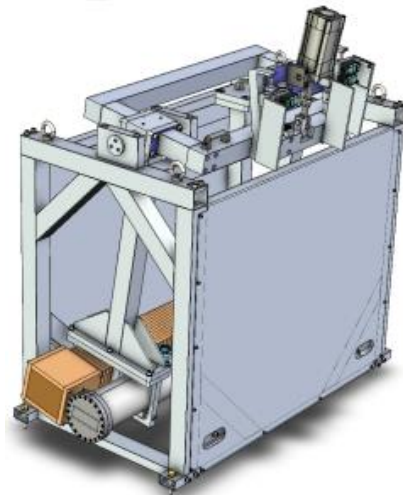
- SKADI



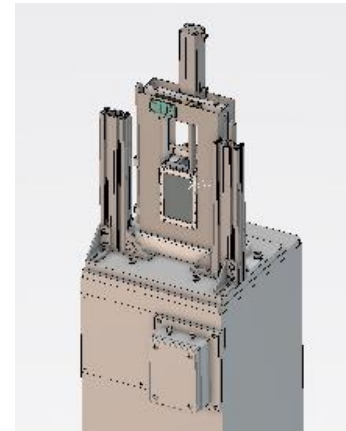
- FREIA
- LOKI



- BEER



- TBL
- ODIN
- DREAM
- HEIMDAL
- TREX



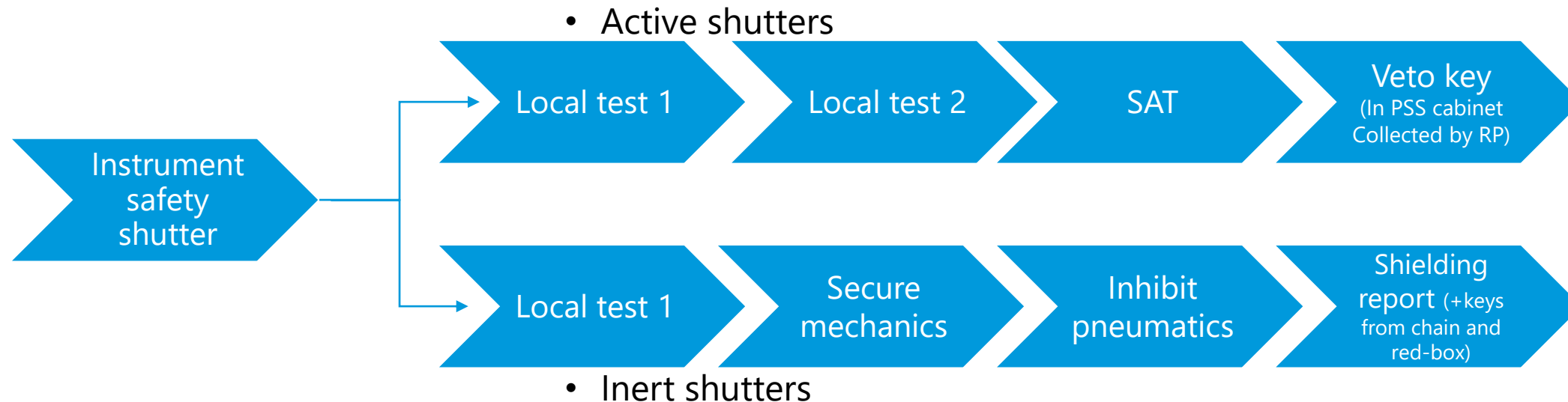
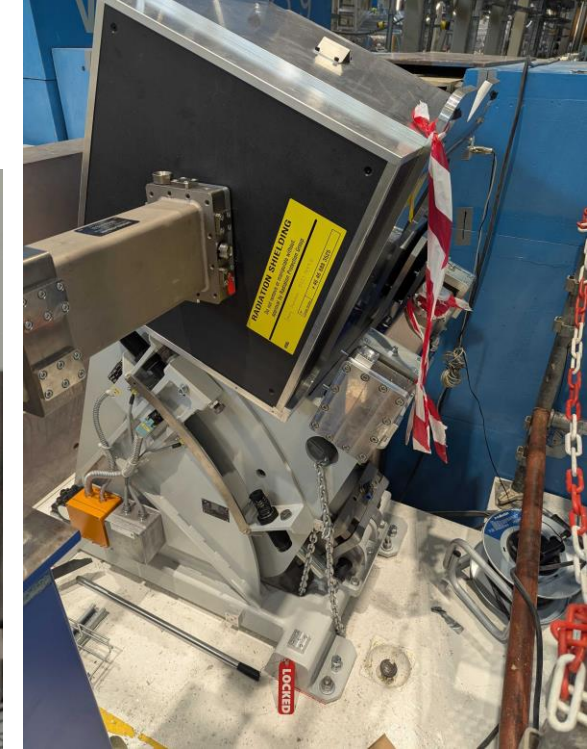
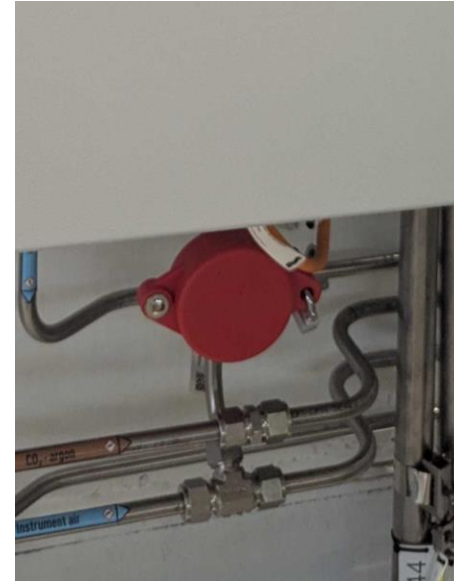
- BIFROST
- CSPEC
- ESTIA
- MIRACLES



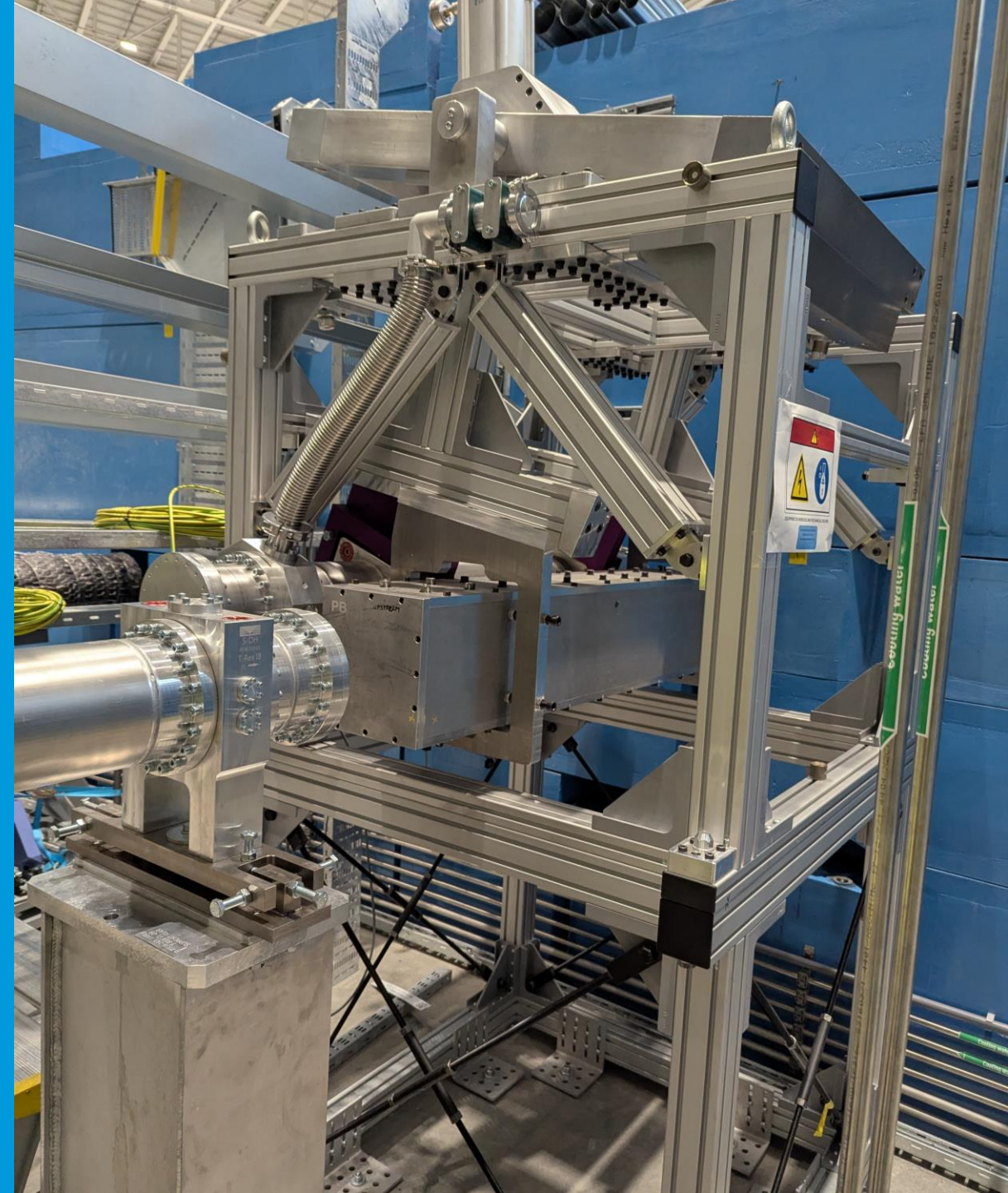
- NMX

Strategy

- This is a description of the process of securing shutters, ensuring their readiness for safe operation for first beam and during commissioning periods.
- Definitions of shutter in different stages of completion:
 - Active shutter
 - Inert shutter



Quality & Compliance



Completion status



All CHESS documents attached to each instrument shutter FBS

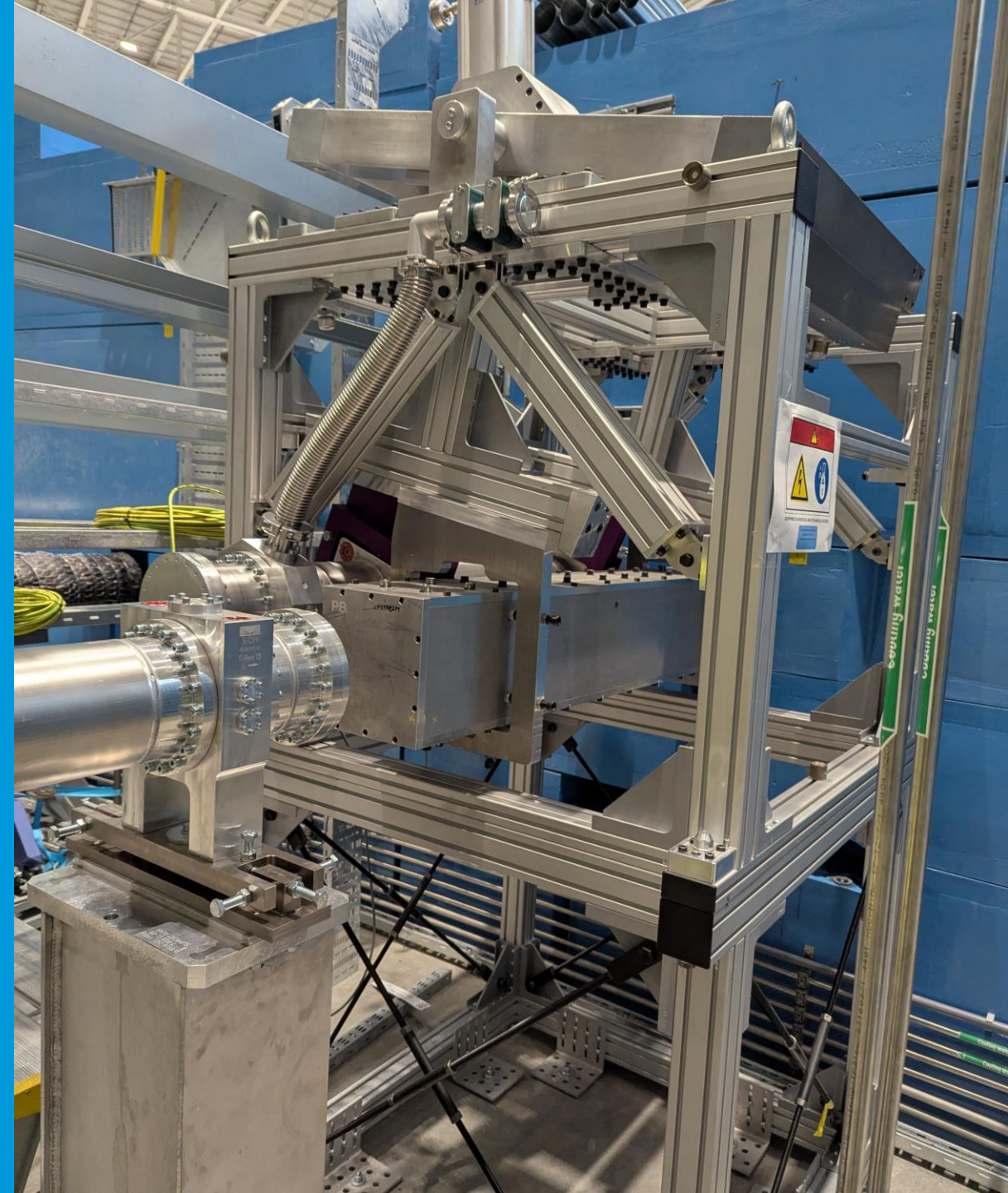
Instrument	FBS	Type	In bunker	Area	Local test 1	Local test 2	Shielding report
BIFROST	ESS.NSS.H01.BIFRO.A01.R03.R01	Active	No	D03	ESS-5662165	ESS-5688808	N/A
DREAM	ESS.NSS.H01.DREAM.A01.R03.R01	Active	yes	D01	ESS-5849425	ESS-5688791	N/A
LOKI	ESS.NSS.H01.LOKI.A01.R03.R01	Active	yes	D03	ESS-5661563	ESS-4972411	N/A
ODIN	ESS.NSS.H01.ODIN.A01.R03.R01	Active	yes	D01	ESS-5693522	ESS-5688779	N/A
TBL	ESS.NSS.H01.TBL.A01.R03.R01	Active	yes	D03	ESS-5665169	ESS-5694721	N/A
NMX	ESS.NSS.H01.NMX.A01.R03.R01	Inert	no	D03	ESS-5861483	N/A	ESS-5861484
ESTIA	ESS.NSS.H01.ESTIA.A01.R03.R01	Inert	no	D01	ESS-5860836	N/A	ESS-5860837
BEER	ESS.NSS.H01.BEER.A01.R03.R01	Inert	no	D03	ESS-5860467	N/A	ESS-5860471
SKADI	ESS.NSS.H01.SKADI.A01.R03.R01	Inert	YES	D01	ESS-5861455	N/A	ESS-5861456
FREIA	ESS.NSS.H01.FREIA.A01.R03.R01	Inert	YES	D03	ESS-5861000	N/A	ESS-5861001
MAGIC	ESS.NSS.H01.MAGIC.A01.R03.R01	Inert	YES	D03	ESS-5860890	N/A	ESS-5860891
HEIMDAL	ESS.NSS.F01.F01.F07.F06	Beamstop	YES	D03	N/A	N/A	N/A
TREX	ESS.NSS.H01.T-REX.A01.R03.R01	Inert	YES	D03	ESS-5860880(Fire valid)	N/A	ESS-5860881
CSPEC	ESS.NSS.H01.CSPEC.A01.R03.R01	Beamstop	no	D03	ESS-5903426	N/A	ESS-5903428
MIRACLES	ESS.NSS.F01.F01.F07.F04	Beamstop	no	D03	N/A	N/A	N/A
VESPA		Beamstop		D01	N/A	N/A	N/A

Status



Instrument	Open NIT	Open NCR	CE marked	Maintenance manual	Pressure	Energization	EAM assets
BIFROST	NIT 155	NCR 10525	No NCR 10525	ESS-5725335	yes	Yes	No
DREAM	NIT 381	NCR 10467	Yes	<u>ESS-3049036</u>	yes	Yes	No
LOKI		NCR 10482	No NCR 10482	ESS-4170571	yes	Yes	No
ODIN			Yes	<u>ESS-3049036</u>	yes	Yes	No
TBL			Yes	ESS-3049036	yes	Yes	No
NMX	NIT 459	NCR 10468	No NCR 10468	<u>ESS-3429206</u>	Yes	Yes	No
ESTIA			Yes	<u>ESS-4773461</u>	Yes	Yes	No
BEER			Yes	<u>ESS-4915989</u>	No	No	No
SKADI	NIT 515 NIT 516	NCR 10492 NCR 10499	Yes	ESS-5636423 ESS-5465473 ESS-3731309	No	No	No
FREIA	NIT 154	NCR 10523	No NCR 10523	ESS-5579918	No	No	No
MAGIC			Yes	ESS-5533020	No	No	No
HEIMDAL			No	N/A	No	No	No
TREX	NIT-426 NIT-427	NCR 10483 NCR 10479	Yes	<u>ESS-4020799</u> (Preliminary)	No	No	No
CSPEC			No	N/A	No	No	No
MIRACLES			Yes	ESS-5634915	No	No	No
VESPA			No	x	No	No	No

Commissioning





Hot Commissioning

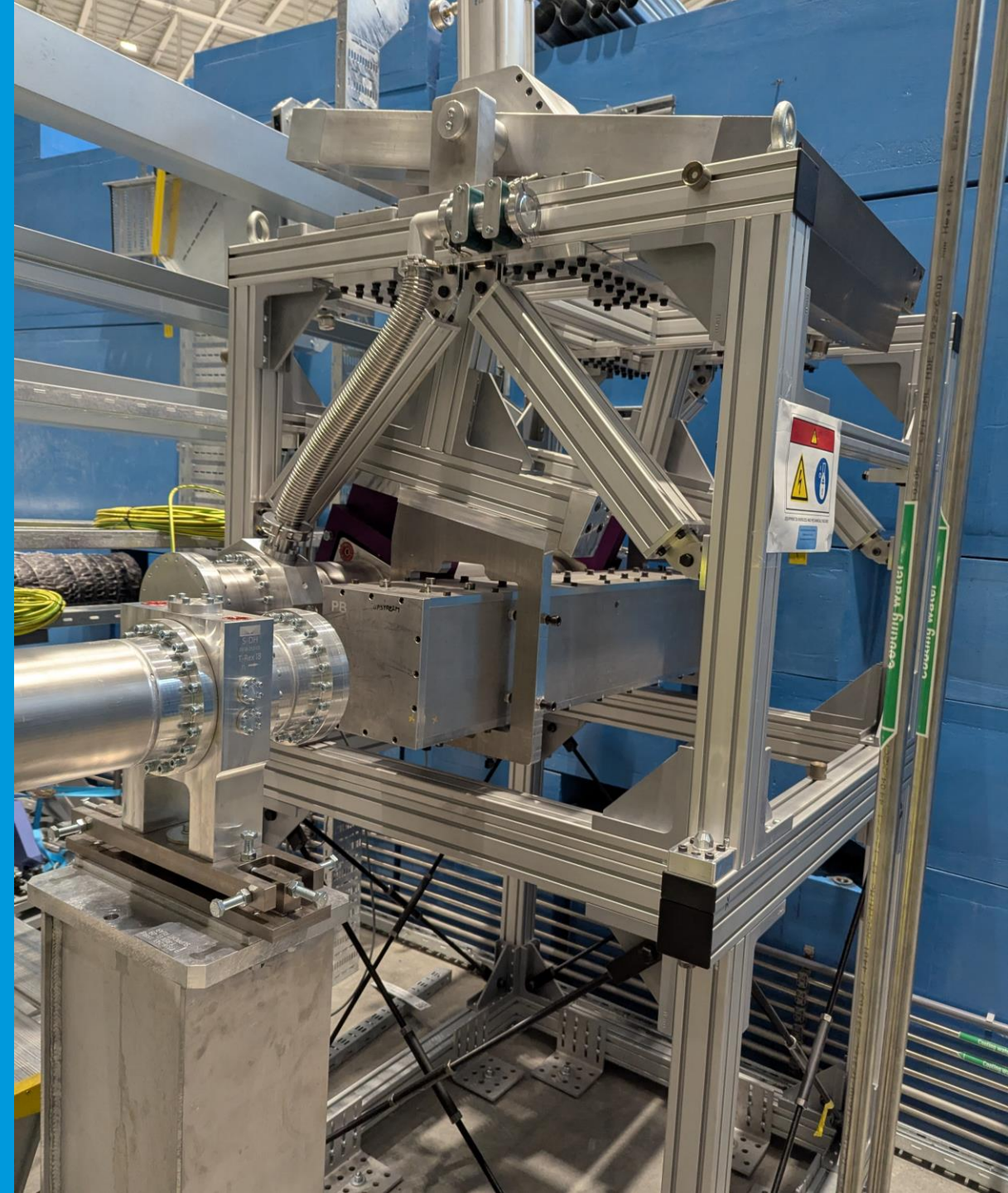
The instrument team is responsible for the hot commissioning, with RP and PSS support.

Will be documented in each instruments

System Verification & Validation plan

- Verify radiation levels near the shutter enclosure using a dosimeter to ensure shielding handles high gamma intensity.

Summary





Summary

Instrument Safety Shutter

All shutters are cold commissioned

8 NITs left

The most crucial is:

NIT 515

NIT 426

NIT 427

Instrument	Open NIT	NIT comments	Open NCR
DREAM	NIT 381	Evaluate design(missing screws)	NCR 10467
NMX	NIT 459	CE marking	NCR 10468
SKADI	NIT 515	Absence of Fire Safety Verification	NCR 10492
	NIT 516	PSS and MCA junction boxes not installed	NCR 10499
FREIA	NIT 154	CE marking	NCR 10523
TREX	NIT-426	Absence of Fire Safety Verification (NCR 10479)	NCR 10479
	NIT-427	Installation of fire safety features	
	NIT-513	Maintenance in EAM	



Questions