

# LS3 activities and resources for WP6a installation

Y. Leclercq for WP6a

10.12.2024

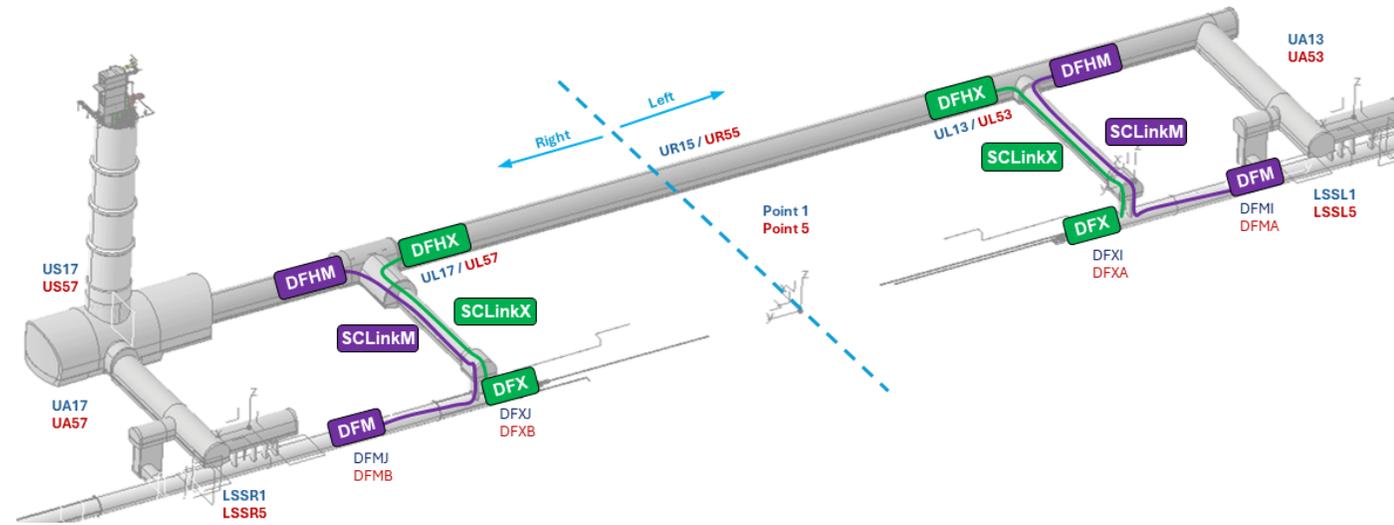
# WP6a LS3 activities : Scope

4 cold powering systems per point : 2 types X&M

Installation from Q2-2028 to Q2-2029 (non-continuous)

Cold Powering System installation :

- Transport activities
- Mechanical activities : Welding, adjusting, forming, assembly
- Electrical activities : Instrumentation, soldering, routing, testing
- QC activities : HV, Instrumentation, Leak tests, dimensional



**1. Supports & Tooling installation**

UR

UL

LHC

**2. Lowering SCLink+DFH**

Preparation

Lowering

Landing

**3. Unspooling**

Left -M

Left -X

Right -M

Right -X

**4. Core insertion**

M

X

**5. UR Interface activity**

Cryogenic interfaces

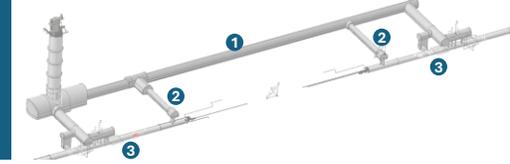
Electrical interfaces

**6. LHC Interface activity**

DFX assembly

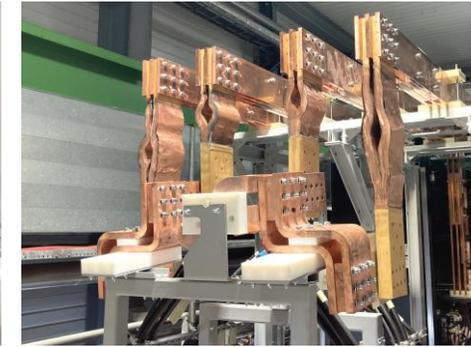
DFM assembly

# Supports & tooling installation



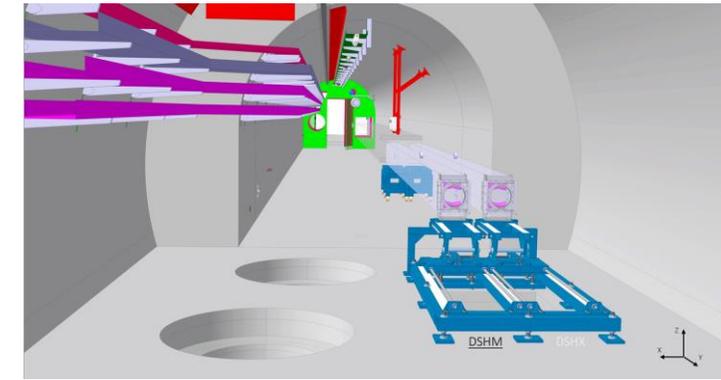
## 1. UR – service galleries

- Install cryogenic warm return lines supports
  - Use of EN-EL sub-contractor
- Install flexible busbars
  - EN-HE + MSC



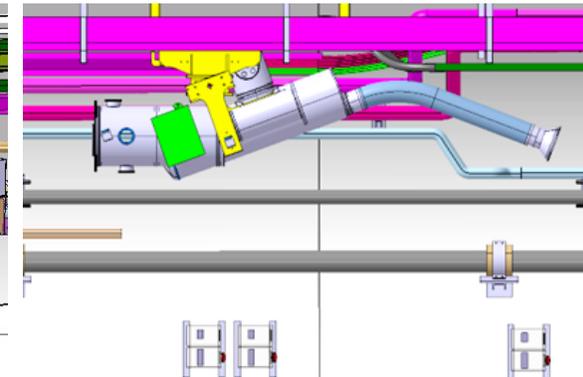
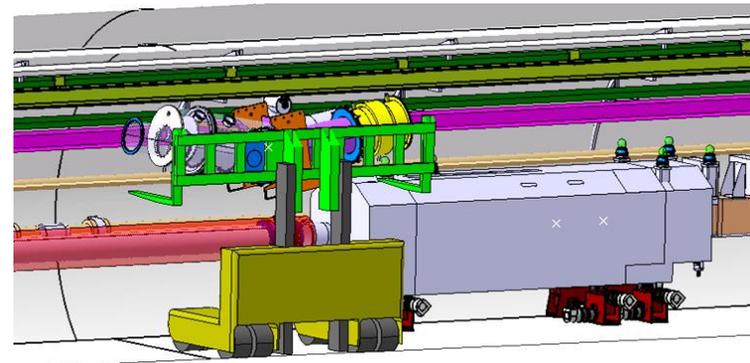
## 2. UL – connecting galleries

- Install shelves
  - EN-ACE-COS
- Install cable chains
  - EN-HE + MSC
- Install supporting structures
  - EN-ACE-COS



## 3. LHC tunnel

- Core location : DFX-DSHM tooling
  - EN-ACE-COS + MSC
- Tunnel : tray over QXL
  - EN-ACE-COSTBC
- D2 location
  - DFM support install. & transport
  - EN-ACE-COS + EN-HE + MSC

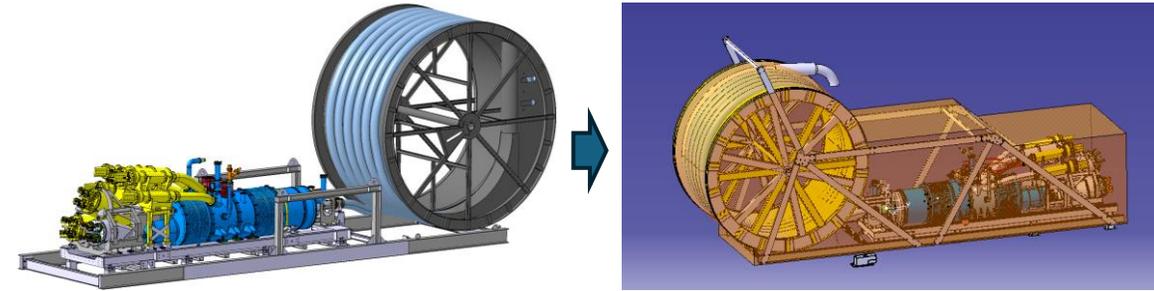


# Lowering SCLink+DFH



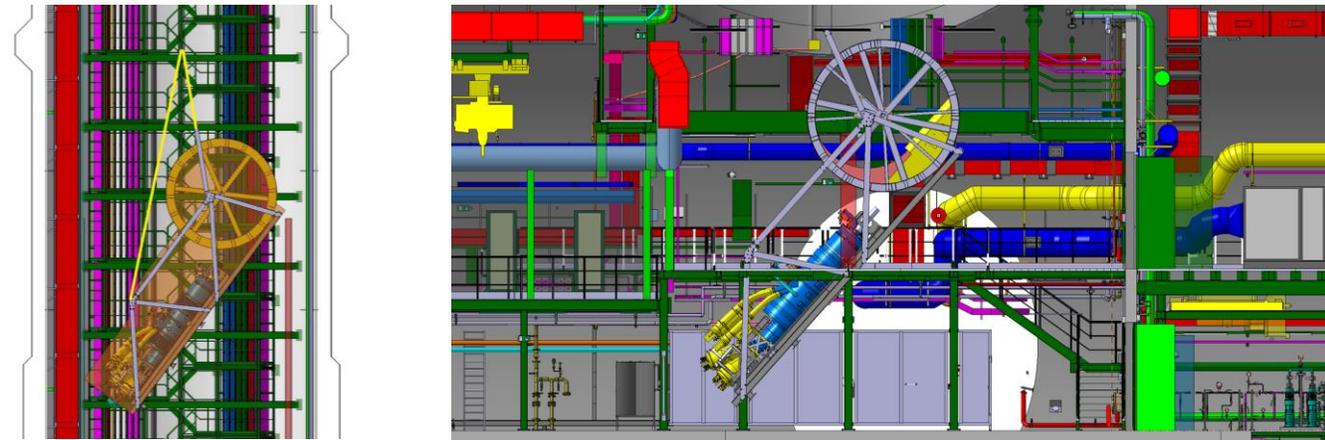
## 1. From Flex to pit

- Transfer to point 1/5
  - EN-HE
- Install lifting tool
  - EN-HE + MSC tbc



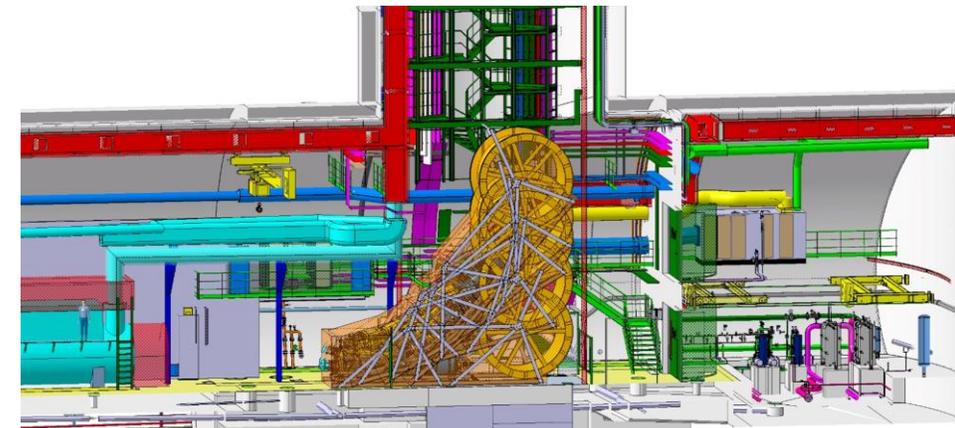
## 2. Lowering

- Install lifting tool
  - EN-HE
- Lower against wall
  - EN-HE

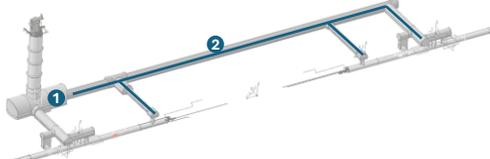


## 3. Landing

- Reception & load transfer to ground
  - EN-HE
- Disconnect overhead crane
  - EN-HE

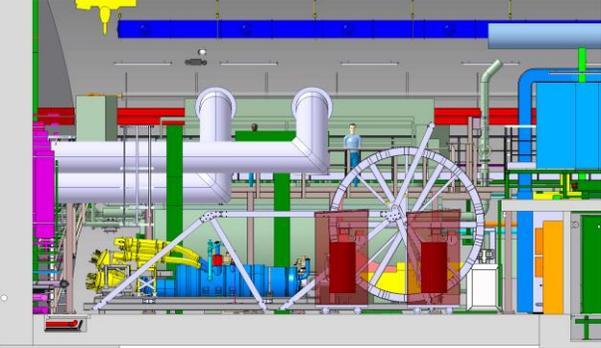


# Unspooling



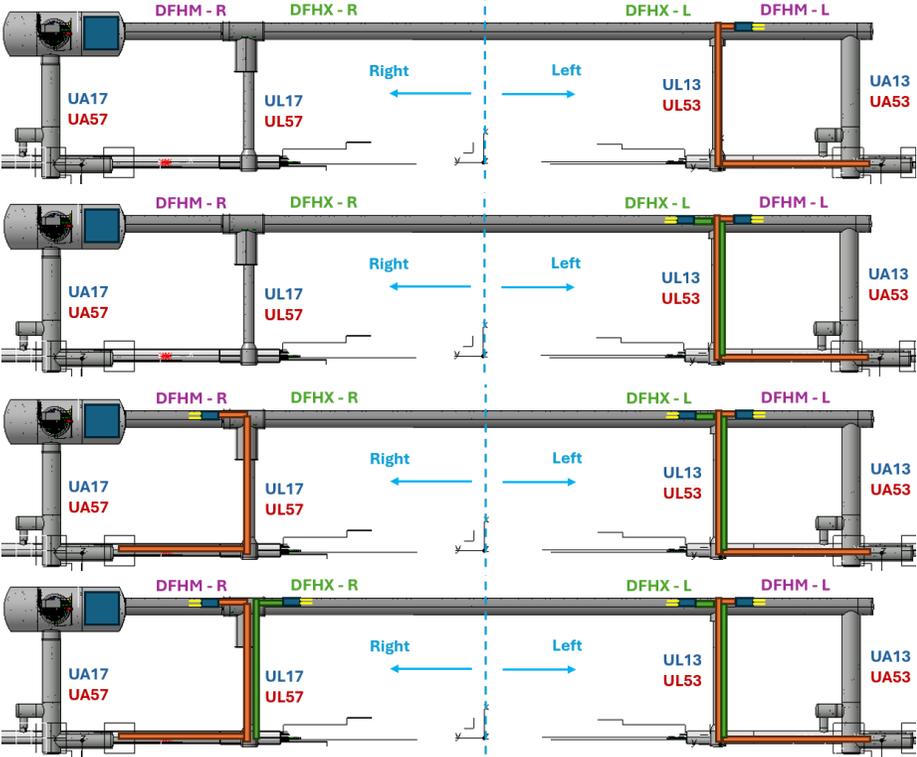
## 1. Position SCLink+DFH

- Transfer to unspooling location
  - EN-HE
- Install spooler
  - MSC

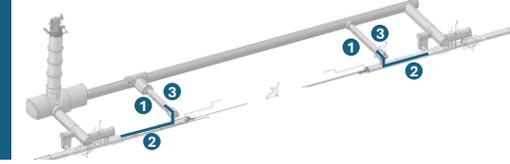


## 2. Unspooling in UR

- P1 then P5 : M-left/X-left/M-right/X-right
  - EN-HE + MSC

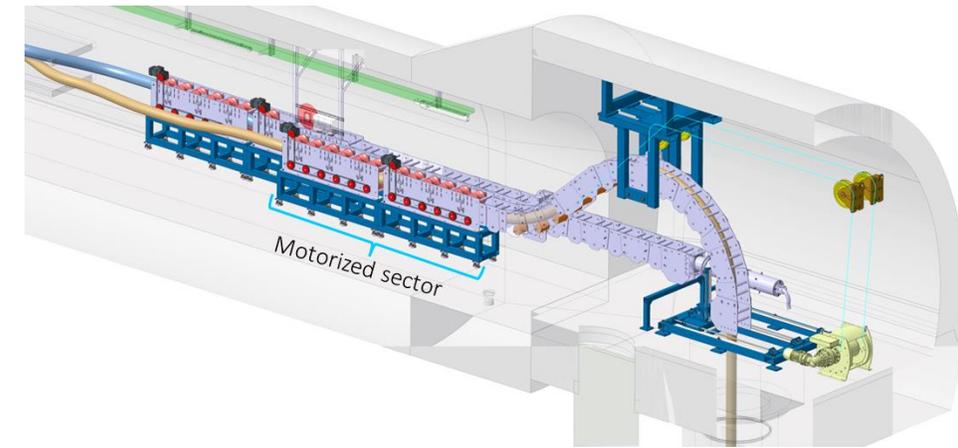


# Core insertion



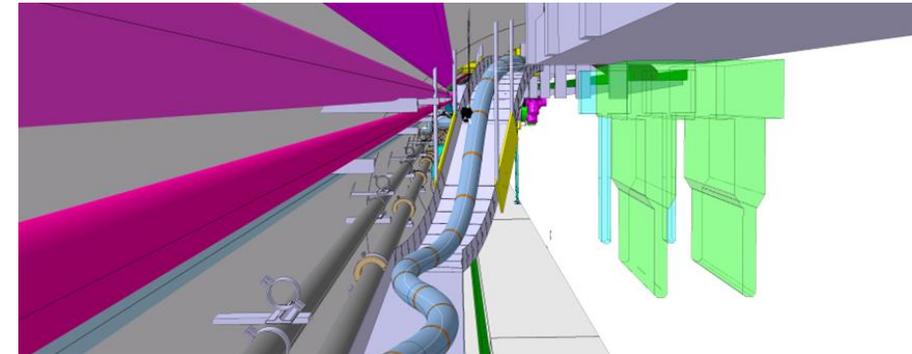
## 1. M-type insertion

- Install on shelves
- Install cable chain horizontally
- Form the SCLink
- Lower the SCLink head
  - EN-HE + MSC



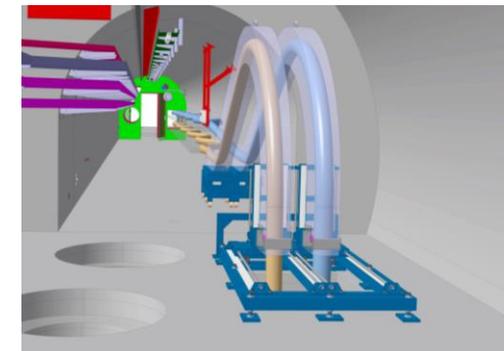
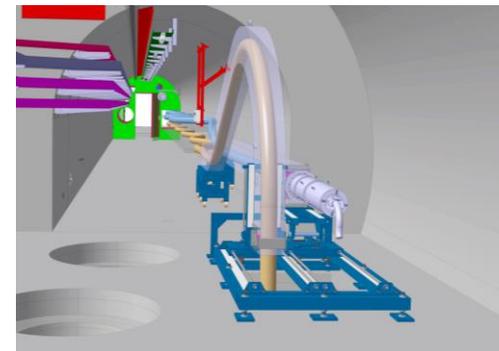
## 2. M-SCLink routing to DFM

- Transfer from core to QXL tray
- Route to DFM area above QXL
- Store on the wall
  - EN-HE + MSC
- QC : Leak & HV test #1
  - EIQA + TE-VSC + MSC



## 3. X-type insertion

- Install on shelves
- Install cable chain horizontally
- Form the Sclink
- Lower the Sclink head
  - EN-HE + MSC
- QC : Leak & HV test #2
  - EIQA + TE-VSC + MSC

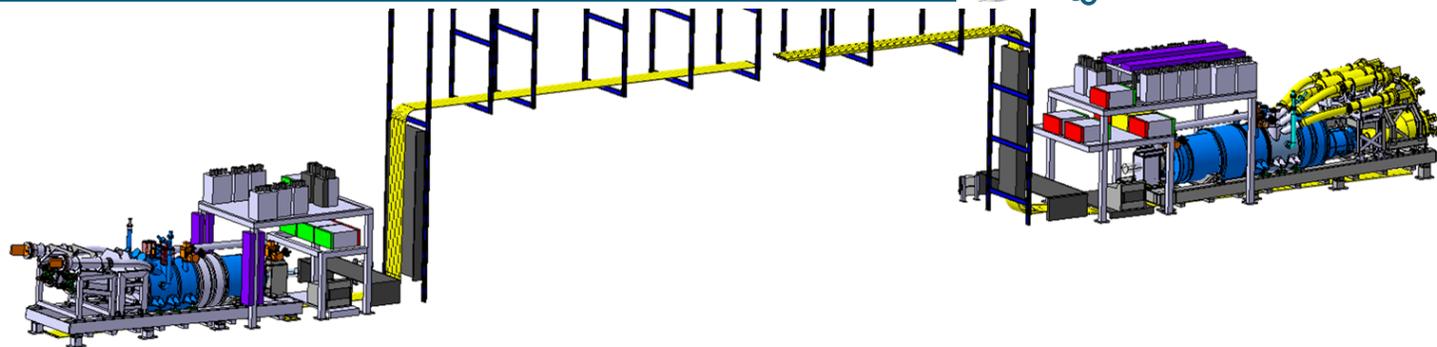


# Interfaces



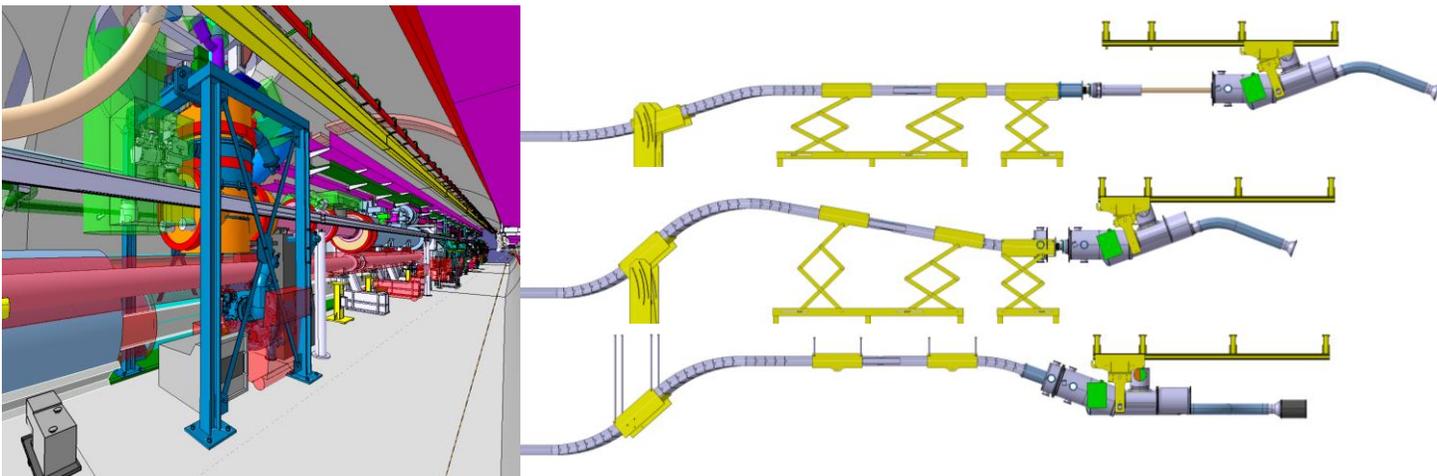
## 1. UR galleries

- Cryogenic interfaces
  - Warm return lines to GMS / MSC
- Electrical interfaces
  - Busbars, proximity equipment / MSC
- Quality controls
  - EIQA + TE-VSC + MSC



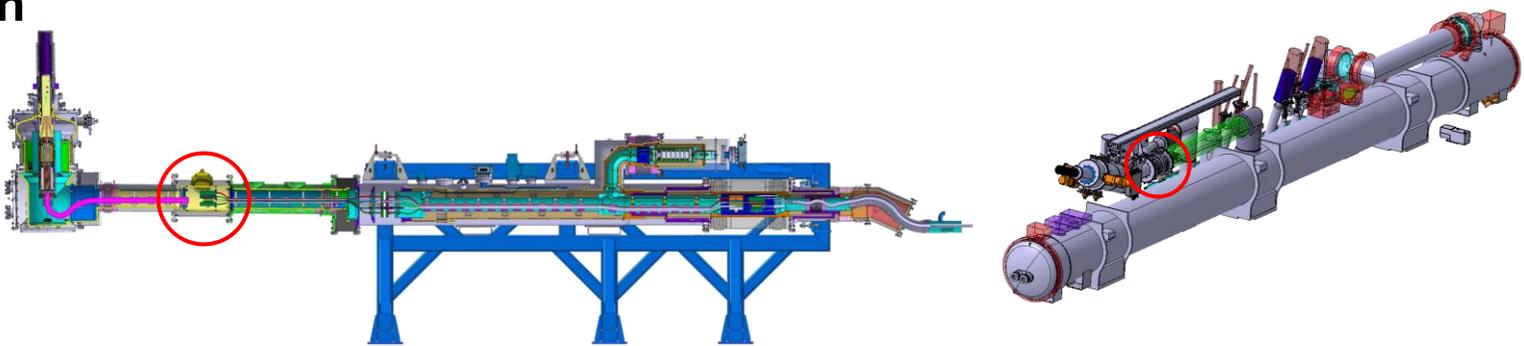
## 2. LHC Tunnel

- DFX assembly
  - EN-MME + EN-HE + MSC
- DFM assembly
  - EN-MME + EN-HE + MSC
- Cryogenic transfer lines
  - EN-MME + EN-HE + MSC
- Quality controls #2
  - EIQA + EN-MME + TE-VSC + MSC



## 3. LHC tunnel – post magnet installation

- IT DFX-DCM interconnect closure
  - Instrumentation continuity : MSC
  - Vessels closure : EN-MME + MSC
- MS DFM-DQM interconnect closure
  - Instrumentation continuity : MSC
  - Vessels closure : EN-MME + MSC



# Resources summary

- SCLink system unspooling
  - Continuous activity in series
  - “Lowering” supervised by EN-HE
  - “Unspooling & core insertion” supervised by WP6a
  - **MSC : 1 WP6a expert team**
- DFX & DFM assemblies
  - Continuous activity
  - DFX&DFM of same system, 50 meters away, in parallel
  - **MSC : 2 teams with 1 supervision**
- Interfaces
  - Assembly electrical components
  - Coordination cryogenic lines installation
  - **MSC : 2 teams with 1 supervision**
- Interconnect with Magnets
  - Electrical activity (instrumentation) WP6a
  - Cryostat closure
  - **MSC : 2 teams with 1 supervision**

- WP6a resources during LS3 :
  - Latest “in work” planning foresees start of DFX/DFM assemblies after completion of unspooling activity
  - 1 team for Unspooling – 2 teams for DF assemblies
  - Each team
    - 1 coordinator
    - 2 or 3 technical staffs
    - 2/3 industrial support
  - Overall coordination

	Comment	Support	MSC contribution
Preparation phase	In series : Mechanical activities	EN-ACE-COS, EN-HE	Inspection
Lowering, Unspooling	In series : Transport & delicate handling	EN-HE , TE-VSC/EIQA	Handling
DFX/M assemblies	In parallel : DFM & DFX of same system 50m away : Mechanical & Electrical QC	EN-HE, EN-MME TE-VSC, EIQA	Mech & elec.
Interfaces UR	Mechanical & electrical	EN-MME, EN-HE	Assembly : Mech. & Elec.
Interfaces LHC	Mechanical & electrical	EN-HE, EN-MME	Assembly : Mech. & Elec.

In work schedule – WP15  
Linear LS3 v02.29

