



# Cryomagnets Interconnections

## ❖ Sector 1-2

Short-circuit in Q19L2

Balls blocked during ball test

## ❖ Update on sector 4-5 consolidation

## ❖ Connection cryostats status

See also TS-SU for geometry in AOB

## ❖ Quick interconnection overview

Report from a work of team and contributions from F Savary, A Musso, M Felip + VAC, ELQA, TS-SU, TS-HDO, IEG, MCS-MF, ....



# Sector 1-2

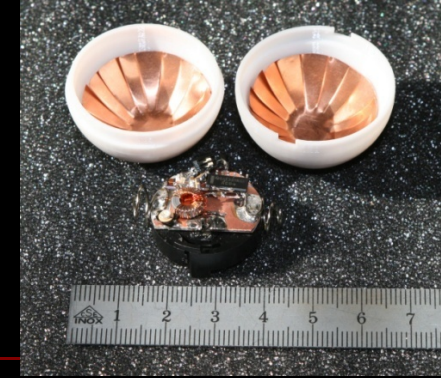
## Short circuit in Q19L2

- Thursday morning (13/3) : TP4-B1 performed by ELQA (Preliminary test of the insulation at 50 V on main and spool circuits during the reparation of the connection cryostats)
- Short to ground detected on the MBA.A12 line of the dipole circuit.
- Fault localized between the dipole magnets at position C.19L2 and B.20L2.
- Connection cryostats not concerned by this problem.
- On Friday, fault localised on the IC dipole/SSS
- Monday 17/3 : IC opened
- Tuesday 18/3 : line M3 cut and endoscopy done
  
- [SSS moved up to 12 mm longitudinally / More than nominal]
- Similar to the case in 7-8
- Extensive inspection and repair are launched with de-soldering of BB to reproduce defect  
Should be completed next week ;





# Sector 1-2 Ball test

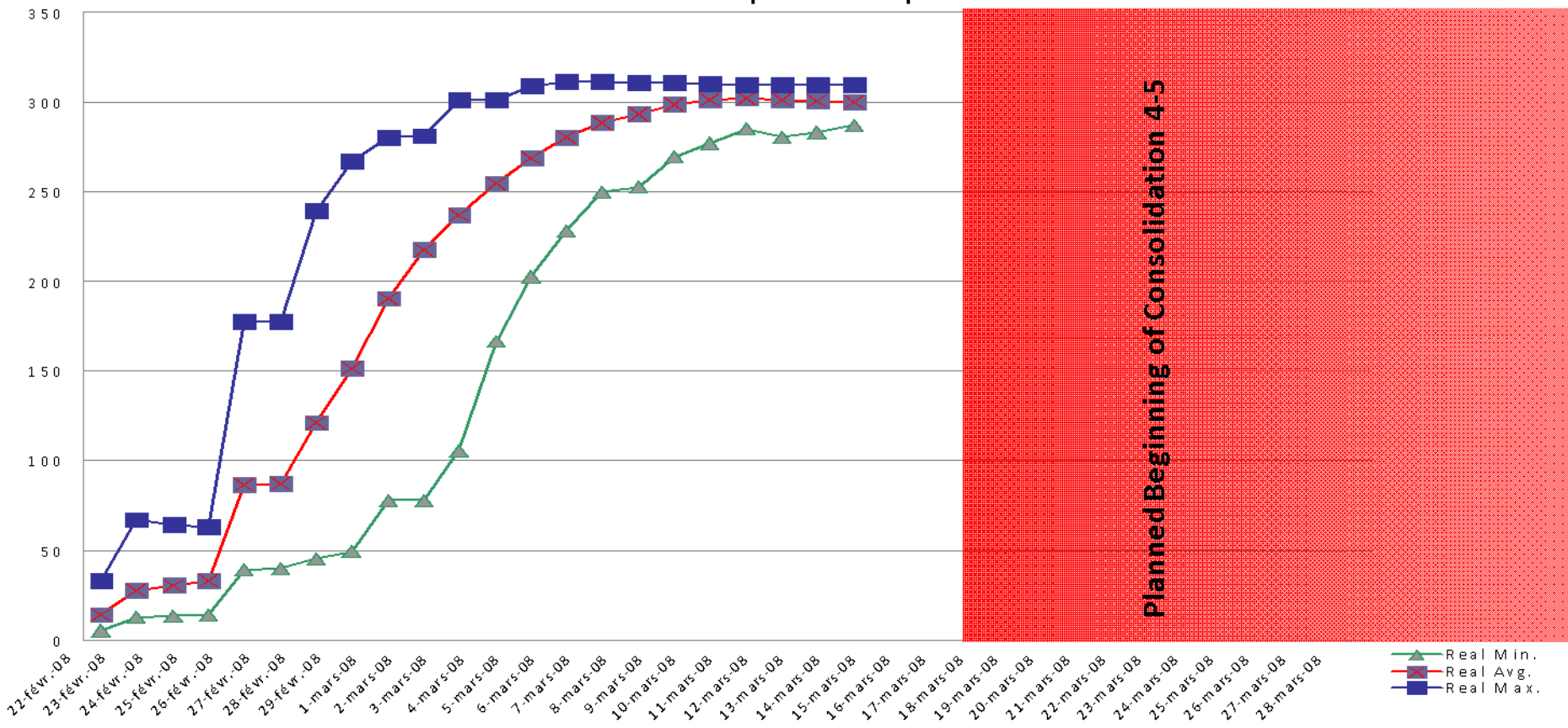


- Last Friday morning (14/3) : Spoutnik ball test in sector
  - \* 1<sup>st</sup> RF ball OK
  - \* Passive ball launched and blocked ?
  - \* This week : Opening of IC of QB type, cutting of PIM.. Found balls in PIM and the PIM has no finger deformed
- Next :
  - \* Endoscopy
  - \* Detailed analysis of PIM
  - \* Rewelding of a new PIM (Today) – Leak test –
  - \* Reclosure of IC
- Why ?

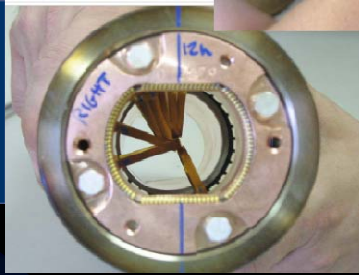


# Sector 4-5 consolidation Warm-up

Warm-up vs Temps



- Started ½ week later than expected
- Completed ½ week in advance



# Sector 4-5 consolidation PIMs



➤ First ball test yesterday (18/3) :

Revealed 4 failures :

Q12R4, Q21 R4, Q12L5, Q28L5

Extrapolations leads to about 20 PIMs to cut / To be confirmed next run

OK up to 24 within schedule

➤ IC are under opening ; one is done ;

➤ Endoscopic inspections are on-going



# Sector 4-5 consolidation

## Y lines

- Interconnections are open
- Line X are cut
- Investigations are on-going
- Endoscopic inspections are on-going
- Probably complete removal for a thorough analysis
- Discussions with IEG







# Sector 4-5 consolidation

## Helium level gauge feed-throughs

<u>Sector</u>	<u>To be replaced</u>	<u>Done</u>	<u>Remark</u>
1-2	24	12	Completed
2-3	9	8	Completed
3-4	3	3	Completed
4-5	20 (8)	0	During shutdown of 4-5
5-6	13 ?	0	After warm-up
6-7	25	25	Completed
7-8	7	7	Completed
8-1	1	1	Completed

- 20 found instead of 8
- Components are available
- No problem to integrate in the schedule

# Sector 4-5 consolidation DFBAs

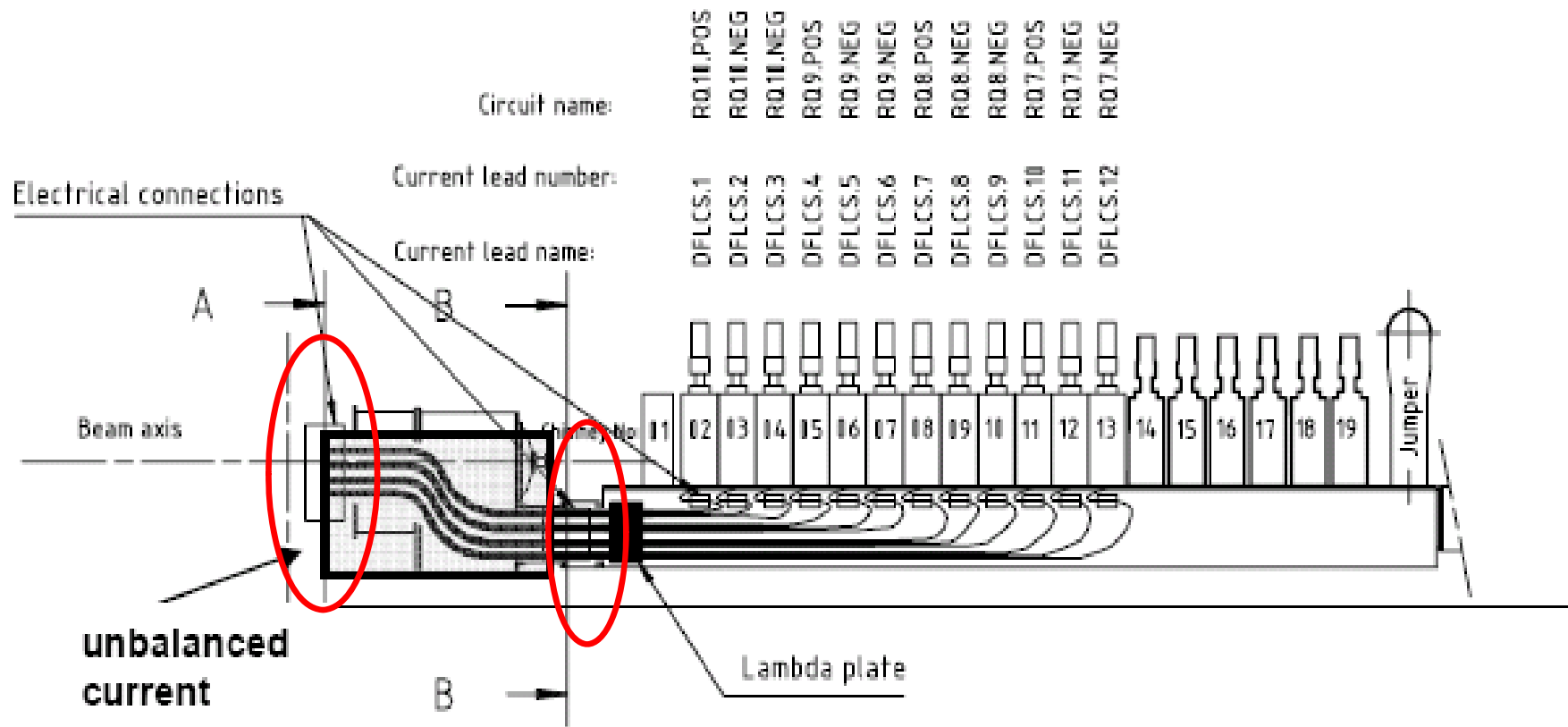
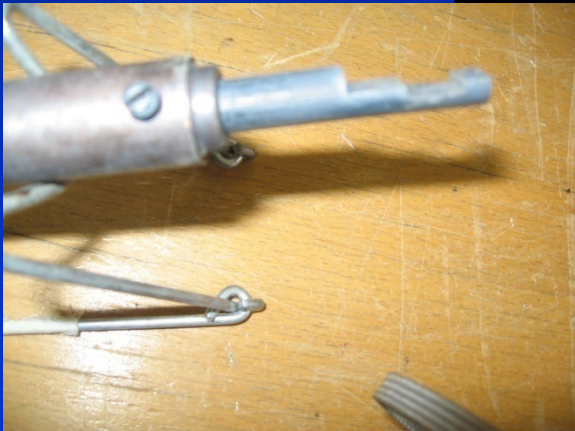
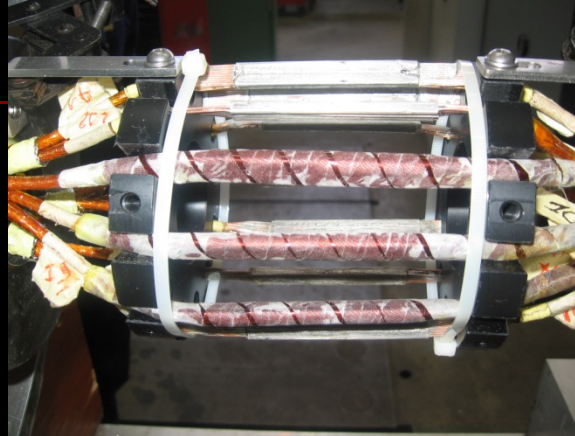
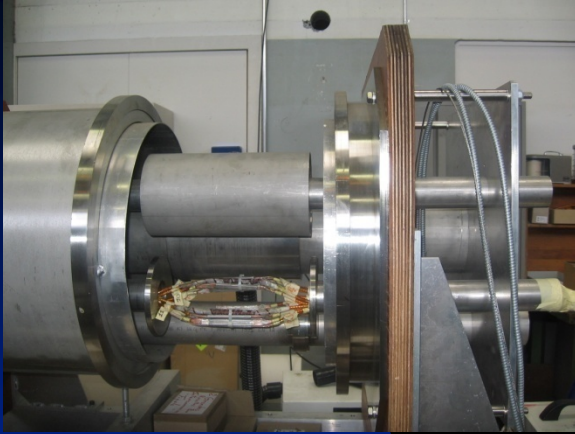


Figure 1. Schematic view of 6kA busbar routing in DFBAs





# Sector 4-5 consolidation DFBAs





# Sector 4-5 consolidation DFBAs

## What was done on the mock-up

De-braze 5 connections

Re-braze them and adapt the support piece to allow re-assembly

... with a mechanical support made out of insulation material

## Conclusions from test :

☺ Technically feasible

☹ Not easy

☹ Risky :

Spacer difficult to remove

Risk to introduce / reveal a defect

☹ Compatible with schedule for one intervention / probably not for 2

☺ Tooling available



# Sector 4-5 consolidation DFBAs

	<u>Validated Procedure</u>	<u>Schedule risk</u>	<u>"New" Defect</u>	<u>Further Interventions Necessary ? Radioactive rules</u>	<u># work</u>
<b>Use as is</b>	No	No	No	Yes ?	0
<b>2 DFBA's</b>	Yes	Yes	Yes (2)	-2	100%
<b>1 DFBA</b>	Yes	Small	Yes (1)	-1	50%

- **DECISION TO BE TAKEN SOON (Clock is launched): ASAP**  
Difficult to balance "necessity" of intervention in the future and risk linked to a repair now
- Meeting today at 9 am on the subject
- Conclusion : No intervention in 4-5 for the moment  
Main argument is that sector is commissioned  
Studies go on (Analysis, experience in the field, other repair options)



# Sector 4-5 consolidation (summary)

Started 13/3/2008

<b>Sector 4-5 Consolidation</b>			<u>Schedule</u>
1	Plug-in modules	4 failed PIMs localised ;	On schedule
2	Photometer test	Planned 9-10/4	On schedule
3	Y lines	IC opened, strategy defined	On schedule
4	Helium guards	Endoscopic inspection done	Manageable
5	Leaks	1 disappeared / 1 under localisation	?
6	Triplet 5L	DFBX aligned	2 days ahead
7	Q5R4	IC opened ; investigation running	?
8	Connection Cryostats	Started	On schedule
9	CC splices	Not critical	1 day
10	DFBs cables	Decision today	?

- VIC done on 13/3/2008
- Well within schedule up to now



# Interconnection Cryostats

<b>Sector</b>	<b>Repair of ICCs</b>
1-2	Under closure / Electrical retest/ End for beginning of W13
2-3	Under repair ; end for beginning of W13
3-4	Opened ; End foreseen beginning W15 [Eastern, Open Days, in paral with 4-5]
4-5	R4 and L5 opened ; end for W17 ; not priority
5-6	Afer warm-up (8th) - 3 units ?
6-7	Completed
7-8	Completed
8-1	Completed

- Presentation on geometry by TS in this MARIC

