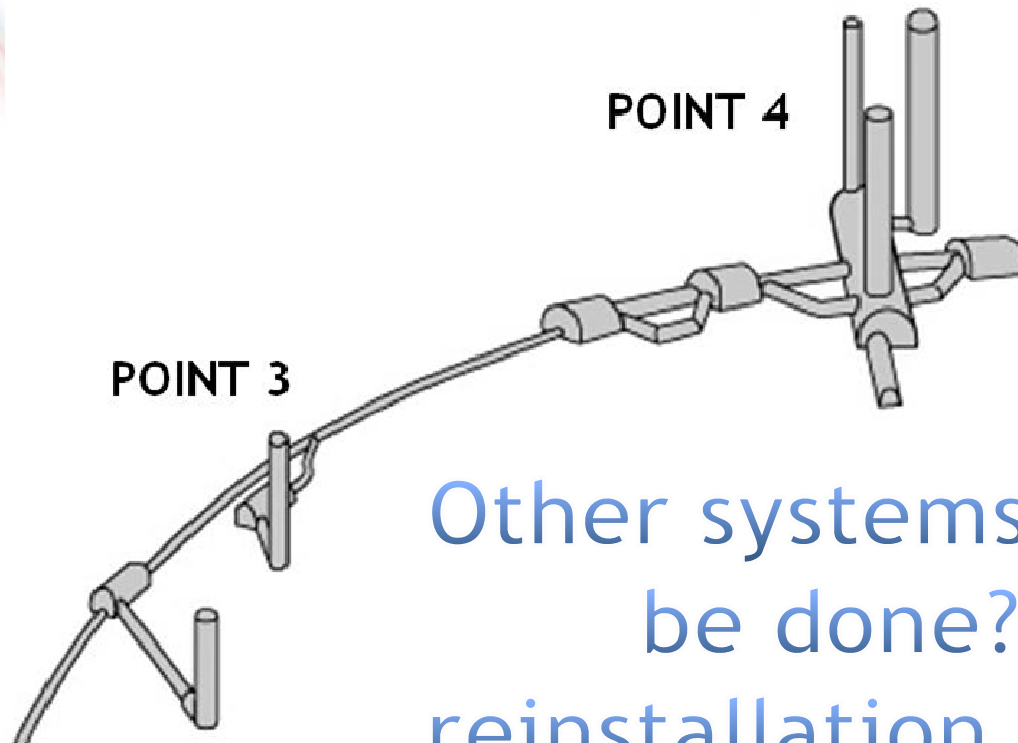




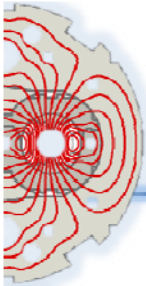
Repair of 34

Chamonix 2009



Other systems - what needs to be done? Repair and reinstallation of other systems

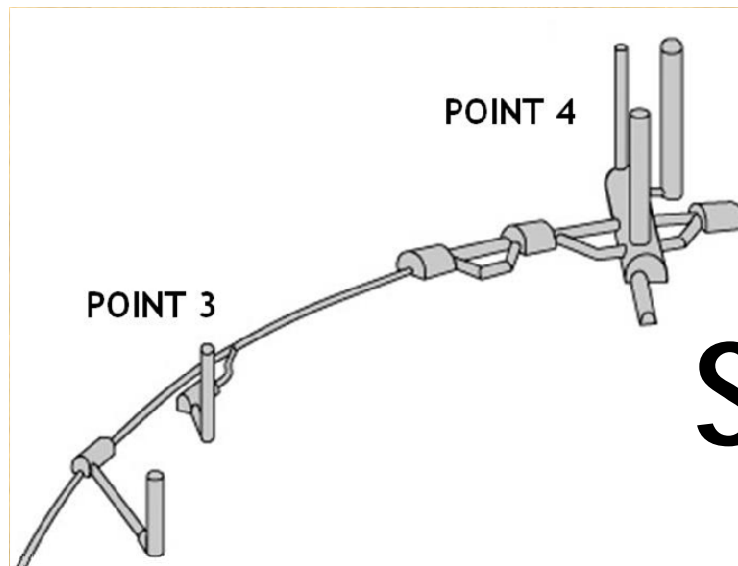
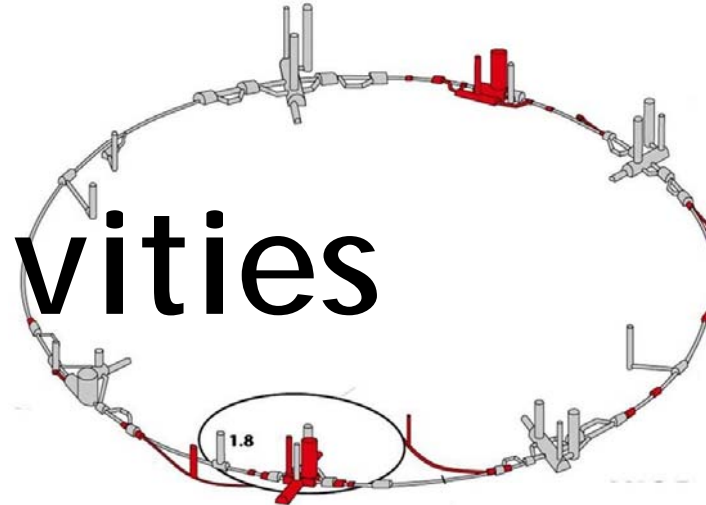
Acknowledgments: O.Aberle - F.Bertinelli - J.C.Billy - O.Capatina - J.Casas - L.Ceccone - S.Claudet
J.Coupard - K.Dahlerup - R.Denz - K.Foraz - J.J.Gras - V.Parma - A.Perin - M.Poyer
R.Shmidt - H.Thiesen - A.Vergara



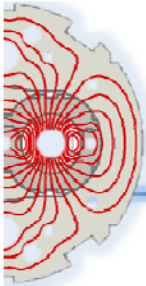
Repair of 34



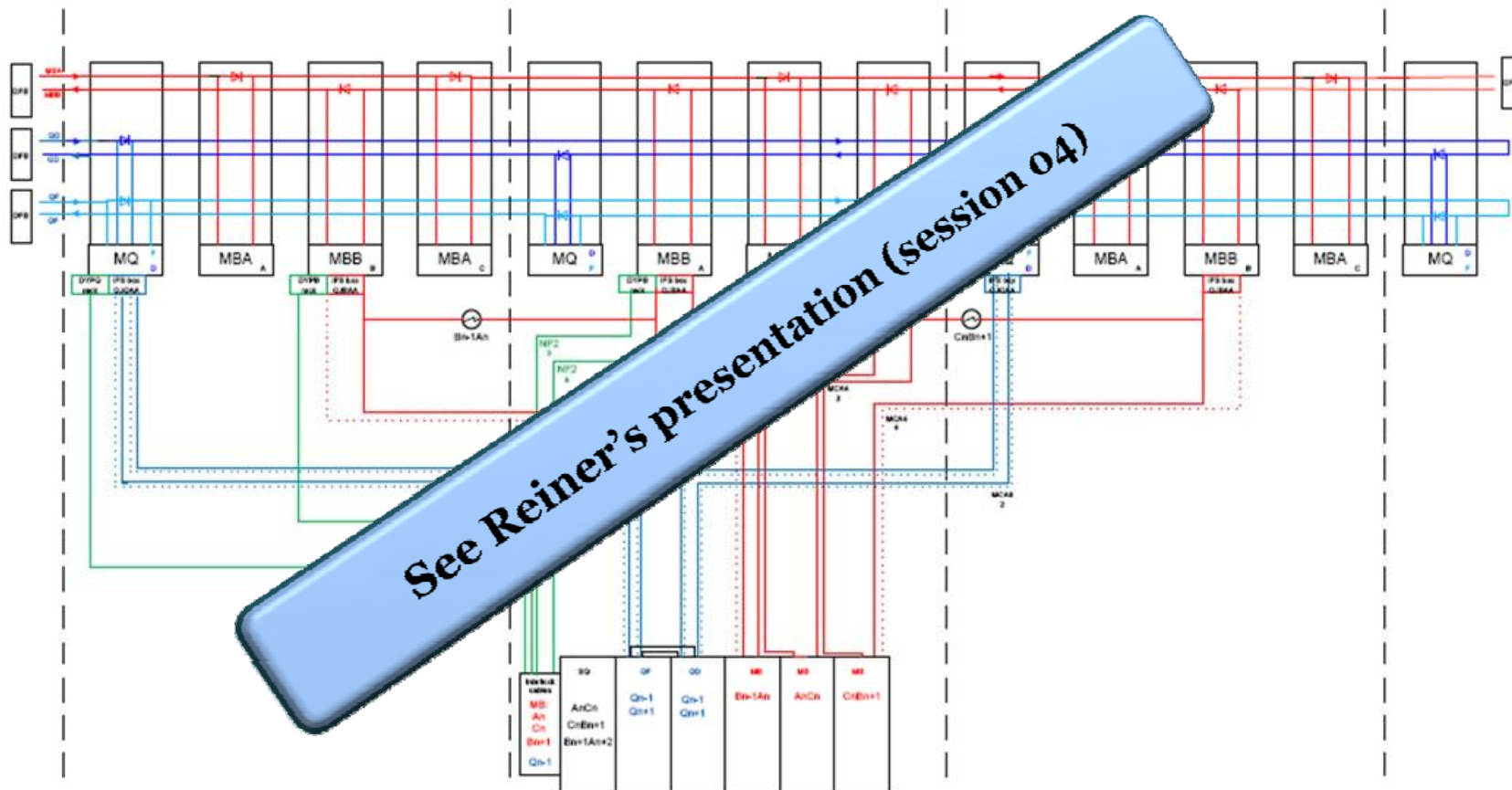
General activities

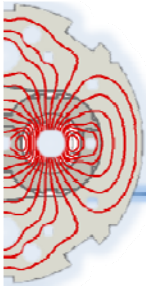


S34 activities

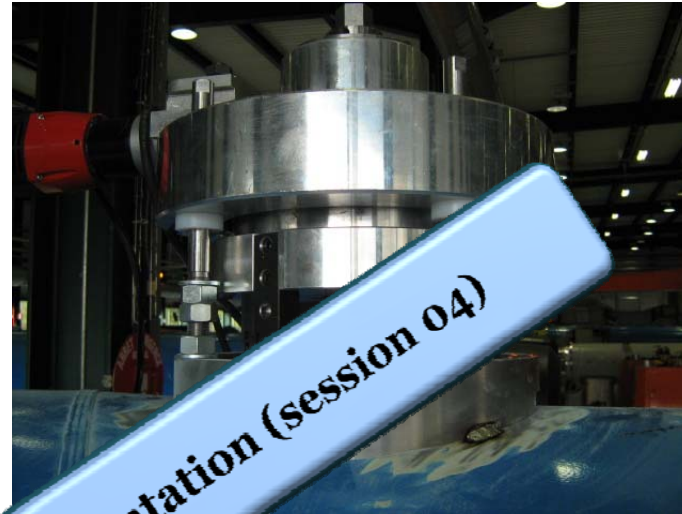


The new QDS system



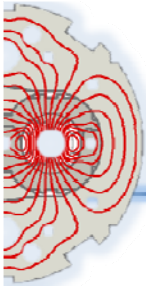


The new valves



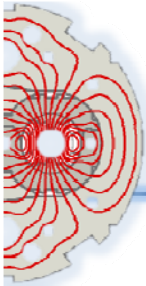
See Vittorio's presentation (session 04)

Courtesy M. Kappinen, M. Duret

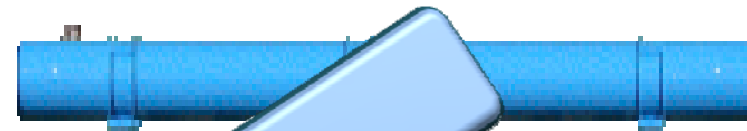


Jacks consolidation



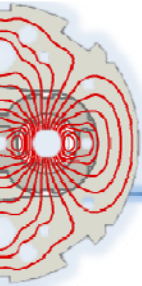


Stand Alone Magnets



See Serge's presentation (session 01)

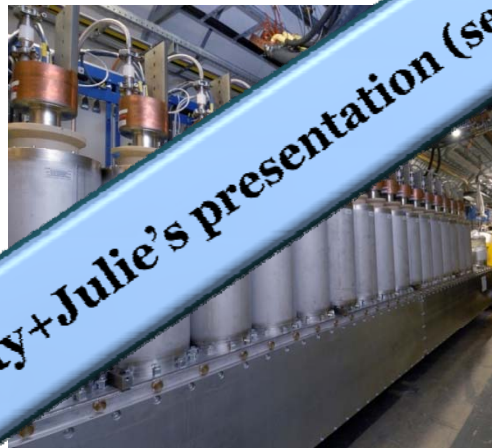
Improve level sensors in the stand alone magnets to increase the reliability by the use of a flexible capillary with a small diameter and without low point



**Install electrical
protections in
front of current
leads**

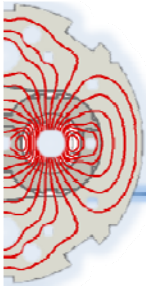
**Improve the
configuration of
safety valves
discharge outlet**

See Katy+Julie's presentation (session 05)



**Install additional
pressure switches
for the dry air
system**

**Install mechanical
protection for
DFBM & DFBA
links**



Collimators

Completion phase 1

Full phase 1 system would be installed for 2009, removing limits for b^* , luminosity, and efficiency, protecting the machine for collimator lifetime, and series production

Consolidation ring skid and inox cages

Consolidation horizontal inox cages

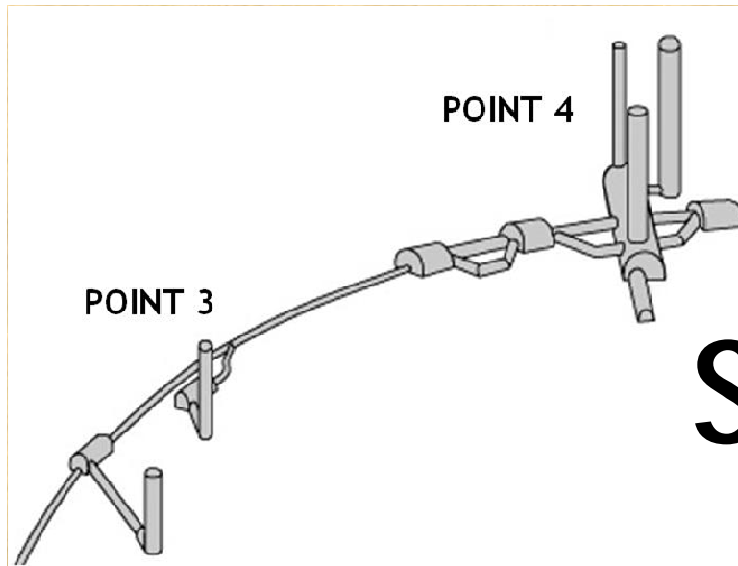
Consolidation TL inox cages

See Katy+Julie's presentation (session 05)



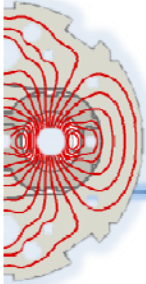


Repair of 34



ated activities

S34 activities
e and Repairs



Racks re-installation





PC 60A - problems



4 converters showed traces of oxidation (Cell 28).

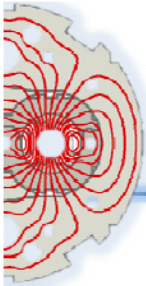
Their DC connectors on DC cable side have to be changed



3 converters have required repairs:

- RCBH30.R3B2 (dead capacitor due to cold?)
- RCBH24.R3B2 (Overvoltage through current lead voltage taps)
- RCBV24.R3B1 (Overvoltage through current lead voltage taps)

The other 87 converters have been fully re-tested and are operational



PC 60A - re-commissioning



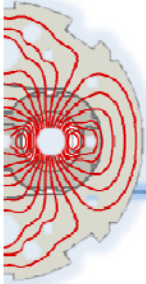
Crates re-installation and re-connection when magnets installation is finished



Re-testing:

PCC – PNO.a1 – PNO.d1

This activity is included in the powering test



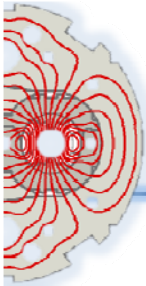
CRYO inst - problems



All systems have been tested

**Only one card was blown out,
most likely because of a small
piece of MLI creating an
internal short circuit**





CRYO inst - re-commissioning



**Visual inspection while
interconnecting**

Check of the signal cabling

**Crates re-installation and
re-connection when
magnets installation is
finished**

Coherency tests



QPS racks - problems



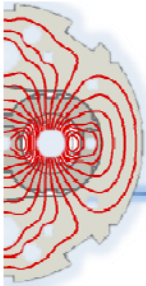
Quench Detector

- All of them have been removed
- All at right of D-area have been cleaned
- Analysis to be done in all the others



Quench Heater Power Supply

- Only QHPS in the D-area have been removed
- Some of them have been analyzed and many have seen a dielectric breakdown at the level of the input diode bridge for charging of the capacitor
 - No clear explanation (due to condensation inside?)
 - They can be easily repaired
 - Removal of the others depending on the situation



QPS racks - re-commissioning



Crates re-installation and re-connection when magnets installation is finished



IST

Heater Charging and Firing

This activity is considered as part of the powering test



Vacuum racks - problems



No problem was found
Electronics re-tested and
operational



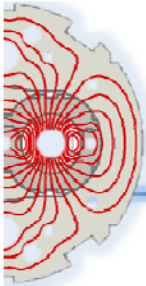


Vacuum racks - re-commissioning



Crates re-installation and re-connection when magnets installation is finished





Beam Instrumentation

Beam Loss Monitor

Re-testing the whole sector
(with radioactive source)

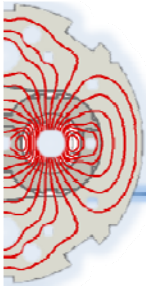


Beam Position Monitor

Tests to be done during the
interconnection phase

BGI - BCT - BTV

- Already commissioned
- Routine inspection



PC - Short Circuit 24h run

Power Converter

PO requested a check of the converters of the A34 to check whether they have been damaged by overcharge (as for some 60A)

P3



DSL



PC connected:
• 22 x 600A

No PC directly
connected

ARC

PC connected:
• 94 x 60A
• 16 x 120A

P4



PC connected:
• 3 x 13kA
• 8 x 6kA
• 25 x 600A

PC - Short Circuit 24h run

PC (13kA – 6kA – 600A – 120A)

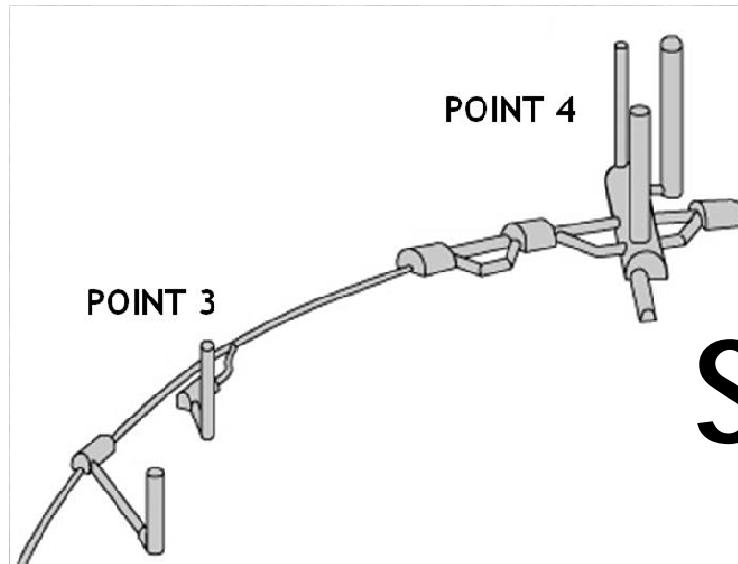
- Set-up of the short circuits at the level of the cables
- 24 hours heat run
- Short circuit removal

(Short Circuit test in the UJ33 was performed at operational current profile – sensitive area)





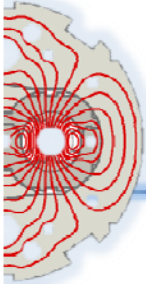
Repair of 34



S34 activities

Incident related activities

Maintenance and Repairs



Beam Instrumentation

RU.L4 removal (?)

Broken internal resistance
(manufacturing problem)



BSRT (Synchrotron Light Telescope)

- Control cable being pulled
- Upgrade of the alignment control engine of the optic system
- Change and regulation of the optic bench
 - Not mandatory for operating the machine at 5TeV
 - Feasibility on the LHC planning to be checked



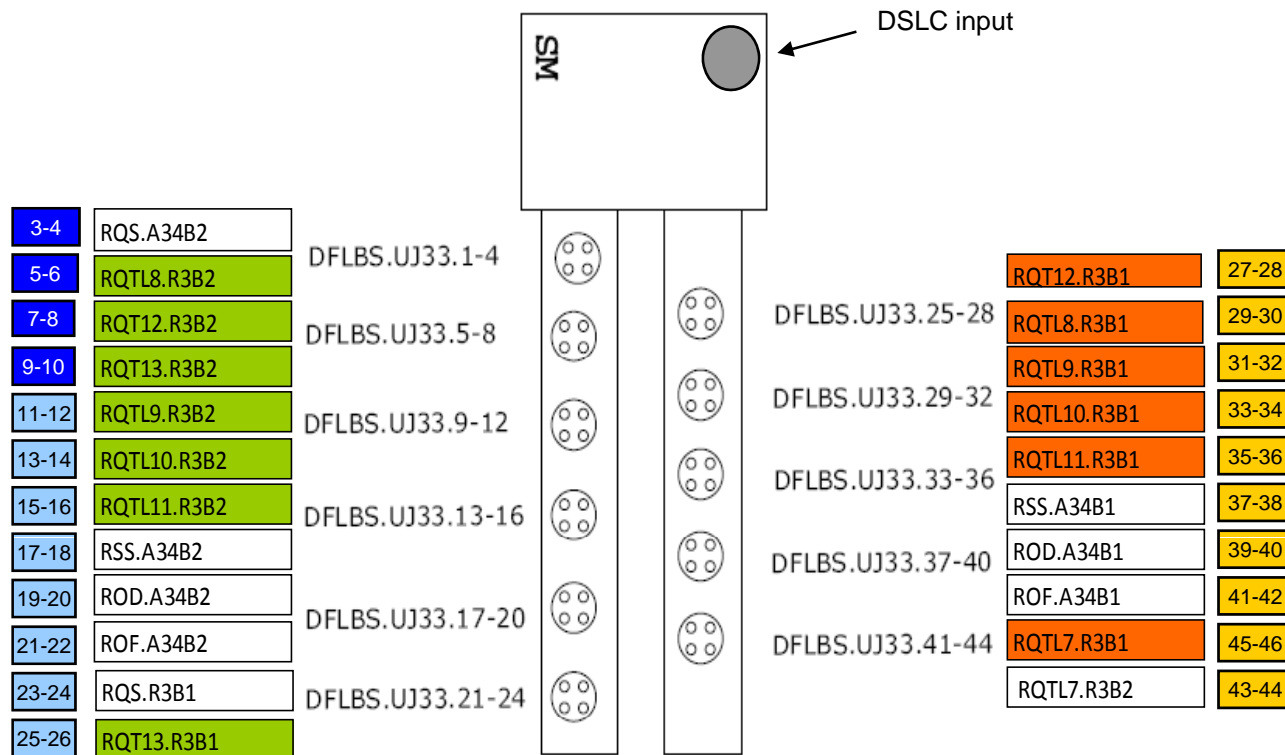
The DSLC - problem

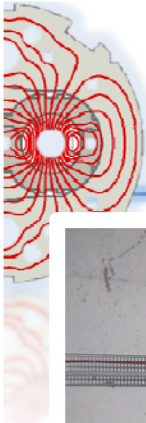
Cable layout

Layer 1 (inner) Wires 1-10:

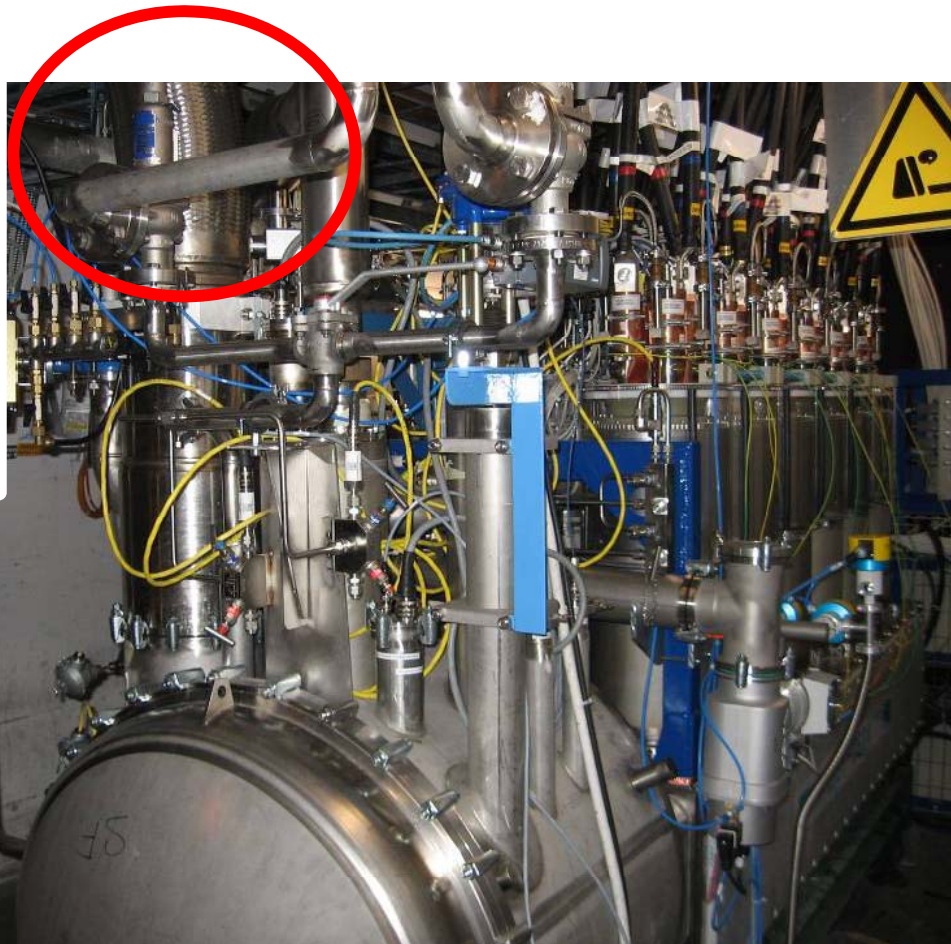
Layer 2: 11-26:

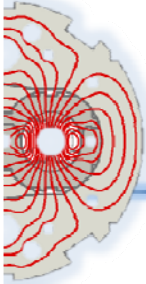
Layer 3 (outer layer) 27-48:



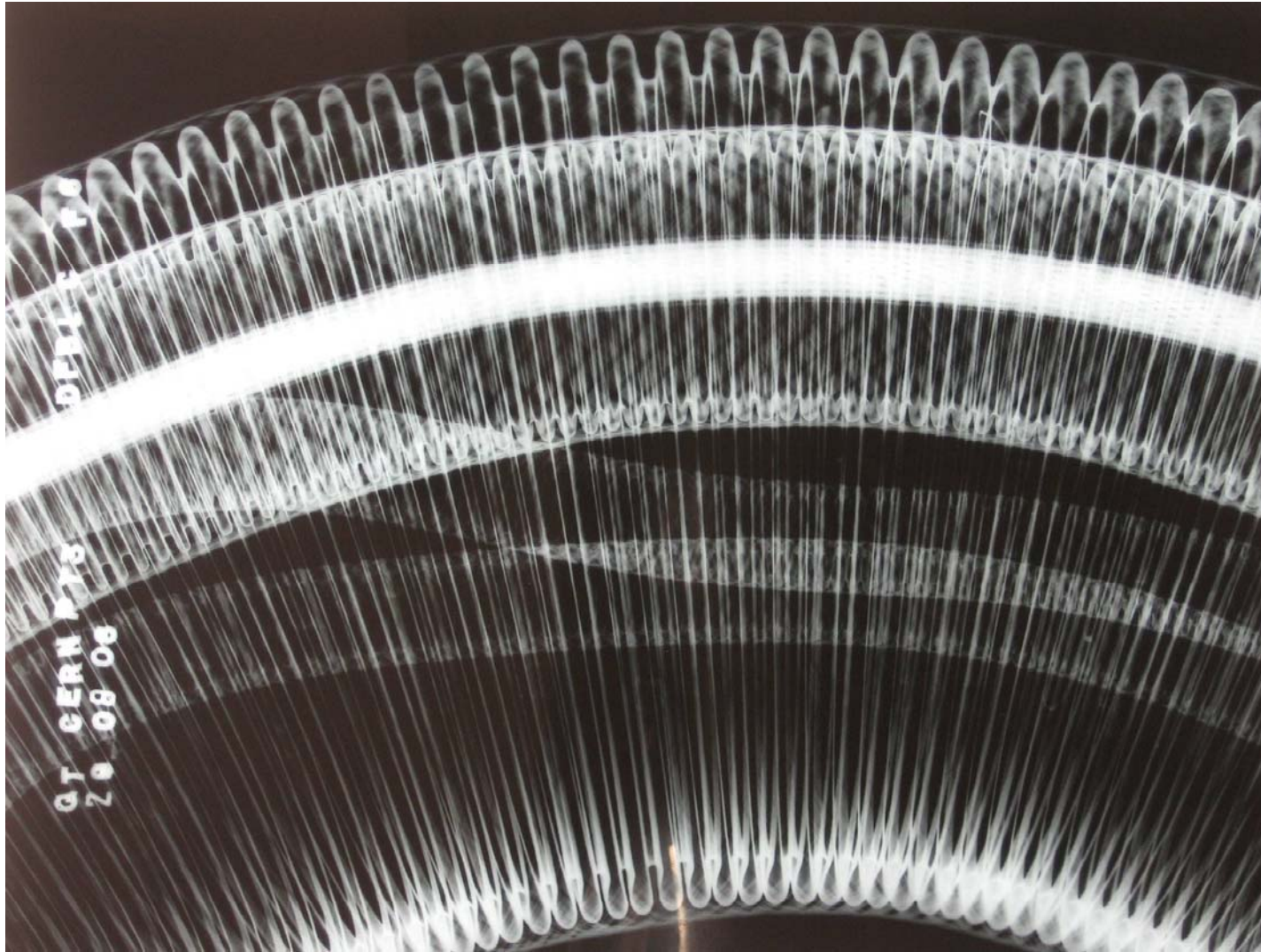


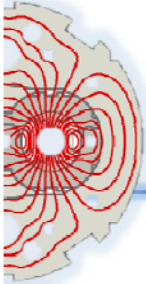
The DSLC





The DSLC - problem

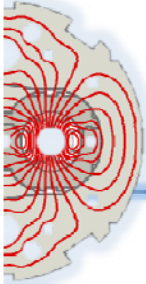




The DSLC - solution



Compression and fixing of the flexible part of the DSLC link in order to avoid displacement which is responsible for the heat load



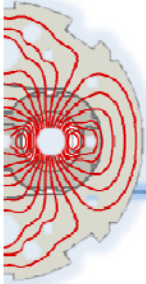
Re-cabling of RQT4.R3 -RQT5.R3

The commissioning of the two magnets showed the impossibility to keep the nominal current in the circuits due to the increase of T of DC cables and magnets. This effect produces a significant variation of the resistance of the circuits with the consequence that the PC is not longer able to provide the nominal current

**Engineering Change Order
EDMS n.938480**

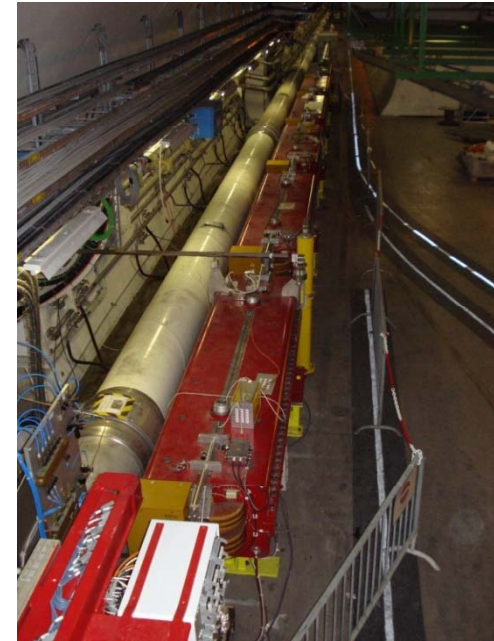


$$R = \rho \frac{l}{A}$$

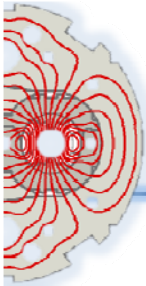


Re-cabling of RQT4.R3 -RQT5.R3

The solution proposed is to pull additional DC cables from the PC to the magnets in order to reduce the resistance of the circuits and limit the DC cables temperature



The present modification is not mandatory for the 5TeV LHC operation



Re-commissioning of RQT4 - RQT5



Electrical Quality Assurance

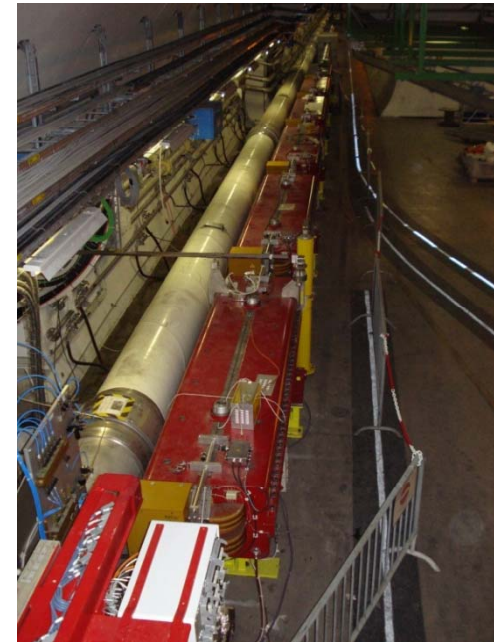
to verify the integrity of the circuits

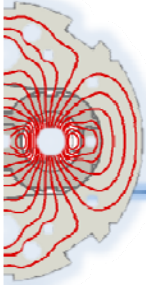
Polarity Check

to verify the correct DC cabling

24h heat run

to validate the electrical circuits
(ventilation and equipments have been
already validated in the previous campaign)





- **GENERAL ACTIVITIES**

(Katy and Julie will better come back to this on Session 05)

- **SECTOR 34**

- Racks (QPS, VAC, PC, CRYO) re-installation and re-commissioning
- BI commissioning
 - BSRT regulation and optic bench change (not mandatory)
 - RU.L4 replacement (?)
- PC short circuit 24h heat run
- DSLC
 - **Ongoing**
- RQT4 - RQT5
 - Re-cabling - **Ongoing**
 - Re-commissioning