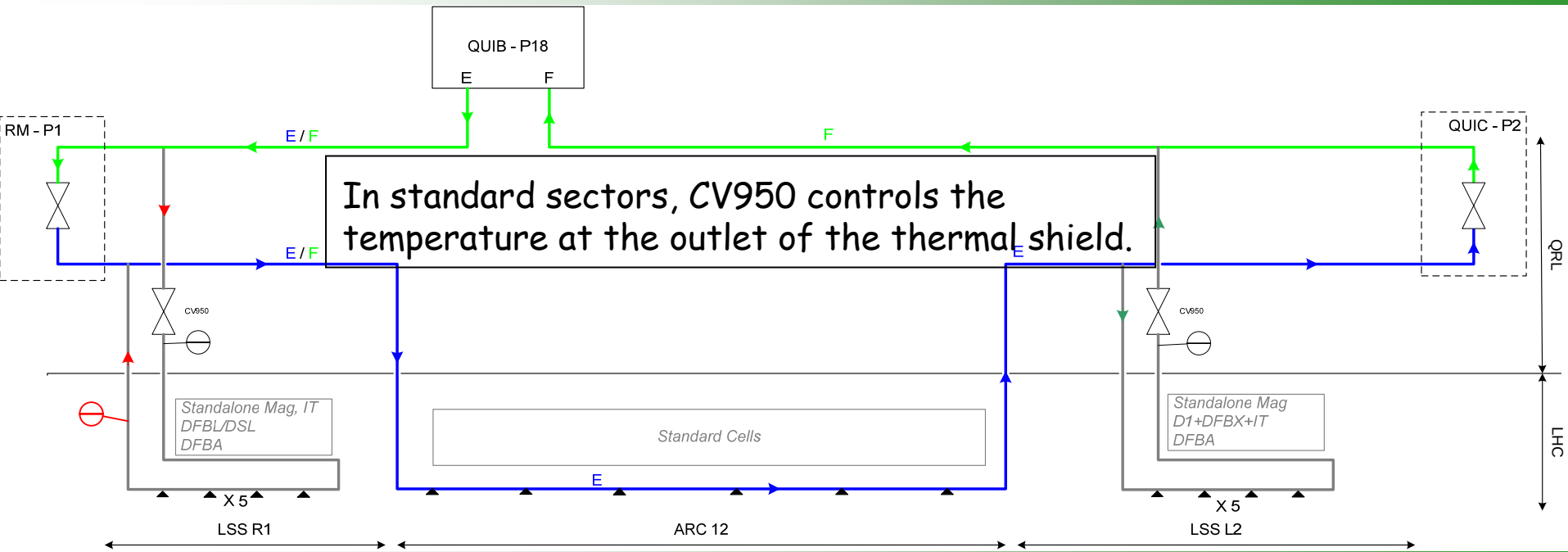
Thermal screens cooling in sector 1-2

- **The issue (Reminder ; see presentation at last MARIC L. Serio)**
- **Proposed solutionS**
- **Conclusion**

After a meeting 15.10.2007 between
- ACR (B Vullierme, N Vauthier) and
- MCS (C Garion, F Laurent, I Slits, JPh Tock)

The issue



- Service module concerned:
  QRLGC (Inner Triplet + DFBX)
  QRLFA (D2 Q4)
  QRLFC/QRLDC (DFBLB /DSL)
  QRLEC_05R1 (Q5)
  QRLEC_06R1 (Q6)
  QRLDA (DFBAB)

- Requires new instrumentation (10 sensors, 5 electronic cards, 5 vacuum feedthrough, cabling, …) and leaving the concerned cryostats open for sensor installation

BUT SOME ARE ALREADY WELDED AND FULLY CLOSED !

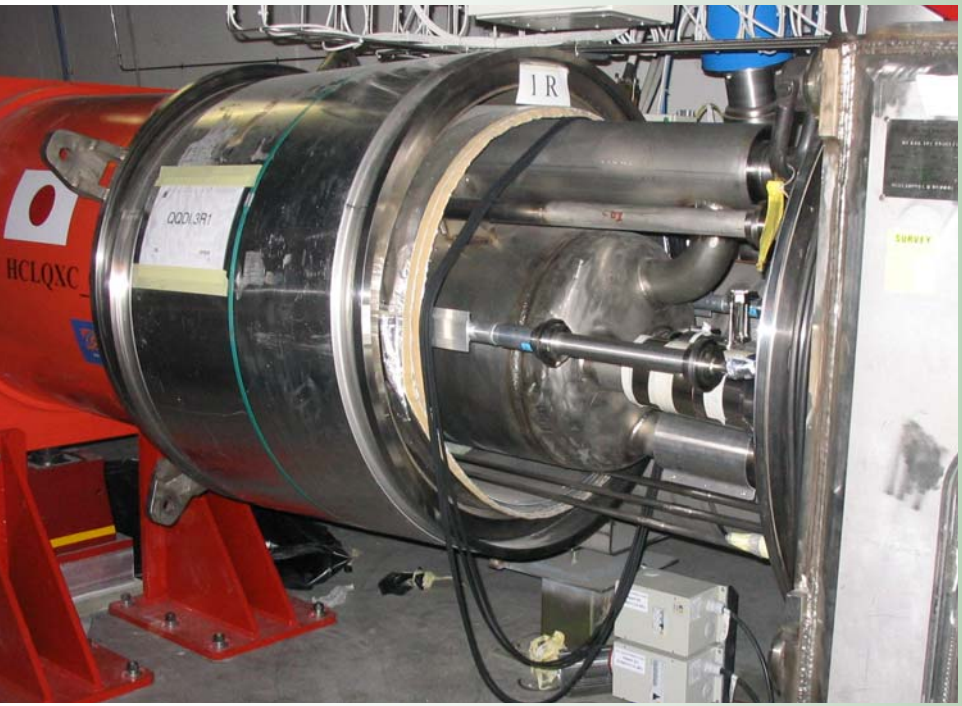
- Alternative solutions:
  - Invert hydraulic connections – does not work with P2 supply
  - Control by virtual flow (possible fall back solution) but no information on blocked pipe

Proposed solutions

For the inner triplet :
QRLGC (Inner Triplet + DFBX)

As cryostat is still open :

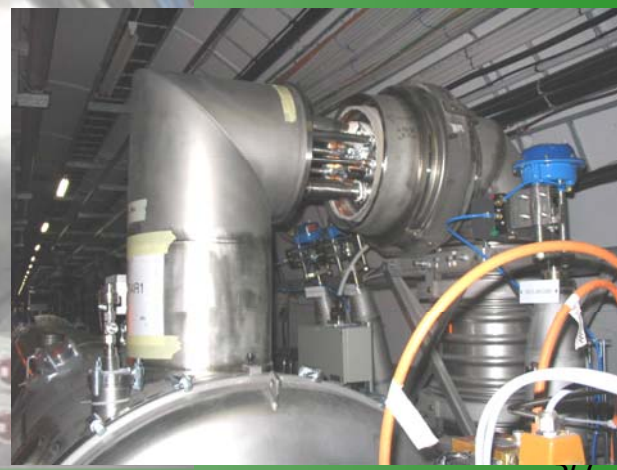
- Install new sensor in Q3/DFBX IC
- Add a port on the Q3 or DFBX cryostat



For the Q4-D2 : QRLFA

Cryostat is closed except Q4 jumper but not on the relevant loop :

1. Open Q4-D2 IC / Install sensor in IC and Q4 or D2 cryostat / Reclose IC
2. No new sensor and control by virtual flow



Proposed solutions

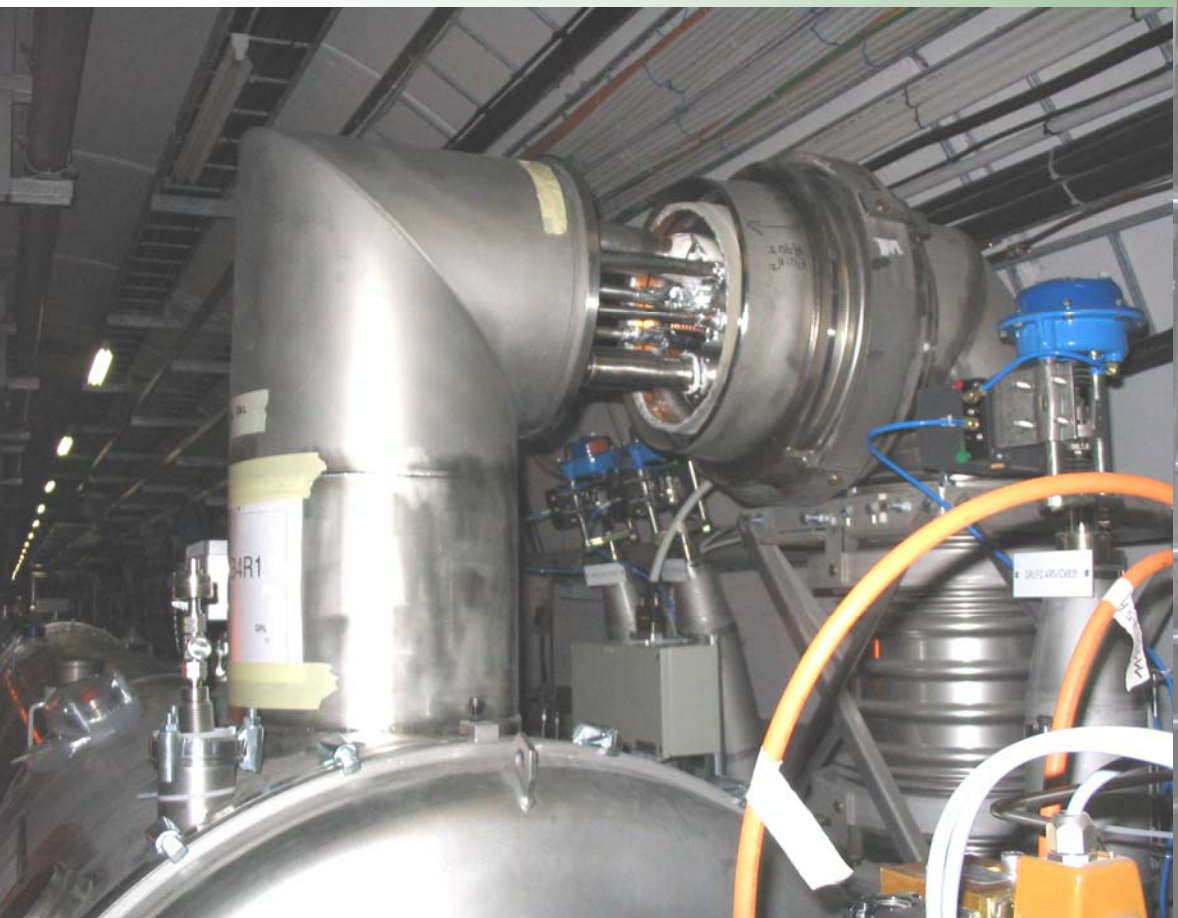
For the DSLB :

QRLFC/QRLDC (DFBLB /DSL)

Available openings are :

- cryogenics extension at DFBLB (not relevant)
- Q4 jumper

1. Install sensor in Q4 jumper
2. Route cable to Q4 cryostat is not feasible so install port on jumper bellows (solid part)



Proposed solutions

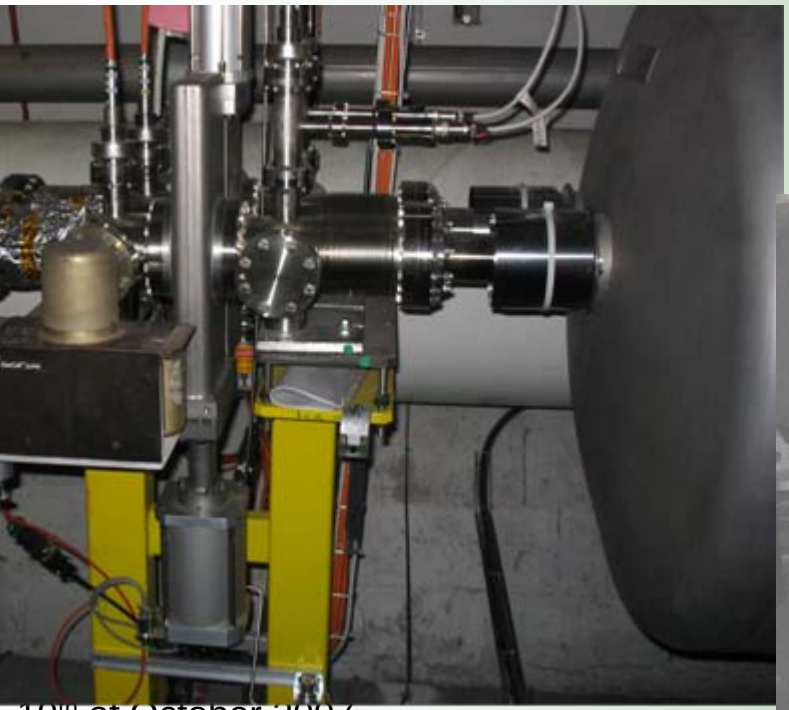
For the Q5 & Q6 :

QRLEC_05R1 (Q5) / RLEC_06R1 (Q6)

Everything is closed :

- cryogenics extension at DFBLB (not relevant)
- Q4 jumper

1. No new sensor and control by virtual flow
2. Cut jumper open / Install sensor / Install a port on the jumper bellows / reclose jumper
   Heavy operations – Losing intervention possibility for machine operation

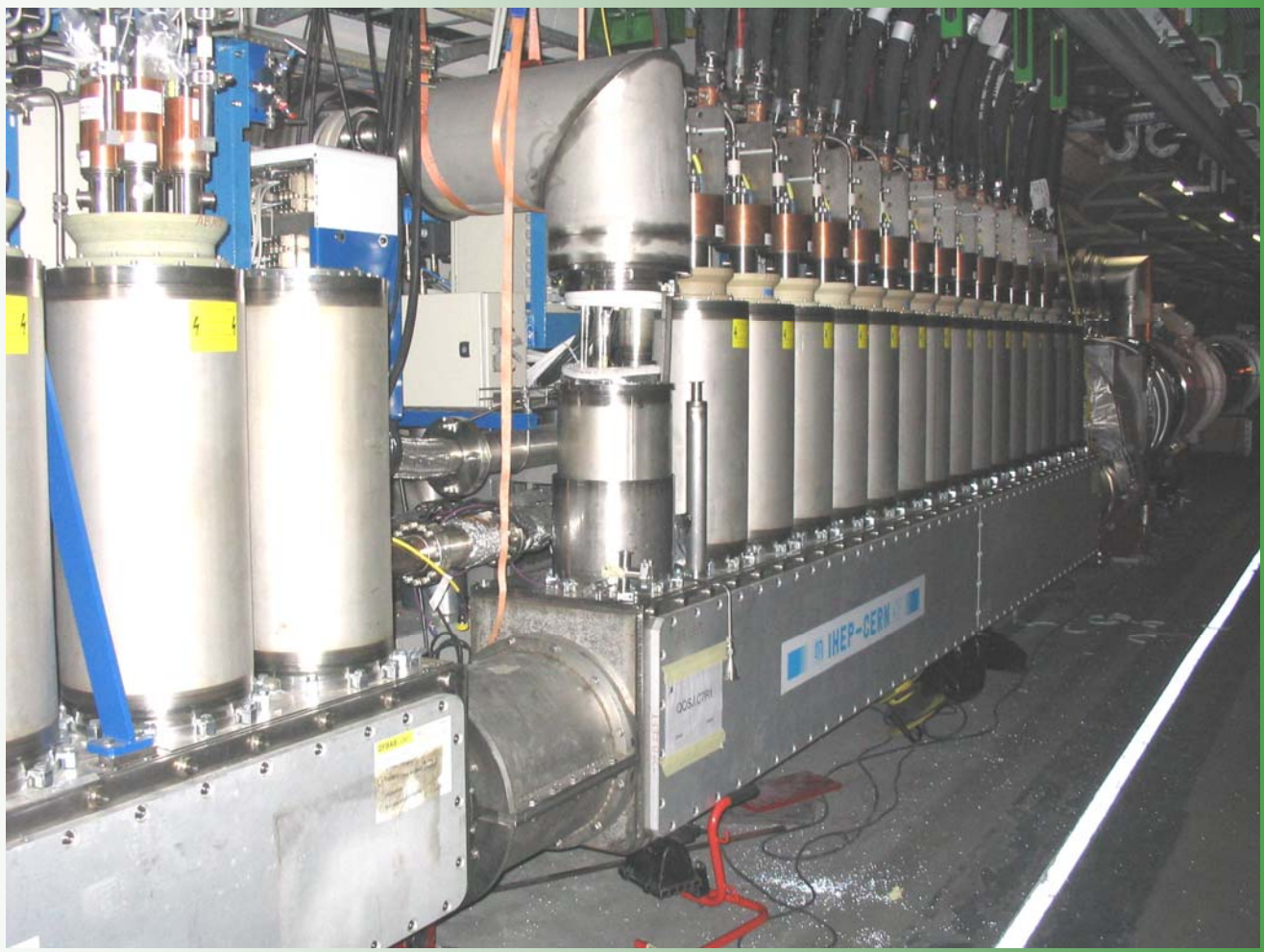


Proposed solutions

For the DFBAB : QRLDA (DFBAB)

Jumper on HCM is still open
HCM cover can be dismounted

1. Install new sensor in HCM
2. Install a port on the DFBAB HCM vacuum vessel



Progress status of the LHC interconnections

Conclusions

- "Easy" solution for loops in inner triplet and DFBAB
- Feasible solution for Q4-D2 but requires reopening the IC
  - Does it need to be done ?
- Solution for DSLB
  - Details to be fixed ; extra work
- "Heavy" solution for Q5 and Q6 ;
  - As they are stand alone magnets (only one magnet so obstruction is unlikely), their working temperature is 4.5 K and sensor is not use for control (for diagnostics), it is preferred to leave them as they are

Sensors are OK for 3 loops ; to be decided for the 3 others but difficult in 2 cases.

Organisation proposed :

This is coordinated by ACR ; MCS can help for installation of additional ports.

Is it really necessary ?