

LS1 CryoBLM installation notes

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EDMS-1342256

Introduction

The relevant documents are:

1. ECR: LHC-LB-EC-0003 (EDMS-1324259)
2. Specification of expected signal levels: EDMS-1340718
3. Measurements of the detectors' positions : EDMS-1334786

Cell 9R7

Installation in cell 9R7 took place in November 2013. Figure 1 shows the end cap of MB magnets with positions of the detectors.

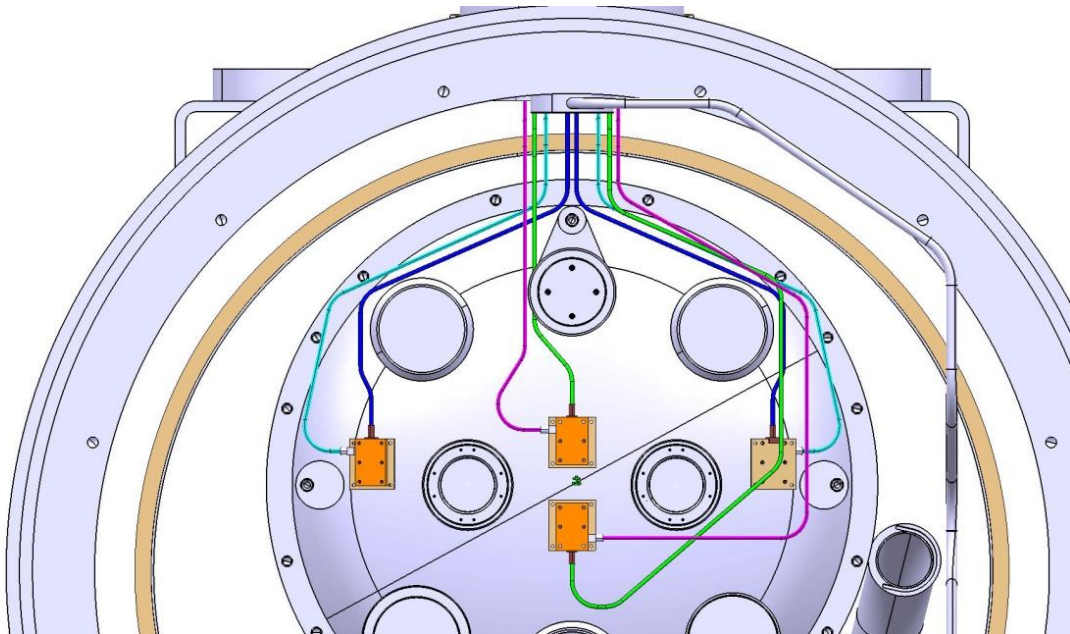


Figure 1: Layout of the detectors on the cold mass surface. Beam 1 is on the left and it is the one around which large signal from collimation system is expected.

Remark 1: we have normal SMA connectors with teflon. It is crucial not to have much mechanical stress on the connector as Teflon will slowly disappear with radiation.

Remark 2 (2013-11-26): When connecting diamond detector Erich heard a little "click". We had no time to open the detector, but signal is ok (source, scope) and no visible crack on the outside is seen.

Installed detectors:

- 1) Upper: Diamond 500 um (D1), ceramic PCB, cables: HV 1, sig 4
- 2) Left: Silicon 100 um (D2) 2N 1x100 SN009, cables: HV 2, sig 3
- 3) Bottom: Silicon 300 um (D3) 2N 4x300 SN001, cables: HV 8, sig 7, 500 Ohmcm
- 4) Right: Silicon 300 um (D4) 2N 4x300 SN002, cables HV 5, sig 6 , 10 kOhmcm

2013-11-26: Knee and flange installed. Measurement of diamond signal with Erich's source (radioactive clock arm). Several cable connectivity checks done – all ok.

For future needed better number on the flange (for instance done with electric pen in the lab).

Below the IV curves are presented for Silicon detectors. For diamond the currents are very small. Note that the light was on during the measurements and the Silicon detector holders are not light-tight. Both measurements were done on 2013-12-03 using Keithley 6517A.

IV before closing the interconnect

Table 1: IV data before closure of the interconnect.

No	HV [V]	D1 current [pA]	D2 current [nA]	D3 current [nA]	D4 current [nA]
1	5	-	0.267	3.8	0.9
2	10	0.001	0.316	4.1	1.1
3	20	0.005	0.445	4.7	1.5
4	30	0.006	0.61	5.2	1.9
5	60	0.015	1.7	6.9	2.7
6	90	0.02	3.2	8.2	3.4
7	100	0.02	3.75	8.6	3.7
8	150	0.03		10.5	4.7
9	200	0.08		12.5	5.7
10	250	0.11		14.2	6.7
11	300	0.28		16	8
12	350	1.8			
13	400	6			
14	450	10			
15	500	13			

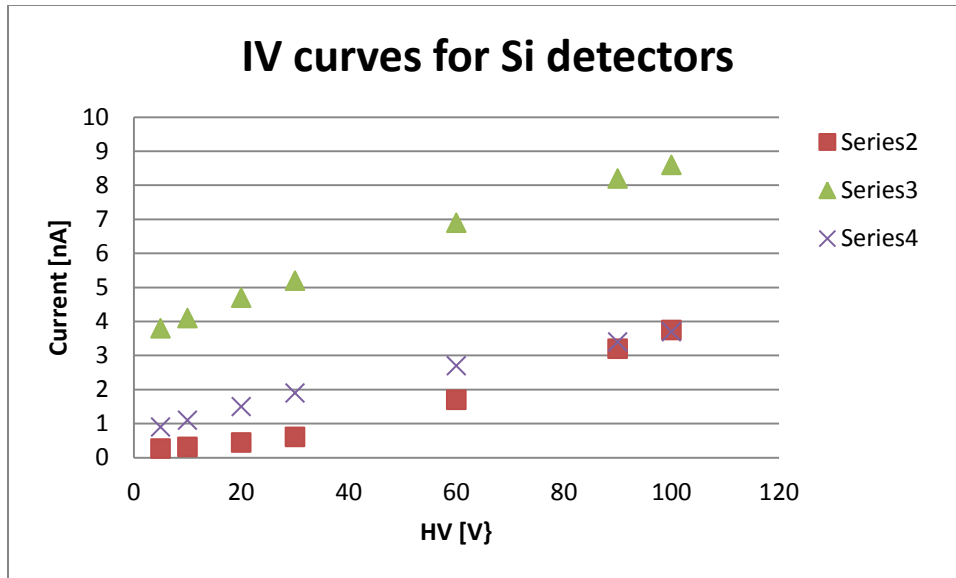


Figure 2: Illustration of IV data.

IV after closing the interconnect

Table 2: IV data after the closure of the interconnect.

No	HV [V]	D1 current	D2 current [nA]	D3 current [nA]	D4 current [nA]
1	5	-	0.13	3.3	0.6
2	10	-	0.18	3.6	0.9
3	20	-	0.3	4.2	1.3
4	30	-	0.46	4.7	1.6
5	40	-	0.78	5.1	1.9
6	50	-	1.12	5.7	2.1
7	60	-	1.52	6.3	2.4
8	90	-	3.04	7.5	3.2
9	100	-	3.59	7.9	3.4
10	150	-		9.9	4.4
12	200	-		11.9	5.3
12	250	-		13.6	6.4
13	300	-		15.4	7.6
14	350	-			
15	400	1.3pA			
16	450	8-9pA			
17	500	20 pA			

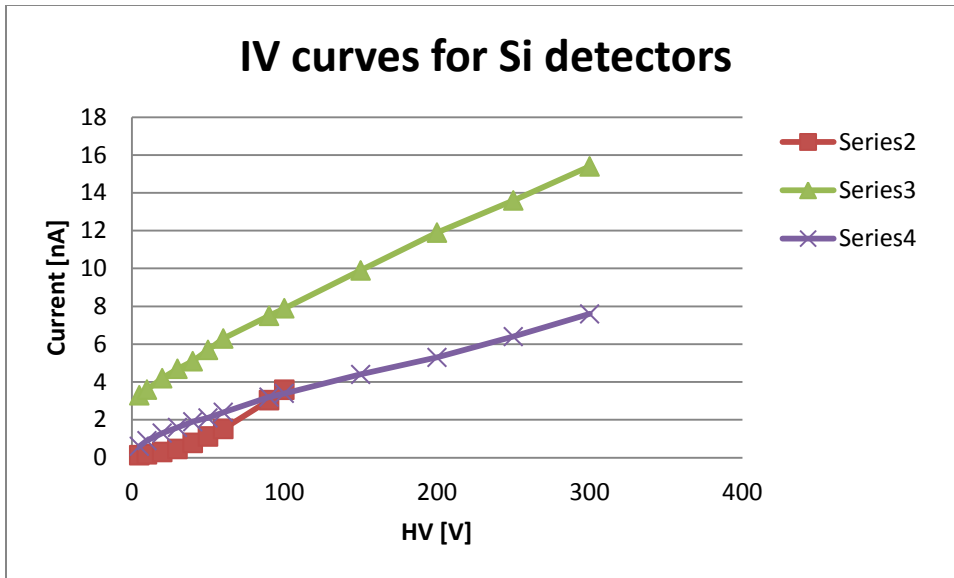


Figure 3: IV data plotted.

Photos



Figure 4: Cryogenic cable routing.

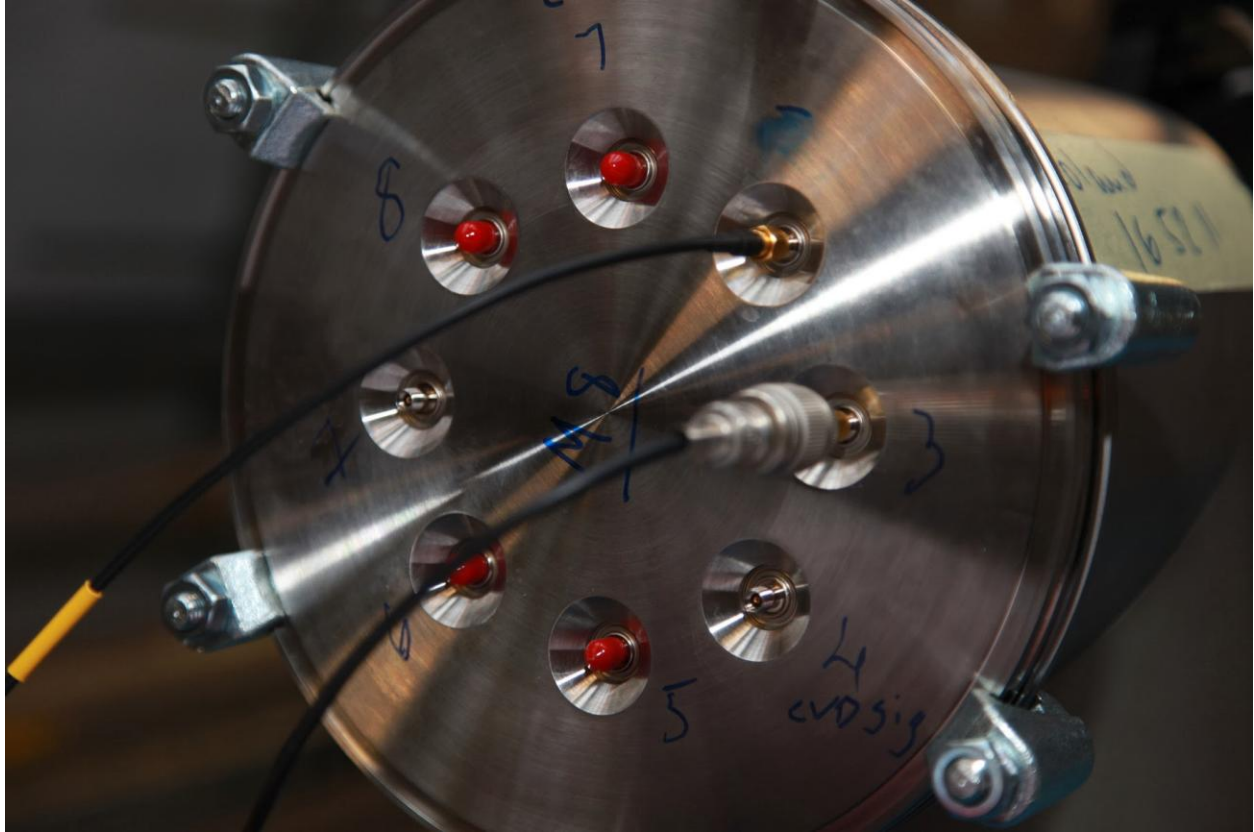


Figure 5: Flange with feedthroughs.

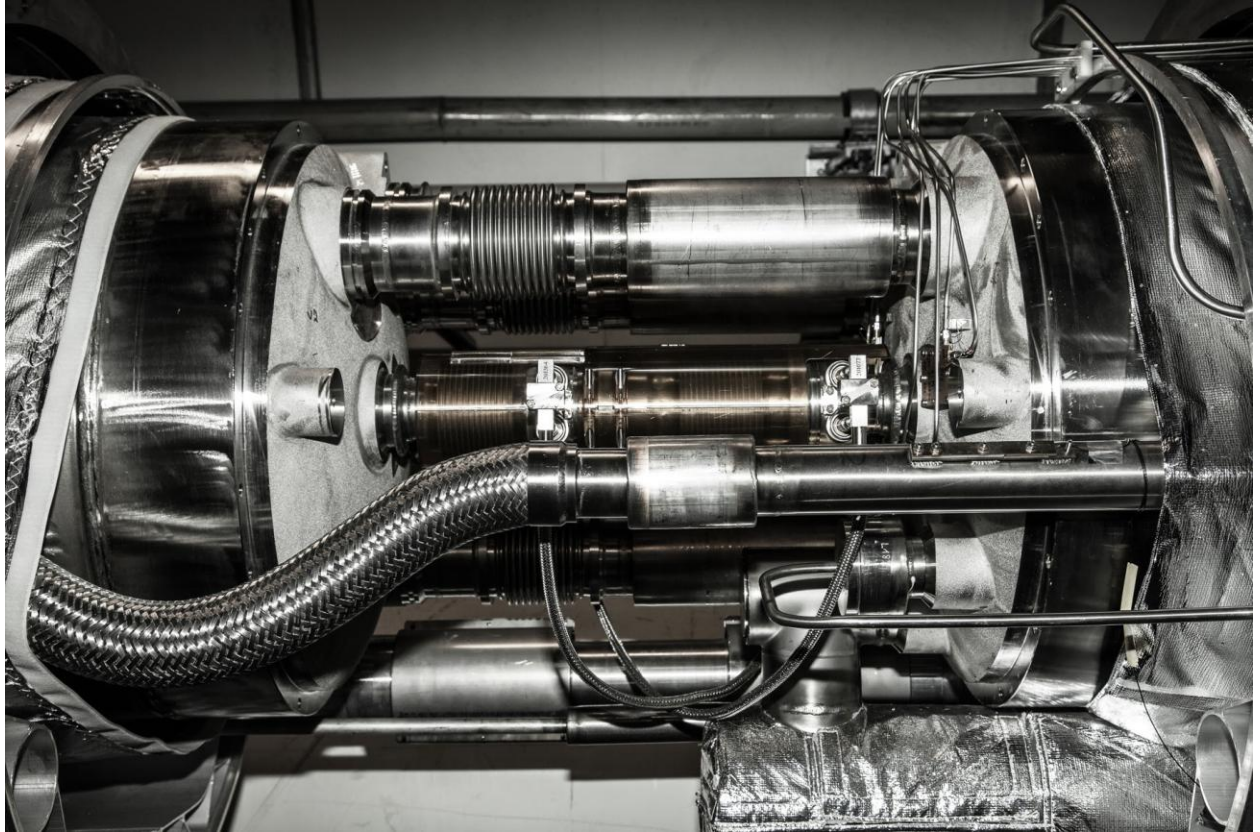


Figure 6: Interconnect with installed detectors before closing.



Figure 7: Routing of the cables through the last MLI layer.