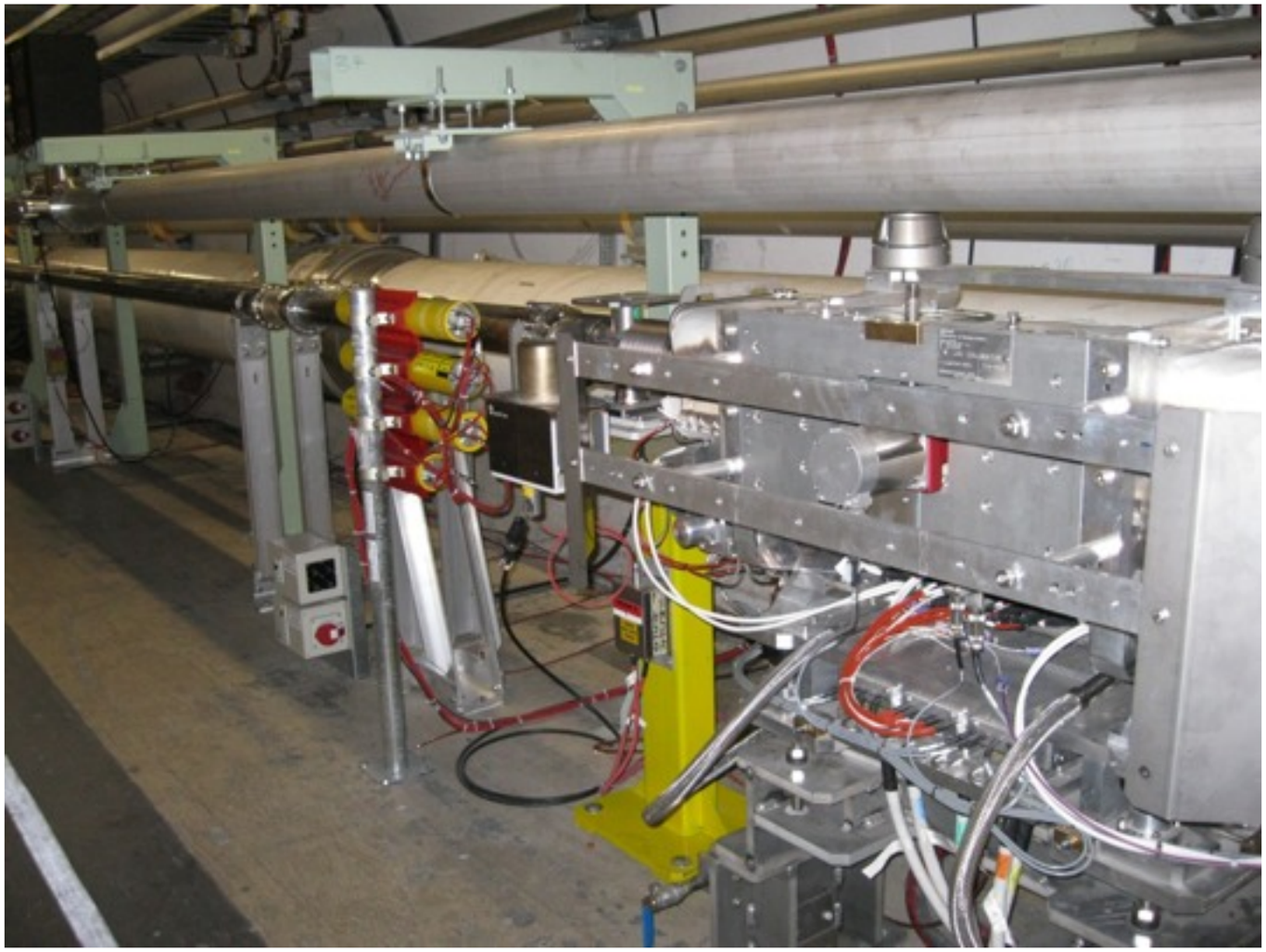
Calibration of Direct Dump BLMs

B. Dehning, E. Effinger, E. Holzer, E. Nebot
and the injection Team.
TWGM 20-07-2011

Location of the Direct Dump monitors

- The Direct Dump BLM under study is located ~ 1m downstream of TCSG.4L6. On the same support there are two ICs (one of them equipped with a 11ms filter) and one SEM



Direct Dump calibration exercise

Beam dumped on TCSG of P6: TCSG closed, TCP-Ir3 closed, all the rest at nominal.
First 4 shots with standard probe intensity:
1) 123
2) 83
3) 129
4) 122

Reduced probe intensity:

5) 45
6) 49

Increased intensity

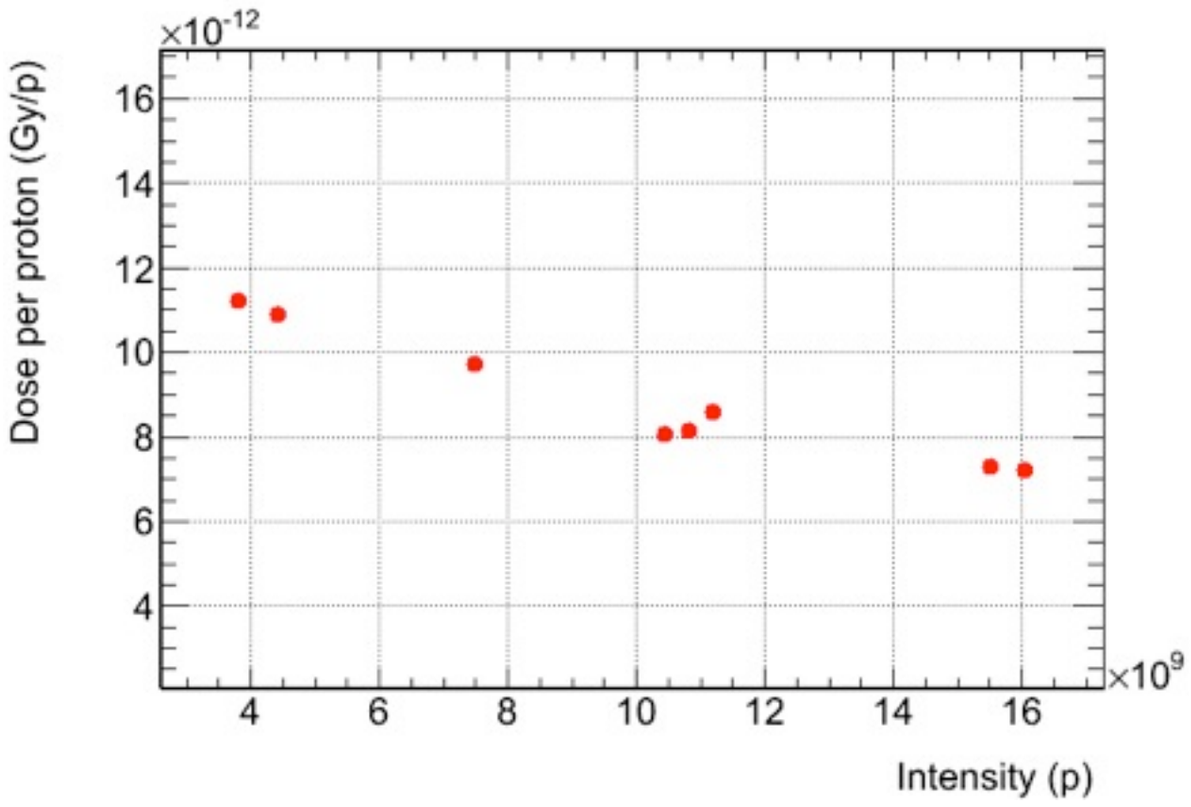
7) 179
8) 173

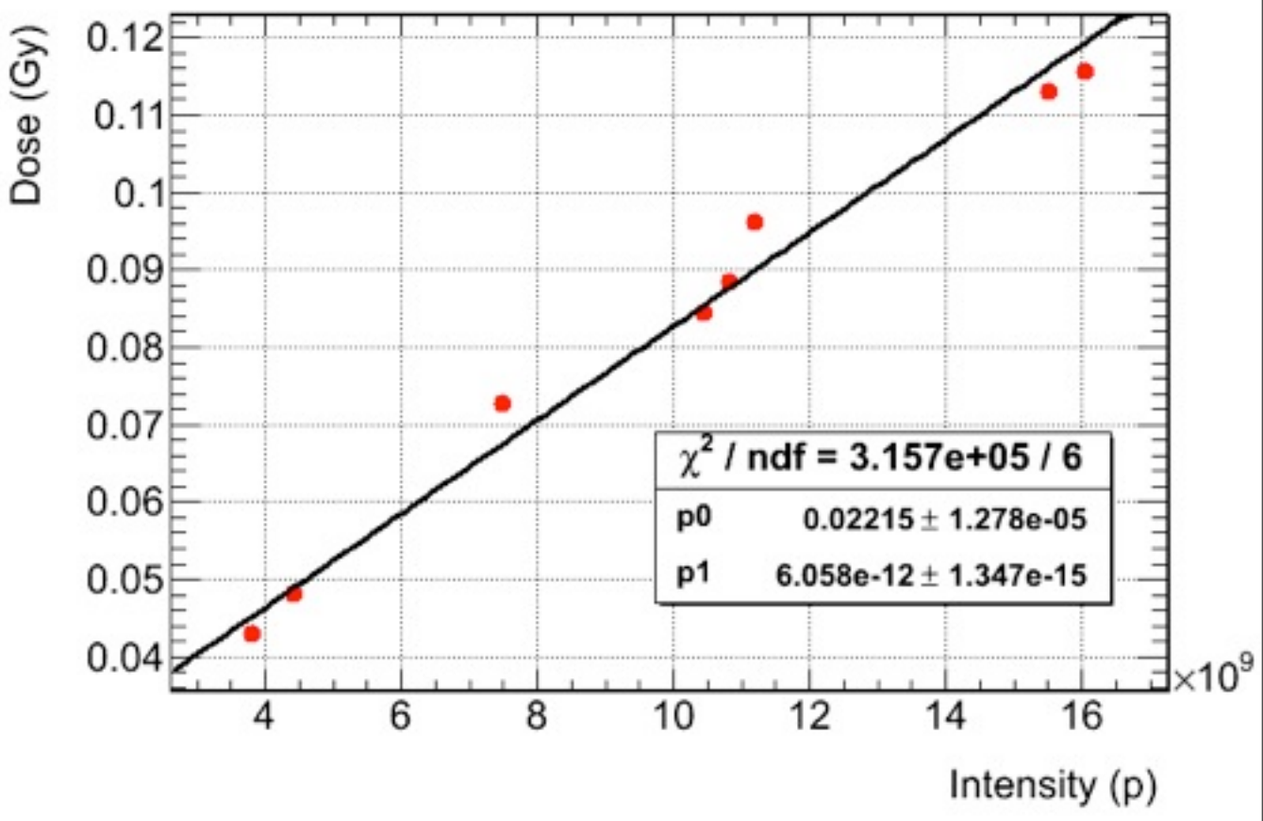
Standard IC calibration exercise

Intensity (p)	Signal (Gy/s)	Dose	Gy/p
1.08E+10	0.068	0.0884	8.20E-12
7.50E+09	0.056	0.0728	9.70E-12
1.12E+10	0.074	0.0962	8.60E+12
1.05E+10	0.065	0.0845	8.10E-12
3.82E+09	0.033	0.0429	1.10E-11
4.42E+09	0.037	0.0481	1.10E-11
1.60E+10	0.089	0.1157	7.20E-12
1.55E+10	0.087	0.1131	7.30E-12

Approximately linear behaviour of the Ionization chamber with intensity.

Calibration in terms of Dose per proton 8.9E-12 Gy/p.
~35% decrease due to space charge effects?



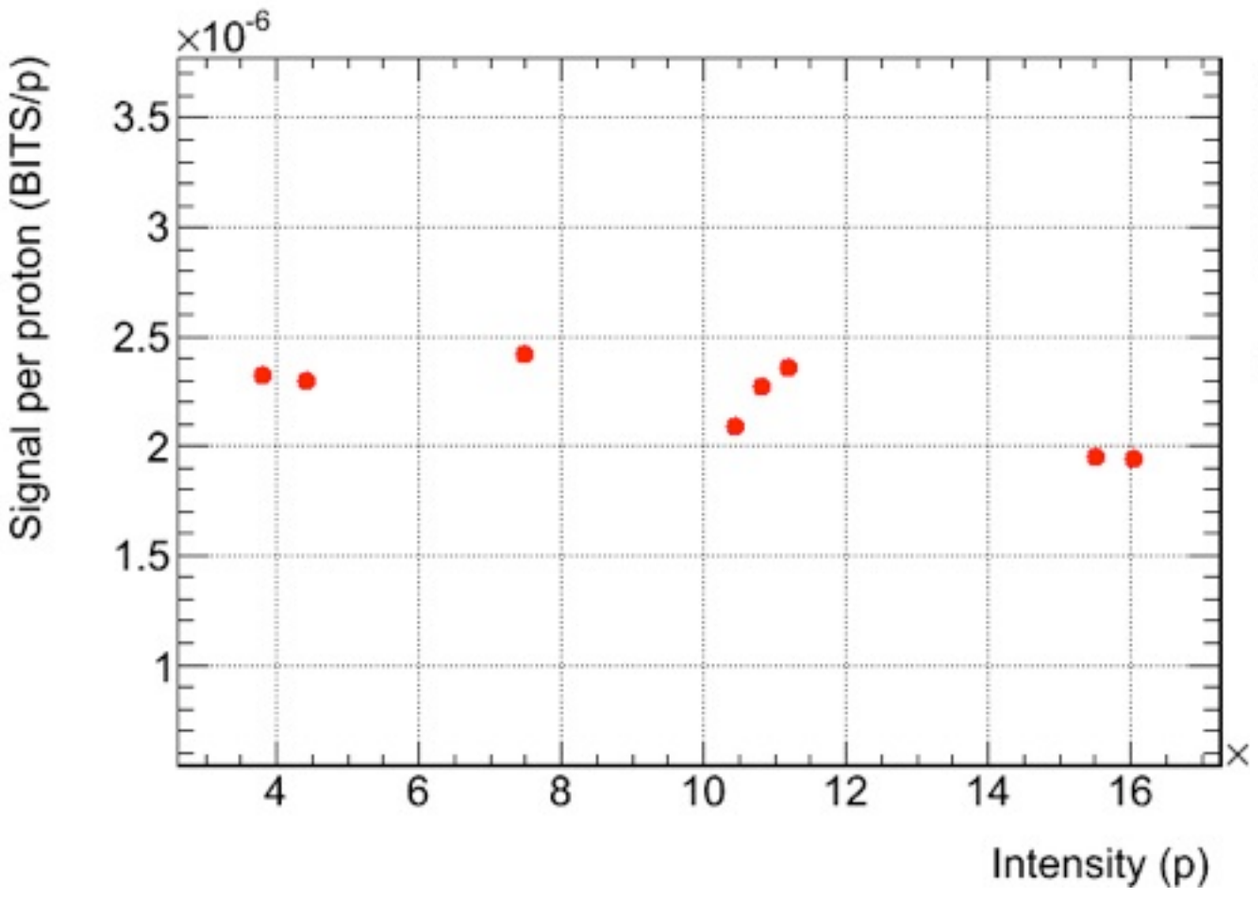


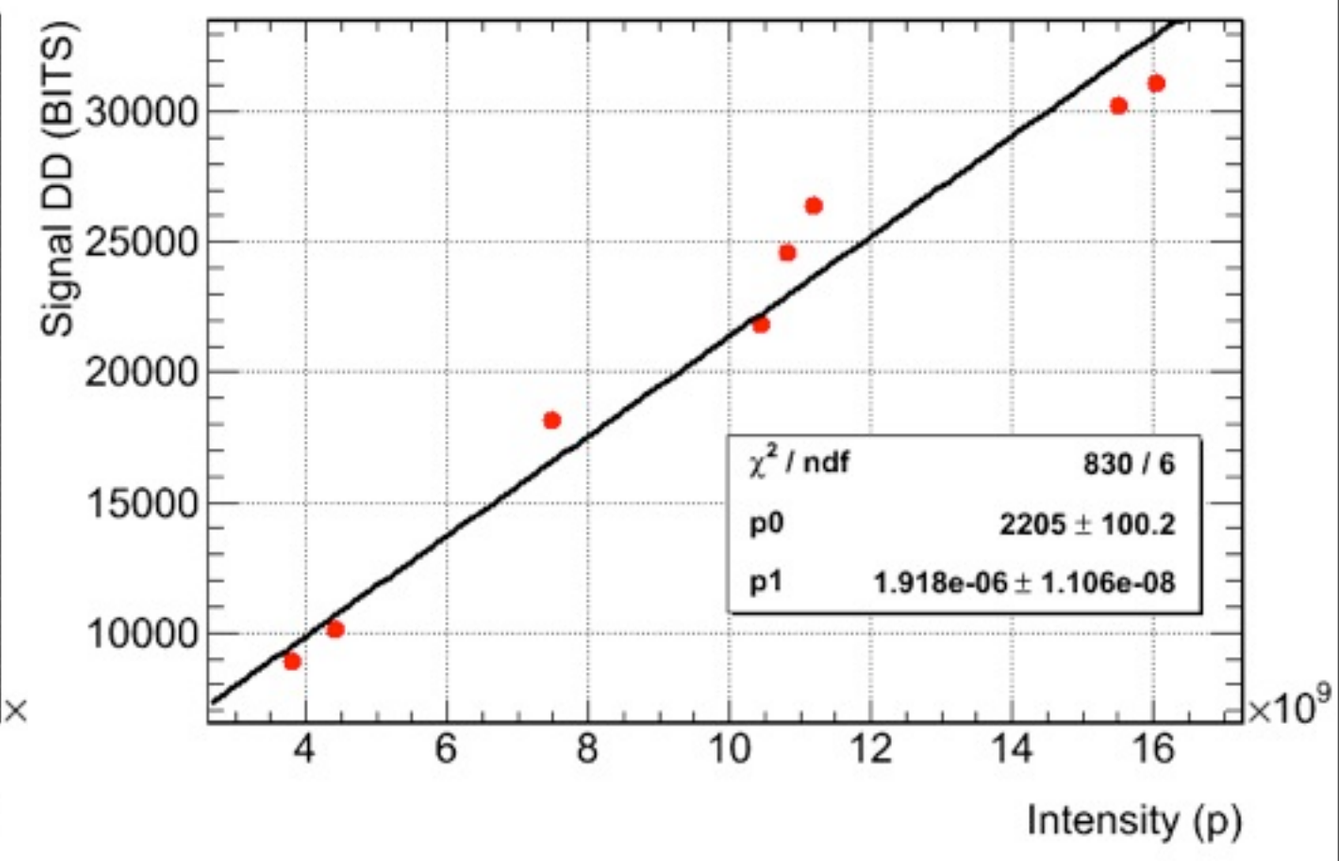
Direct Dump calibration exercise

Intensity	Signal DD (BITS)	BITS/p
1.08E+10	24601	2.27E-06
7.50E+09	18151	2.42E-06
1.12E+10	26417	2.35E-06
1.05E+10	21865	2.10E-06
3.82E+09	8893	2.33E-06
4.42E+09	10152	2.30E-06
1.60E+10	31095	1.94E-06
1.55E+10	30256	1.95E-06

Approximately linear behaviour of the Ionization chamber with intensity.

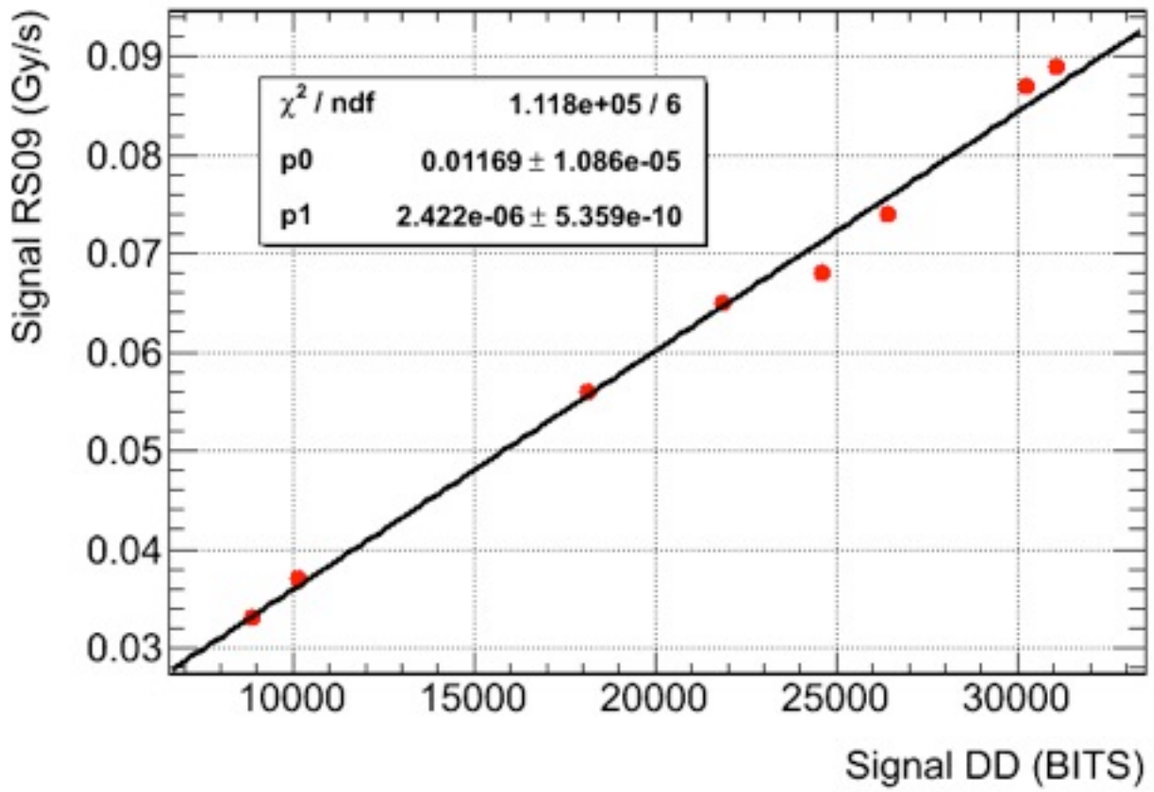
Calibration in terms of Signal per proton 2.22 BITS/p.
~15% decrease due to space charge effects?

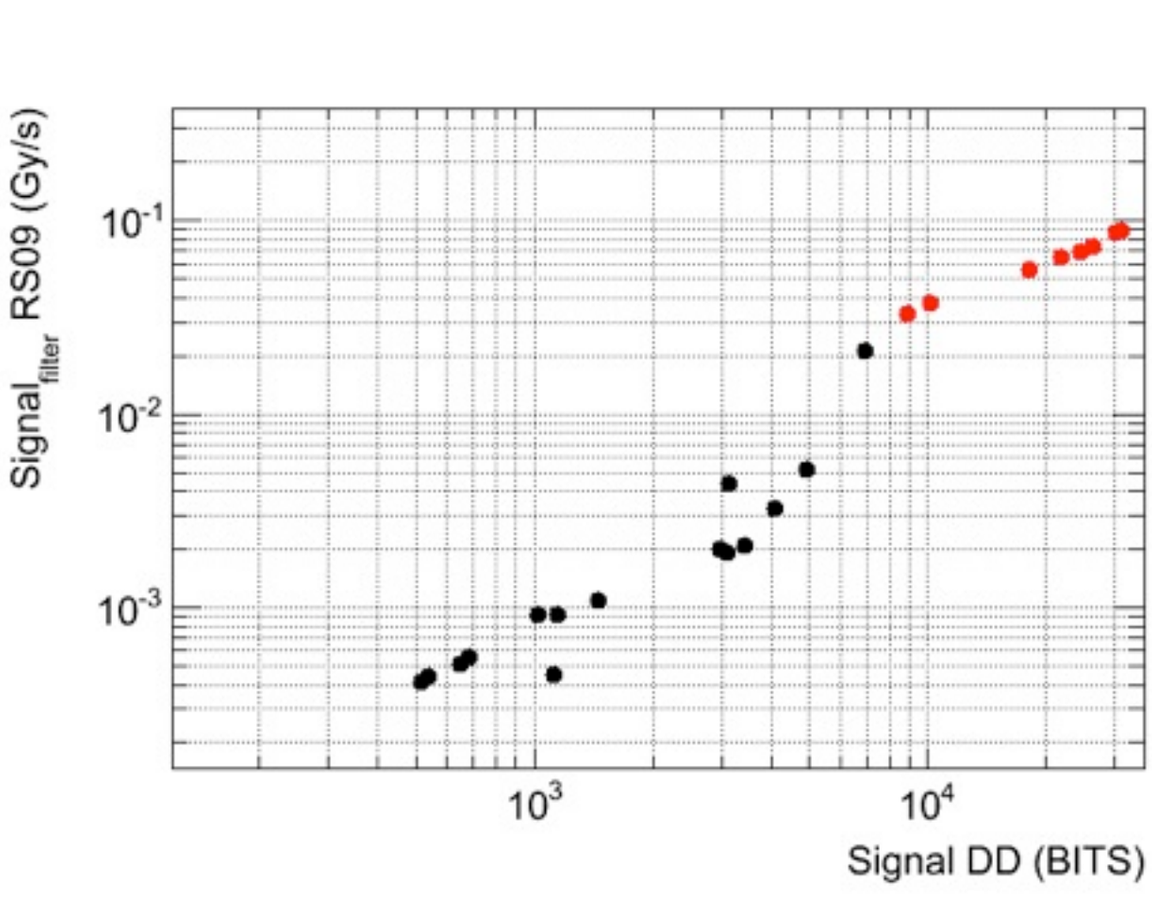




Direct Dump and standard BLM

- Linear dependence between standard IC and Direct Dump BLM under study is located ~ 1m downstream of TCSG.
- ~ 2.4E-6 Gy/p with a large offset (0.01 Gy/s) !!!!

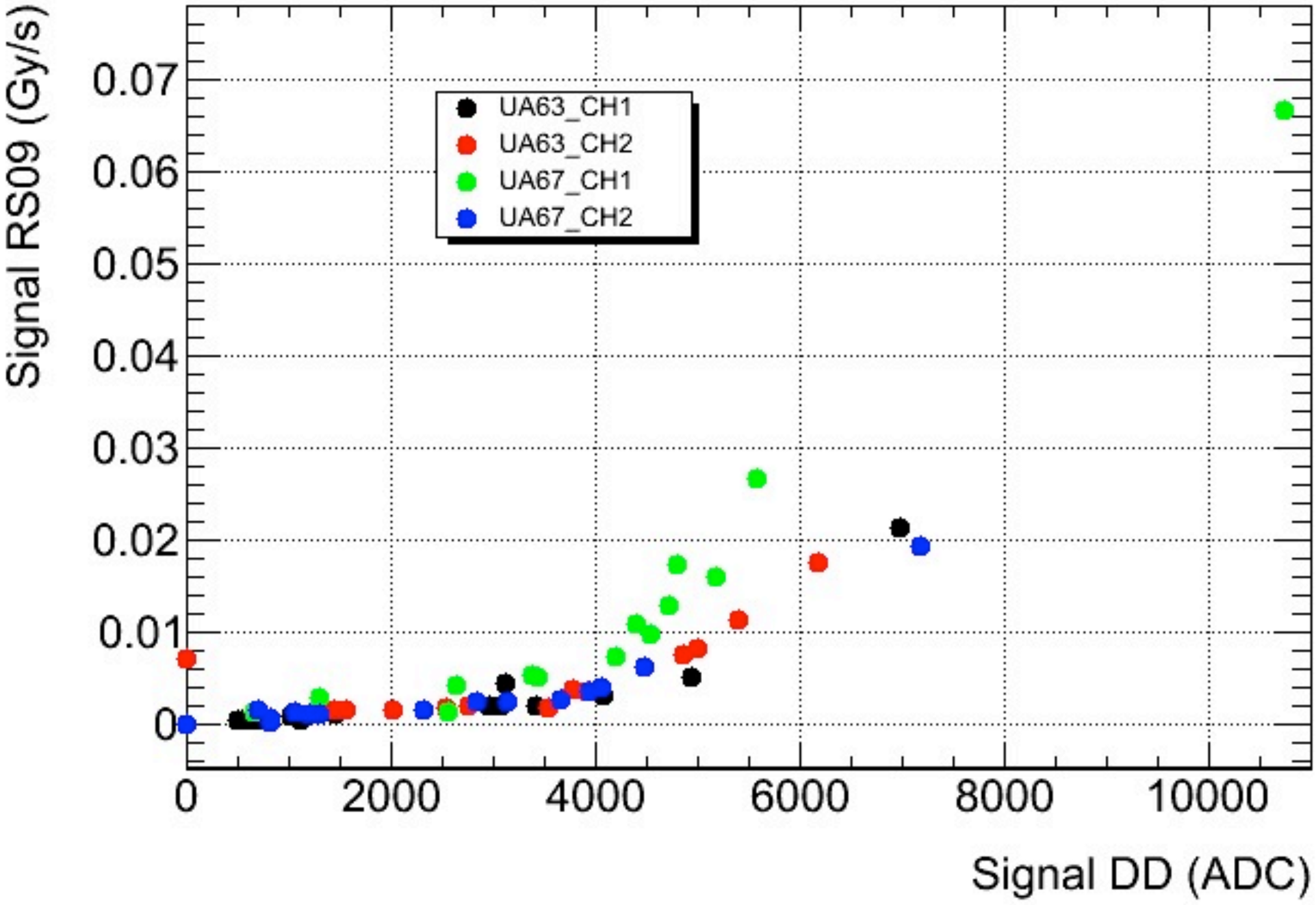




- Detectors have different response in "Normal Operation" and "MD"

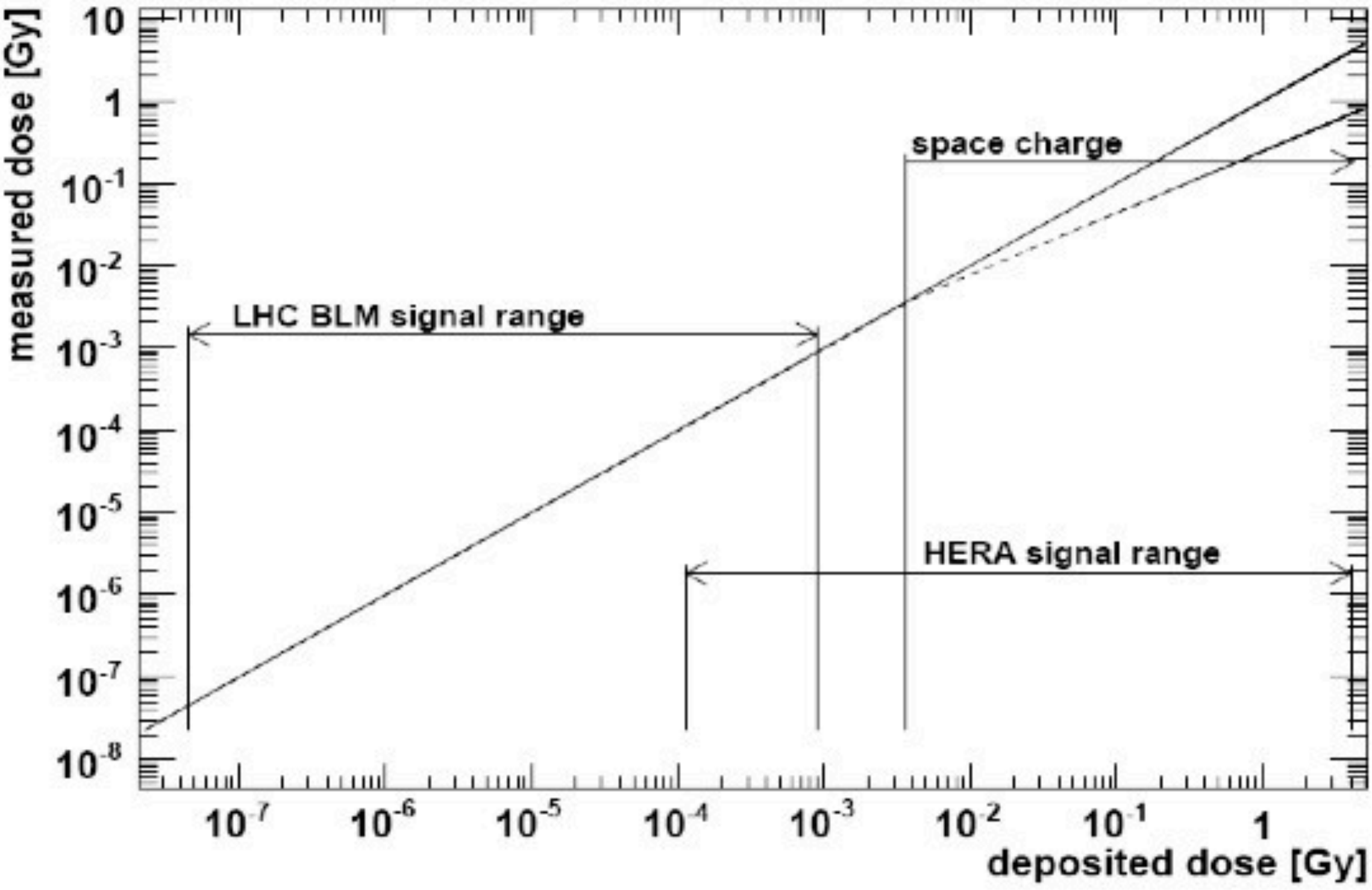
Observed Signals (After TS)

During the TS the direct dump blm located downstream of TCDQA.4R6.B1 (UA63_CH2) was investigated (signal cable was not connected). Test with signal source in the tunnel was successful. The observed signals after the TS are consistent with a proper functioning of the detector.

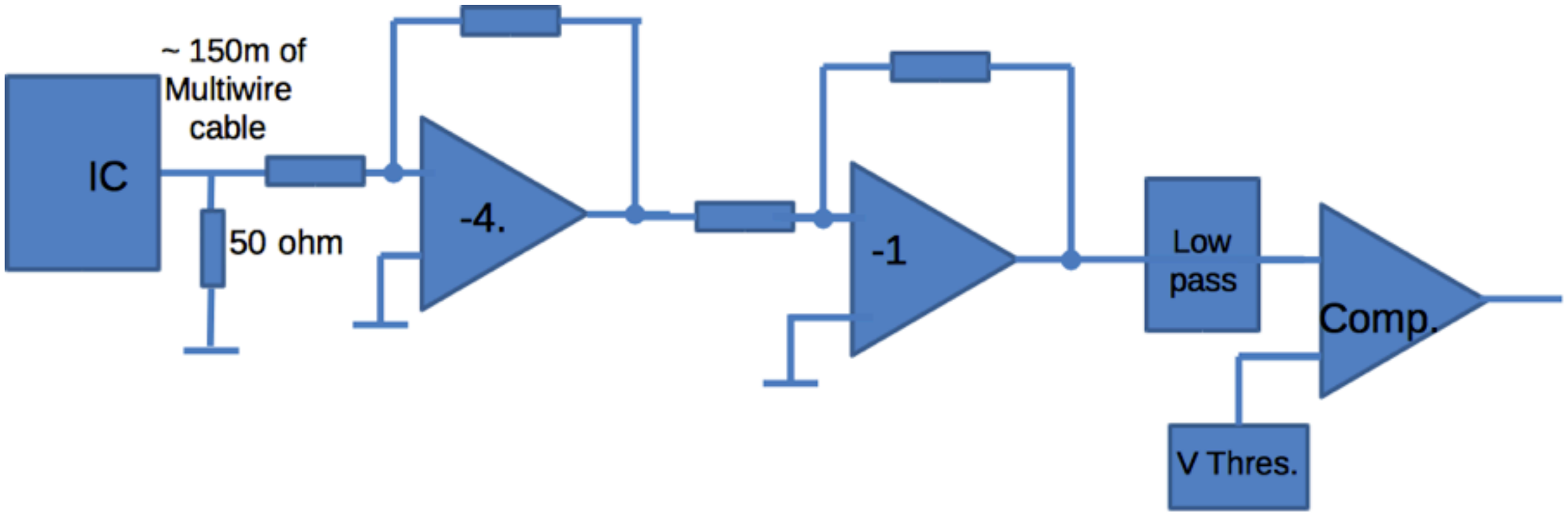


Back Up

Observed Signals



Direct Dump Circuit



- Dynamic range 65536 Bits => 10V => 50mA
- Currently not connected to LBDS
- Threshold 44590 Bits => 6.8V => 34mA => 0.0252Gy/40us = 630.17Gy/s. This threshold was set based on signals observed in BLMEI.04L6.B2I10_TCDQA.B4L6 (11 ms filter) during asynchronous dump