



DFM in WP6a

A. Ballarino



DFM Detailed Design Review, CERN, 18/12/2022

WP6a Cold Powering System

WP9
Cryogenics

WP17 – WP6b
RT Cables

Power Converters

$T_2 \leq 50$ K

HTS

DFHX/DFHM

$T_1 \leq 17$ K

MgB₂ to HTS

3
DFH

2
SC Link (DSL)

1
DF

LHe
4.2 K
MgB₂ to Nb-Ti
Nb-Ti to Nb-Ti

WP3 - Magnets (λ -plate with Nb-Ti)

λ -Plate

Nb-Ti – 1.9 K

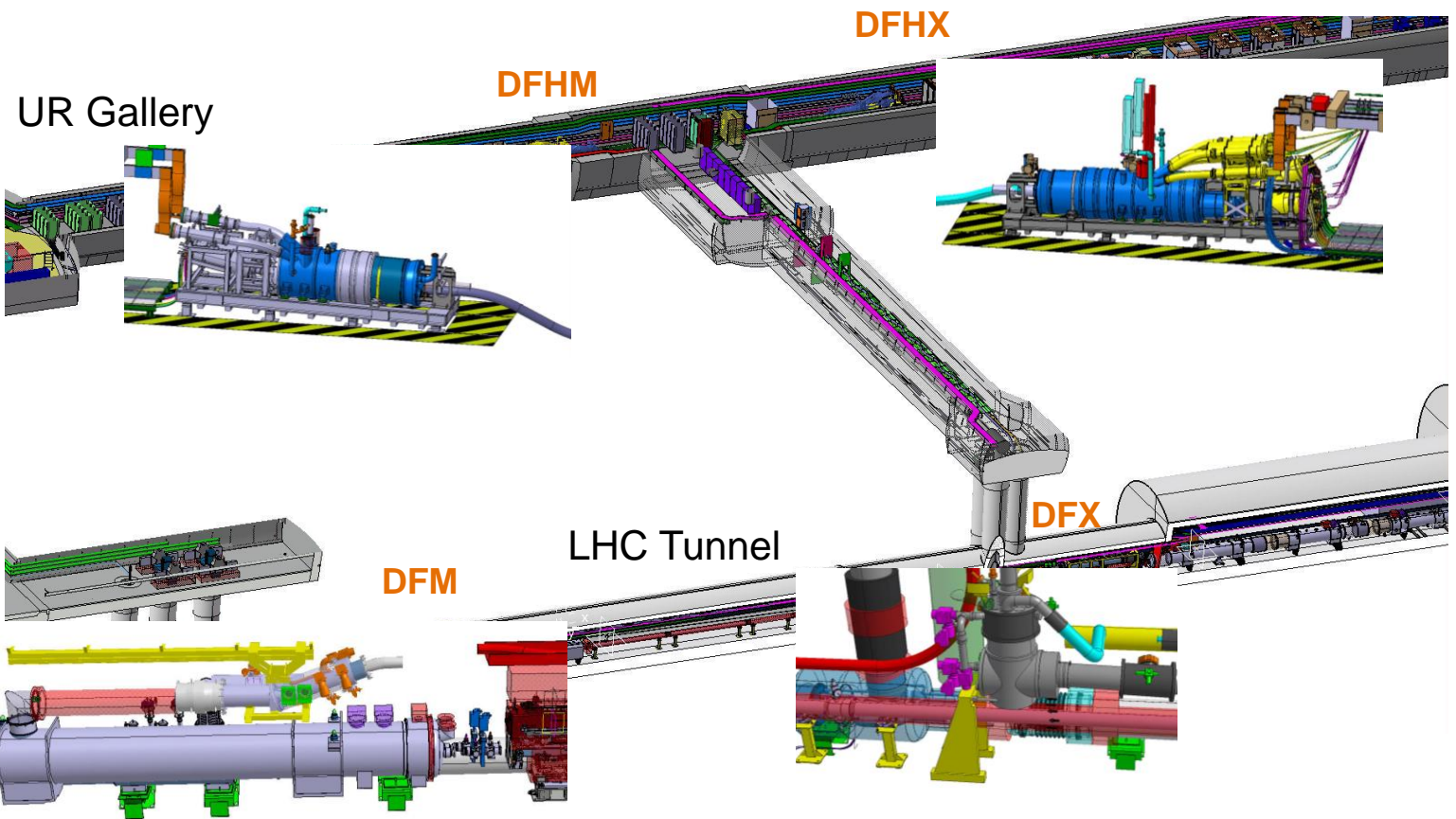
DFX/DFM

4
Current Leads (DFLH)

Interface to WP3
Nb-Ti to Nb-Ti



WP6a configuration in the LHC underground



DFM for the Matching Sections

Matching Sections

| Rating (kA) | N_{leads} | N_{cables} |
|-------------|--------------------|---------------------|
| 13 | 2 | 2 |
| 0.6 | 8 | 8 |

D2 and its correctors

The DFMs are part of the Cold Powering Systems that power the Matching Sections

Triplets

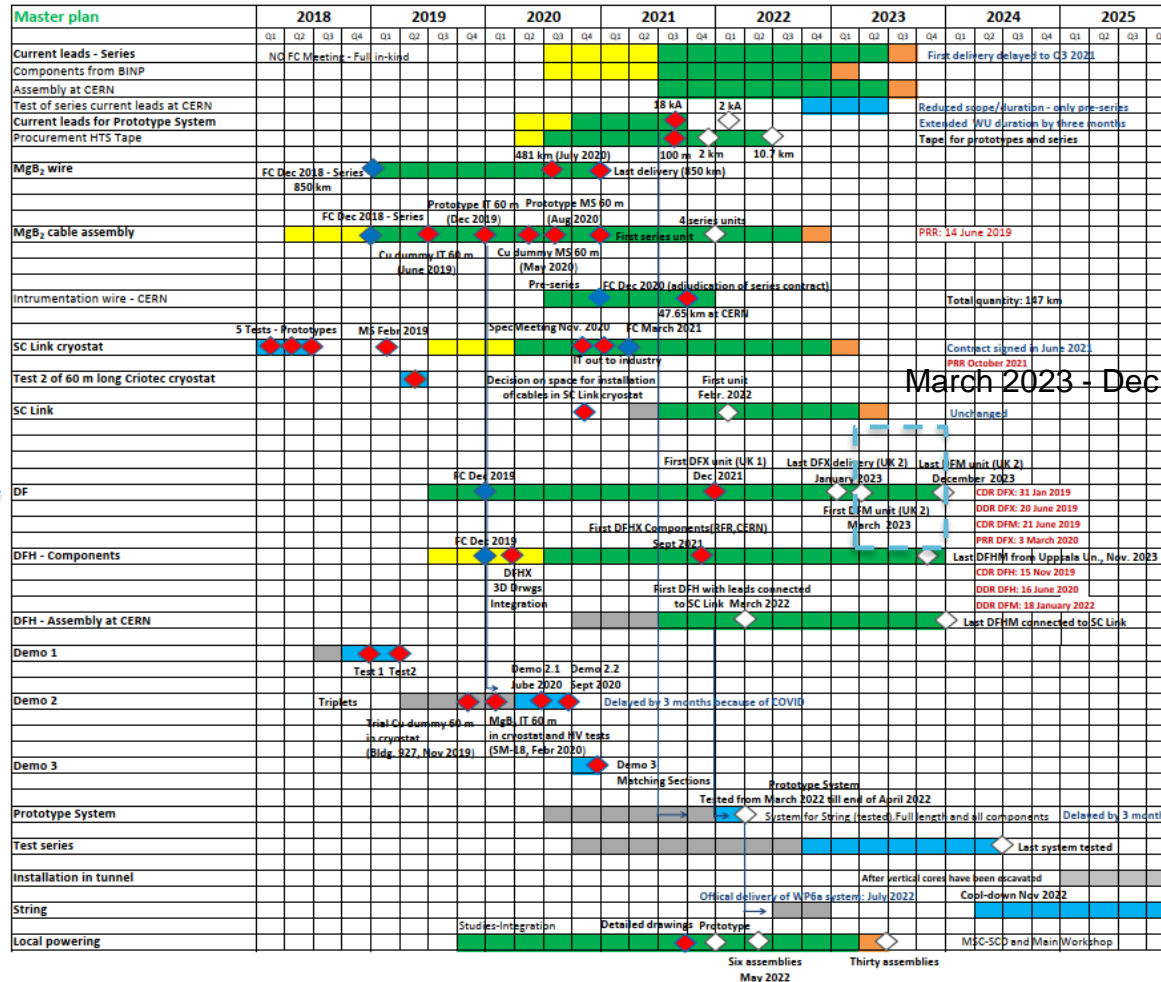
| Rating (kA) | N_{leads} | N_{Cables} |
|-------------|--------------------|---------------------|
| 18 | 4 | 4 |
| 7 | - | 3 |
| 2 | 12+3* | 12 |

Production of DFMs

- Construction of five **DFM cryo-modules**, via **UK 2 Collaboration Agreement**, by **Southampton University (SOTON)**. Detailed design done by CERN
- **Five** cryo-modules: **one pre-series** unit (also spare for HL-LHC) and **four series units**
- No DFM test in nominal cryo/electrical conditions in the WP6a baseline. But recent studies for the test bench dedicated to the series tests (series DFH+SC Links to be tested in SM-18, Cluster F2) consider the DFM as potential cryostat for the SC Link termination in LHe
- The cryostats are **installed in the LHC tunnel** – where the Nb-Ti cables of the SC Link are connected to the Nb-Ti cables passing through the λ plate
- Availability: at the installation in the tunnel (+ 1 unit for the series test)

DFM in WP6a Master Schedule

Presented at Cost&Schedule Review 2021



March 2023 - Dec 2023

- Tendering
- Manufacturing
- Tests
- Installation
- Spares
- Achieved milestone
- Future milestone
- FC Date





Thanks for your attention !

