Progress status of the LHC interconnections

- **Summary of all sectors arc and LSSs**
- **Leaks in 7-8 : K-C' in Q9R7 and D1/DFBX @ 8L**
- **What remains …**
- **F 523 Contract**

Work done by the whole MCS-IC section in collaboration with MCS-ET, MCS-SC, AT-MEL, AT-VAC, TS-IC, TS-SU,… and IEG (F523 Contract) and especially :

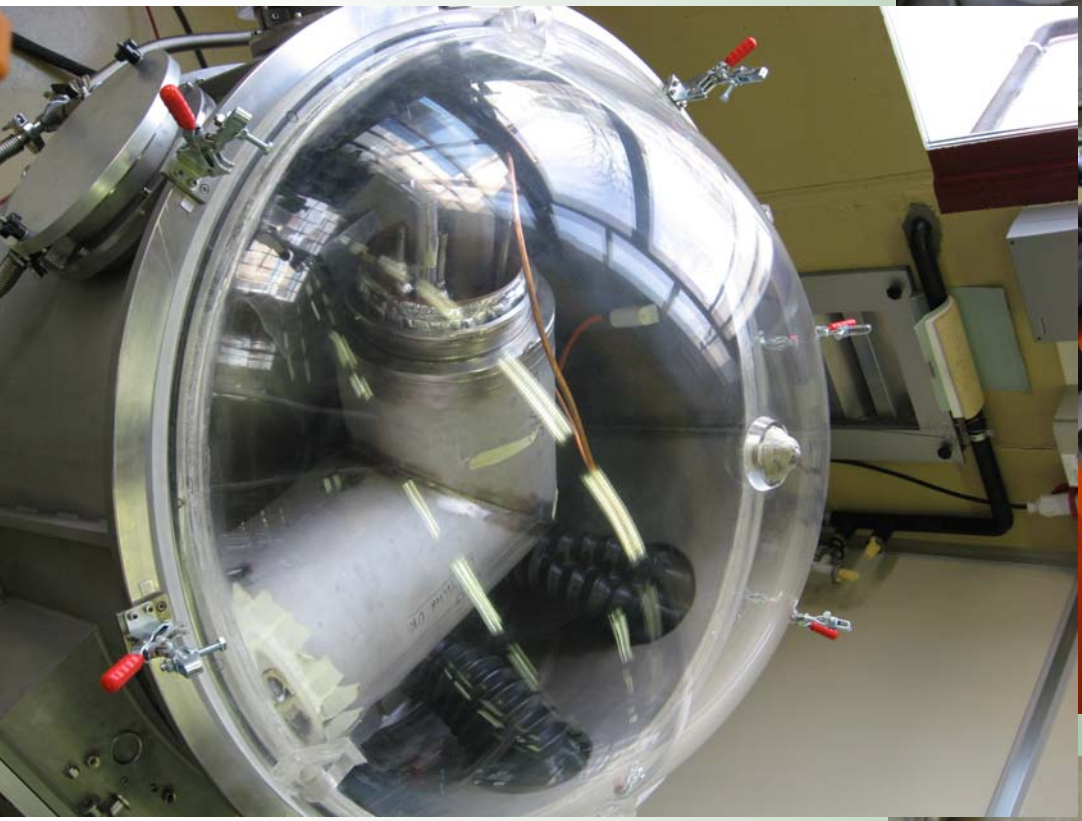
LSSs (Including triplets)	*C Garion / I Slits*
DFBL / Cryo ext /WRL	*I Slits*
Arcs	*~~P Fessia~~, A Musso, M Struik, (1…8)*
Reporting	*O Denis*

Progress status of the LHC interconnections

Sector	status	Next step
4-5	Cool down in progress ; T about 2.18 K	Power test
3-4	1) Vacsec status a) Leak in 7R3 confirmed on K-C' circuit but in stand-by 1.5 10-6 mb l / sec (Use as is ?) b) Leak in 7L4 found after pressure test on jumper of DFBAG (See pictures from S Atieh – TS-MME) 2) DSLC : Electrical interconnections completed ***LAST electrical test of an IC done with success (except 5L triplet .. and 8L)*** Welding of cryogenics lines in progress Waiting leak test (priority on 1-2)	Jumper in repair
5-6	Cool-Down started	Cool-down
6-7	Ready for flushing	Flushing

Accelerator Technology Department

Leak in jumper DFBA @ 4L



Courtesy of S Atieh

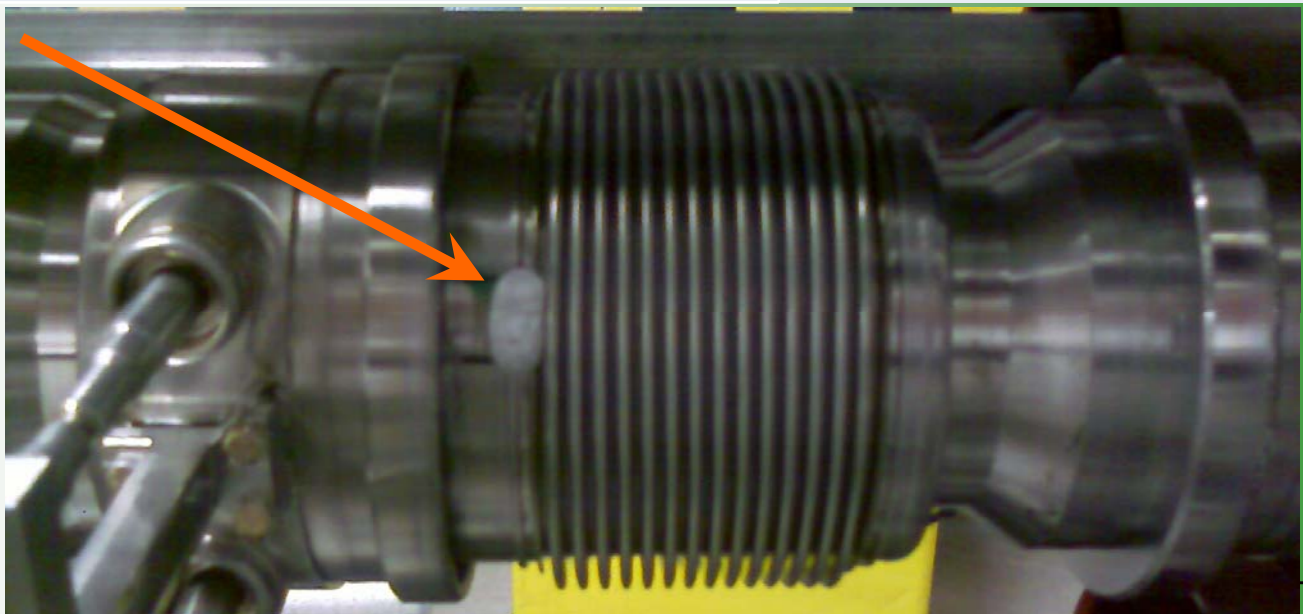
21st of November 2007

Progress status of the LHC interconnections

Sector	status	Next step
2-3	Pressure tested with success last week ; Leak test on going with 10 bars He in cryolines	Repair of 6 Helium guards Cabling of one T sensor Leak localization and repair in 7L3
1-2	1) All arc sectors are provided to VAC 4 still to be validated (priority) 2) Activities on triplet 2L: Closure for end of W 47 3) Additional cryogenics instrumentation LSS1R : See V Parma (Done) – Q4/D2 reclosed 4) Activities on triplet 1R: Repair of one PIM by AT-VAC to be tested	Repair of He guards (7/11) Will be on critical path for pressure test (Bad vacuum) but no impact as PT of triplets is independent

NC 882743

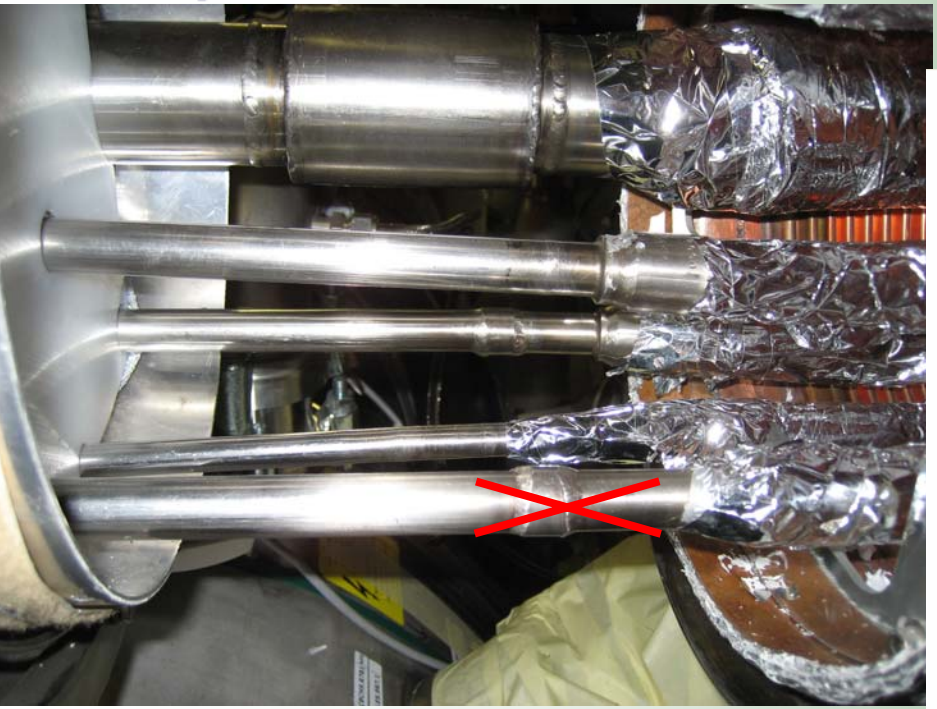
Q2-Q3 R1

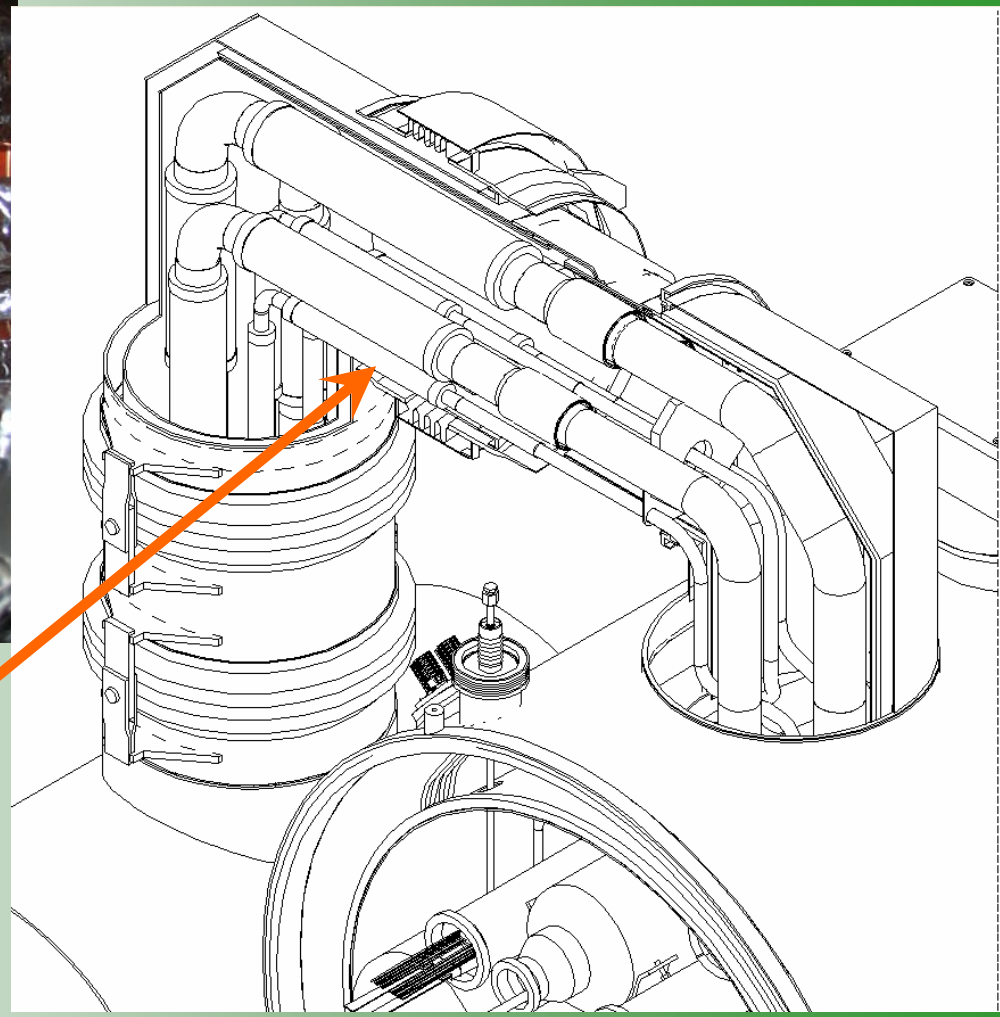


Progress status of the LHC interconnections

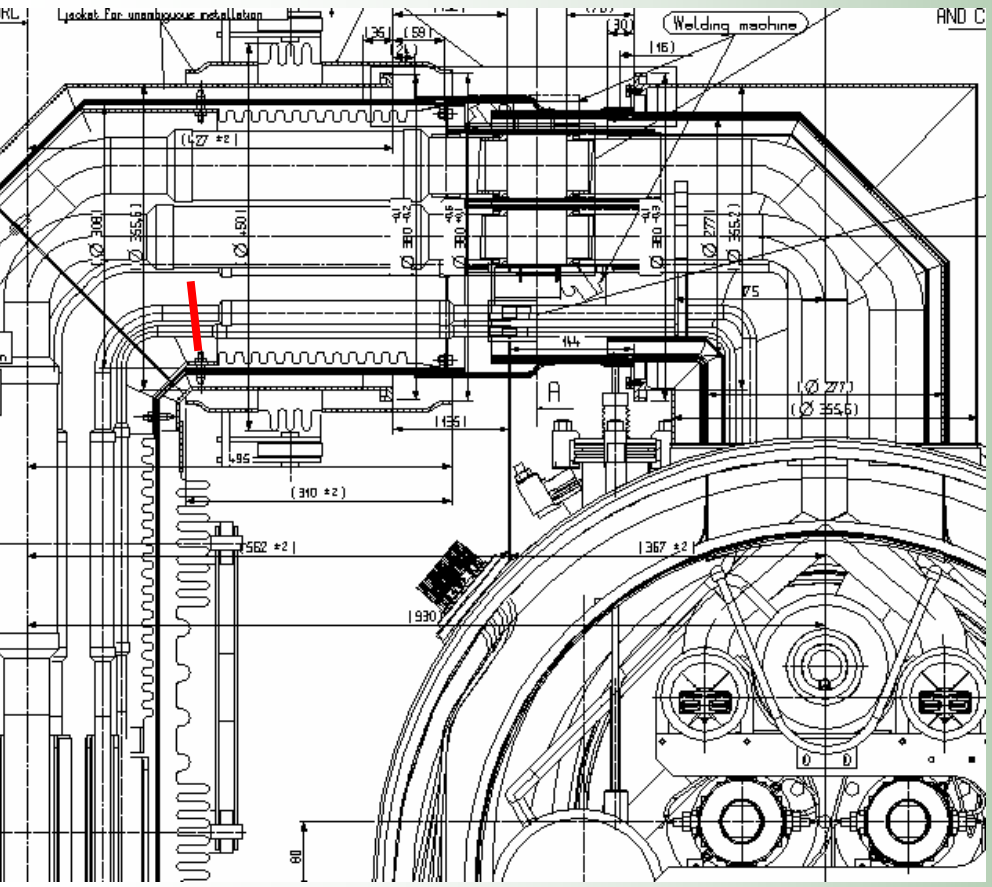
Sector status		Next step
7-8	Leak in DSR7 K-C' localised in jumper metal hose on QRL side ; repair is on-going Triplet 8 L : Leak on CM circuit localised (see next slides)	Repair and local LT Repair of leak ?
8-1	RAS	

Leak in K-C' at Q9R7 (1/2)





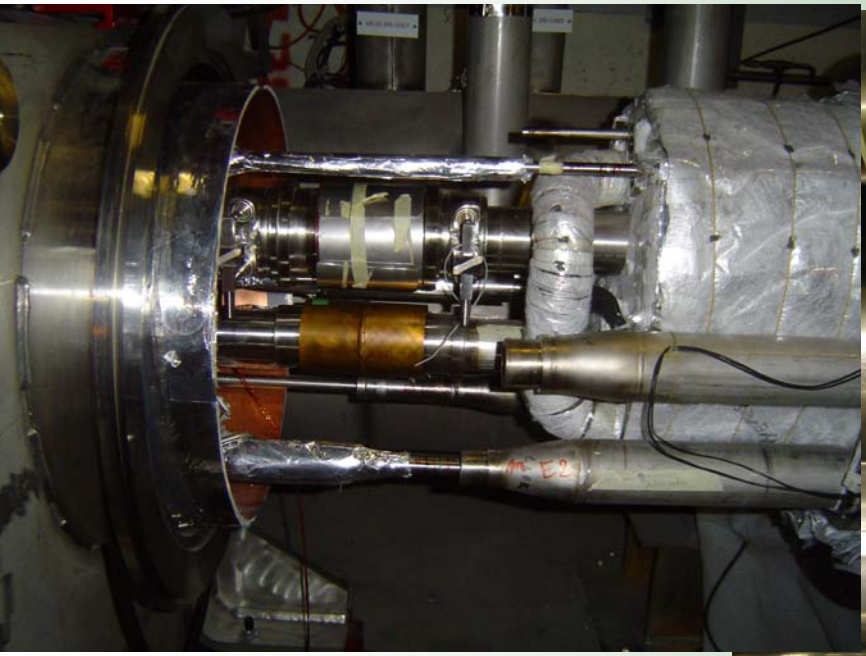
Leak in K-C' at Q9R7 (2/2)

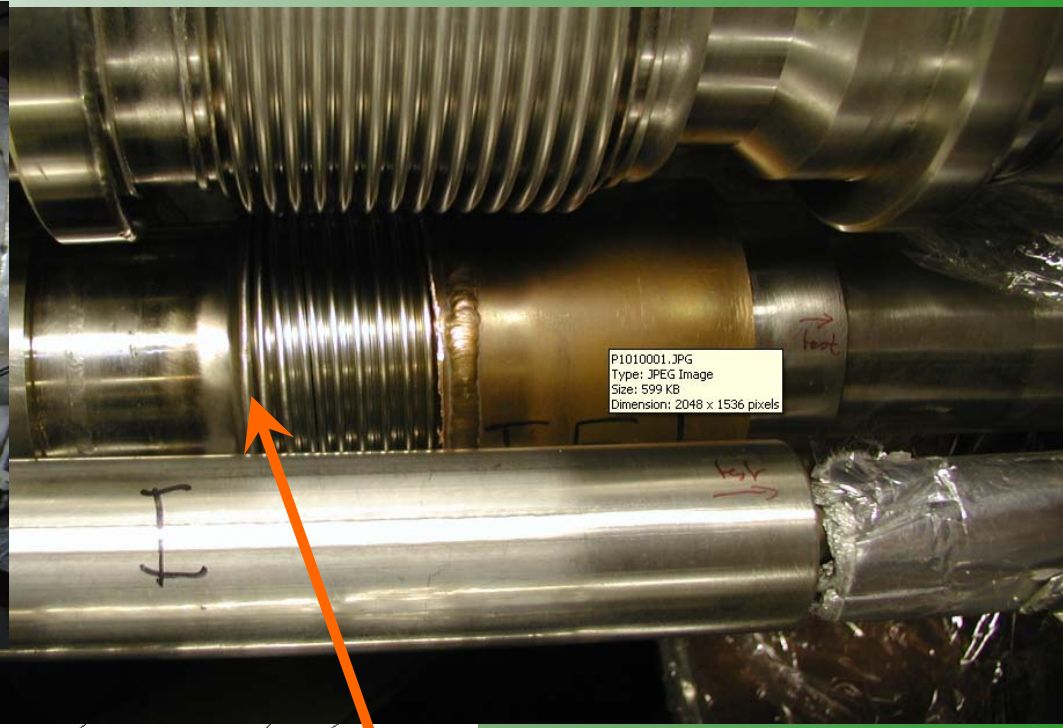


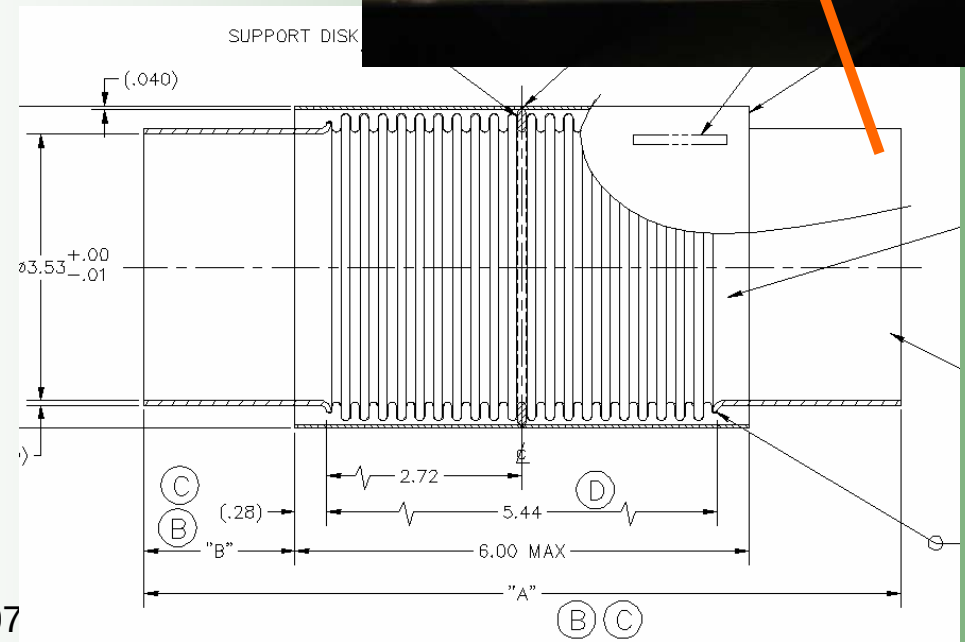
- **Repair method defined and agreed between ACR and MCS**
  Will be done by MCS-ET (19/11)
  Metal hose will be replaced with special adaptors to allow face welding
- **Spare provided by ACR (LHCDFB__0074) [PN 25] bar and tested by TS-MME (3 X LN2 shock + PT @ 25 bar ; no leak > 3.2 10-10 mb l / sec) (20/11)**
- **Cut of leaking hose (20/11) by MCS**
- **Prepare adaptators (20/11) MCS**
- **Analysis of leaking hose (ACR)**
- **Reweld and step by step leak test (MCS-VAC) (up to 26/11)**
- **Reclosure of thermal shields and outside sleeve (MCS) (up to 28/11)**
- **Leak Test of external envelope (VAC)**

Schedule to be confirmed ; never done before.

Leak in D1/DFBX @ 8L (1/2)







Leak in D1/DFBX @ 8L (2/2) Schedule

Day					
1	Cut the bellows (depends on replacing one)				
2	Unsolder busbars and remove leaking bellows				
	// Leak test of bellows after LN2 cold schocks				
3	Prepare extremities and insert replacing bellows				
4&5	Resolder busbars				
6	Electrical test and insulation				
7	Welding of cryogenic line				
8	Local leak test				
9&10	Closure of IC				

- **Evolution of a leak on a flexible elements is unknown so risk is high**
- **RHIC bellows is on his way to CERN ; start tomorrow for day 1 after confirmation of reception**
- **Back-up solution : 2 line E bellows**
- **Part of replacement time is hidden by the repair in Q9R7**

Progress status of the LHC interconnections

What remains in 2007

- 2 closures in 3-4 after DSLC IC and repair of DFBA leak
- Repair of Helium guards (1-2, 2-3) mainly
- Triplets in 1R, 2L and 5L (Low priority)
- DSLC interconnections with DFBLC and DFBAF
- Leaks repairs…. At several locations ; a lot of leak tests interleaved with the assembly/repair activities

Progress status of the LHC interconnections

F523 Contract

* Extension up to April 2008
Activities in 2008 (in 4-5 mainly) :
*Reconnection of triplet 5L
* Warm-up so possible openings and replacement of PIMs

- Induction soldering machines are functionally tested. Will be transferred to CERN
- Ultrasonic welding machines are under test
- Programme is established for all tooling and components