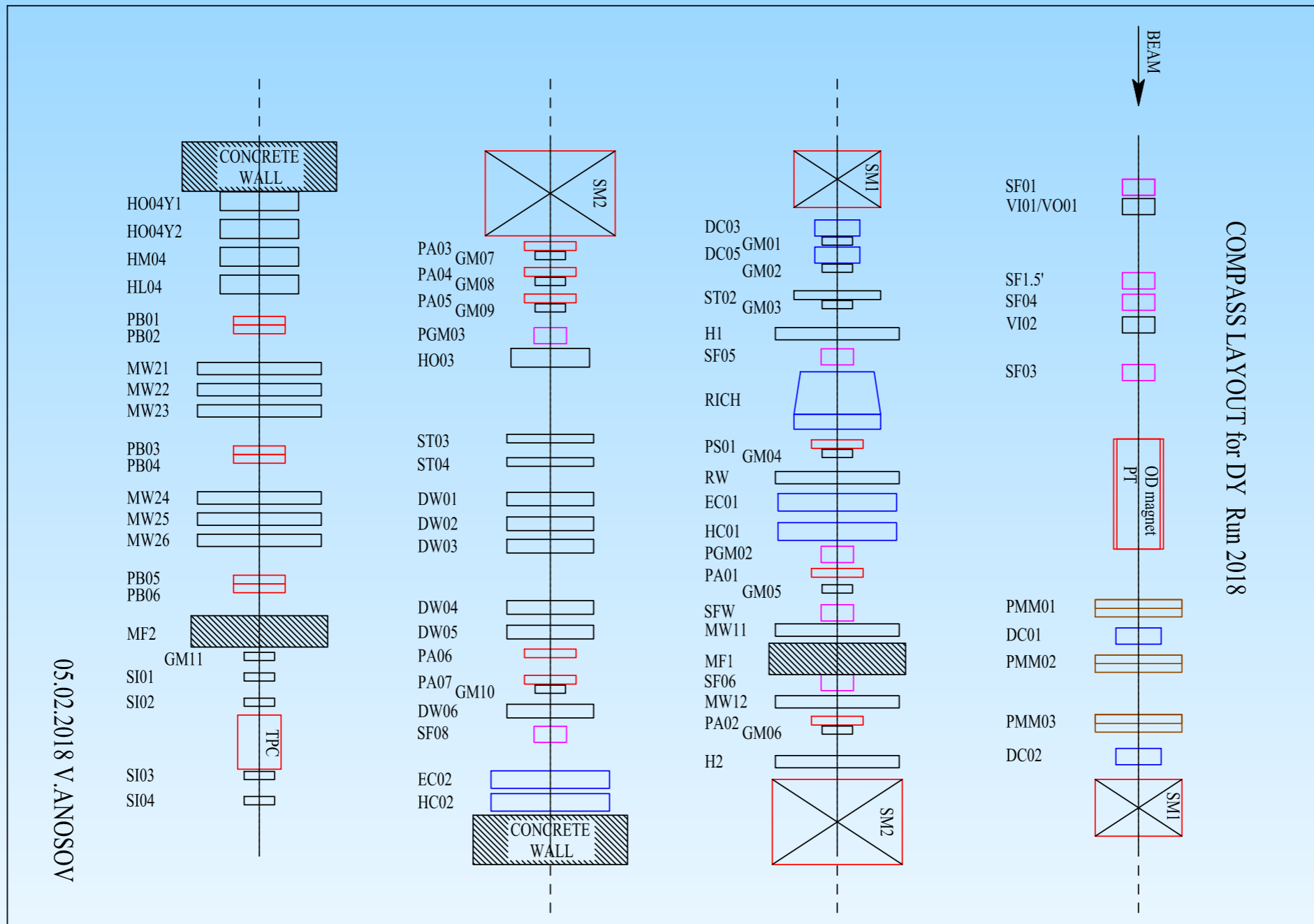


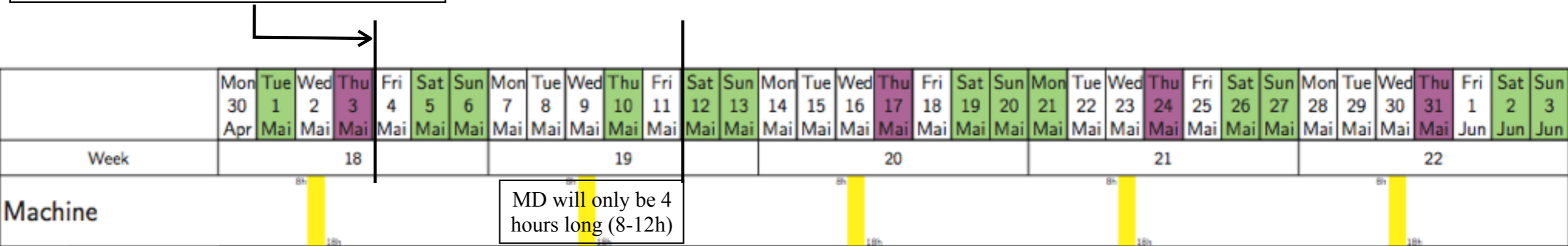
# COMPASS Weekly Report: May 4-11

## Drell Yan 2018



**NH3 target:** loaded & first (long.) polarization & magnet commissioned  
**All detectors installed,** including beam telescope FI01, VI01 & FI15, FI04, VI02, FI03  
**Trigger commissioned**

## This week: getting ready for Drell Yan 2018 physics



	Friday May 4	Saturday May 5	Sunday May 6	Monday May 7	Tuesday May 8	Wednesday May 9	Thursday May 10	Friday May 11
units on T6	80 →100	100	100	100→120	120	120	120	120
main topic	FI03 / FI04 threshold scans	wire chamber plateaus @180, 500mm	wire chamber plateaus @ 40, 500mm	Li absorber	Li absorber	Li absorber	Move chicane & goto dipole	Beam steering
others					Survey FI01, FI04, RW & MW1 interventions, alignment w/o solenoid	PA01* intervention	move chicane & goto dipole DC4 intervention	
target	trim coil setting check, field	solenoid	solenoid	solenoid	solenoid OFF during day, ON evening & start polarizing	polarizing	dipole ON	dipole

# Plateaus scans 2018 at 100 units on T6

Drift chambers DC0, DC1, DC4, DC5  
Micromegas, Straw ST03

PMM and DC MEASUREMENTS 2018 - Table must be checked for 2018 before using it !!!!

Trigger settings: HALO: 30 000, or 30%, VI: 20%, BT: 5%, Physics(MT+OT+LT+CT): 40%, Rnd: 5% --- Need 100 000 events/spill, or 20-25kHz.  
20 spills/run.  
After each run, select new reference files following the run number: one file for each Detectors (DC00-04, DC5 and STRAW).  
Runs #0, #9, #19, #29, #39 → Reference.DetectorName

Task (for shift): take data at different, well-defined HV  
Goal (for experts): efficiency vs. HV (offline)

Note: In the DCS, MM 1X\_Drift and and 3V\_Drift are OFF because they are connected to HV splitters (1Y\_Drift and 3U\_Drift). They'll not appear in the DCS Efficiency tables

Action	No	Note: Other DC0, DC1, DC4 and DC5: 1675. DC5Y=1650. Keep BK as they are																				Note: All other planes at 320/620/920/1420; Drifts 1X, 1Y, 3U and 3V always at 1420 V, 2X = 1320 V								Note: all other planes at 1640/1780 V (6mm/10mm)			
Run	-1	DC0X_Pi	DC0X_Wr	DC1Y_Pi	DC1Y_Wr	DC4U_Pi	DC4U_Wr	DC5V_Pi	DC5V_Wr	1X_Mesh	1X_G-Bt	1X_G-Tp	1X_Drift	2U_Mesh	2U_G-Bt	2U_G-Tp	2U_Drift	3X_Mesh	3X_G-Bt	3X_G-Tp	3X_Drift	ST03Y1_6mm	ST03Y1_10mm	ST03Y2_6mm	ST03Y2_10mm								
Run	1	1675	1675	1675	1675	1675	1675	1675	1675	320	620	920	1420	320	620	920	1420	320	620	840	1340	1640	1780	1640	1780								
Run	2	1650	1650	1650	1650	1650	1650	1650	1650	240	540	840	1340	240	540	840	1340	240	540	840	1340	1630	1760	1630	1760								
Run	3	1625	1625	1625	1625	1625	1625	1625	1625	280	580	880	1380	280	580	880	1380	280	580	880	1380	1620	1750	1620	1750								
Run	4	1600	1600	1600	1600	1600	1600	1600	1600	300	600	900	1400	300	600	900	1400	300	600	900	1400	1580	1700	1580	1700								
Run	5	1575	1575	1575	1575	1575	1575	1575	1575	320	620	920	1420	320	620	920	1420	320	620	920	1420	1560	1680	1560	1680								
Run	6	1550	1550	1550	1550	1550	1550	1550	1550	340	640	940	1440	340	640	940	1440	340	640	940	1440	1540	1660	1540	1660								
Run	7	1525	1525	1525	1525	1525	1525	1525	1525	360	660	960	1460	360	660	960	1460	360	660	960	1460	1520	1640	1520	1640								
Run	8	1500	1500	1500	1500	1500	1500	1500	1500	380	680	980	1480	380	680	980	1480	380	680	980	1480	1500	1620	1500	1620								
Run	9	1675	1675	1675	1675	1675	1675	1675	1675	320	620	920	1420	320	620	920	1420	320	620	920	1420	1640	1780	1640	1780								
Note: Other DC0, DC1, DC4 and DC5: 1675. DC5Y=1650. Keep BK as they are		Note: All other planes at 320/620/920/1420; Drifts 1X, 1Y, 3U and 3V always at 1420 V, 2X = 1320 V																				Note: all other planes at 1640/1780 V (6mm/10mm), DO NOT change 03U1_10mm_1											
Action	No	DC0V_Pi	DC0V_Wr	DC1X_Pi	DC1X_Wr	DC4Y_Pi	DC4Y_Wr	DC5U_Pi	DC5U_Wr	1U_Mesh	1U_G-Bt	1U_G-Tp	1U_Drift	2X_Mesh	2X_G-Bt	2X_G-Tp	2X_Drift	3Y_Mesh	3Y_G-Bt	3Y_G-Tp	3Y_Drift	ST03X1_6mm	ST03X1_10mm	ST03U1_6mm	ST03U1_10mm								
Run	11	1675	1675	1675	1675	1675	1675	1650	1650	240	540	840	1340	240	540	840	1320	240	540	840	1340	1630	1760	1630	1760								
Run	12	1650	1650	1650	1650	1650	1650	1625	1625	260	560	860	1360	260	560	860	1320	260	560	860	1360	1620	1740	1620	1740								
Run	13	1625	1625	1625	1625	1625	1625	1600	1600	280	580	880	1380	280	580	880	1320	280	580	880	1380	1600	1720	1600	1720								
Run	14	1600	1600	1600	1600	1600	1600	1575	1575	300	600	900	1400	300	600	900	1320	300	600	900	1400	1580	1700	1580	1700								
Run	15	1575	1575	1575	1575	1575	1575	1550	1550	320	620	920	1420	320	620	920	1320	320	620	920	1420	1560	1680	1560	1680								
Run	16	1550	1550	1550	1550	1550	1550	1525	1525	340	640	940	1440	340	640	940	1320	340	640	940	1440	1540	1660	1540	1660								
Run	17	1525	1525	1525	1525	1525	1525	1500	1500	360	660	960	1460	360	660	960	1320	360	660	960	1460	1520	1640	1520	1640								
Run	18	1500	1500	1500	1500	1500	1500	1450	1450	380	680	980	1480	380	680	980	1320	380	680	980	1480	1500	1620	1500	1620								
Run	19	1675	1675	1675	1675	1675	1675	1675	1675	320	620	920	1420	320	620	920	1320	320	620	920	1420	1640	1780	1640	1780								
Note: Other DC0, DC1, DC4 and DC5: 1675. DC5Y=1650. Keep BK as they are		Note: All other planes at 320/620/920/1420; Drifts 1X, 1Y, 3U and 3V always at 1420 V, 2X = 1320 V																				Note: all other planes at 1640/1780 V (6mm/10mm)											
Action	No	DC0U_Pi	DC0U_Wr	DC1V_Pi	DC1V_Wr	DC4X_Pi	DC4X_Wr	DC5Y_Pi	DC5Y_Wr	1X_Mesh	1X_G-Bt	1X_G-Tp	1X_Drift	2Y_Mesh	2Y_G-Bt	2Y_G-Tp	2Y_Drift	3V_Mesh	3V_G-Bt	3V_G-Tp	3V_Drift	ST03V1_6mm	ST03V1_10mm	ST03X2_6mm	ST03X2_10mm								
Run	21	1675	1675	1675	1675	1675	1675	1650	1650	240	540	840	1420	240	540	840	1340	240	540	840	1420	1630	1760	1630	1760								
Run	22	1650	1650	1650	1650	1650	1650	1625	1625	260	560	860	1420	260	560	860	1360	260	560	860	1420	1620	1740	1620	1740								
Run	23	1625	1625	1625	1625	1625	1625	1600	1600	280	580	880	1420	280	580	880	1380	280	580	880	1420	1600	1720	1600	1720								
Run	24	1600	1600	1600	1600	1600	1600	1575	1575	300	600	900	1420	300	600	900	1400	300	600	900	1420	1580	1700	1580	1700								
Run	25	1575	1575	1575	1575	1575	1575	1550	1550	320	620	920	1420	320	620	920	1420	320	620	920	1420	1560	1680	1560	1680								
Run	26	1550	1550	1550	1550	1550	1550	1525	1525	340	640	940	1420	340	640	940	1440	340	640	940	1420	1540	1660	1540	1660								
Run	27	1525	1525	1525	1525	1525	1525	1500	1500	360	660	960	1420	360	660	960	1460	360	660	960	1420	1520	1640	1520	1640								
Run	28	1500	1500	1500	1500	1500	1500	1450	1450	380	680	980	1420	380	680	980	1480	380	680	980	1420	1500	1620	1500	1620								
Run	29	1675	1675	1675	1675	1675	1675	1650	1650	320	620	920	1420	320	620	920	1420	320	620	920	1420	1640	1780	1640	1780								
Note: Other DC0, DC1, DC4 and DC5: 1675. DC5Y=1650. Keep BK as they are		Note: All other planes at 320/620/920/1420; Drifts 1X, 1Y, 3U and 3V always at 1420 V, 2X = 1320 V																				Note: increase software MAX to 1660/1800, all other planes at 1640/1780 V (6mm/10mm), DO NOT change 03U1_10mm_1											
Action	No	DC0Y_Pi	DC0Y_Wr	DC1U_Pi	DC1U_Wr	DC4V_Pi	DC4V_Wr	DC5X_Pi	DC5X_Wr	1Y_Mesh	1Y_G-Bt	1Y_G-Tp	1Y_Drift	2V_Mesh	2V_G-Bt	2V_G-Tp	2V_Drift	3U_Mesh	3U_G-Bt	3U_G-Tp	3U_Drift	ST03X1_6mm	ST03X1_10mm	ST03U1_6mm	ST03U1_10mm	ST03Y2_6mm	ST03Y2_10mm						
Run	31	1675	1675	1675	1675	1675	1675	1650	1650	240	540	840	1420	240	540	840	1340	240	540	840	1420	1650	1790	1640	1780	1640	1780						
Run	32	1650	1650	1650	1650	1650	1650	1625	1625	260	560	860	1420	260	560	860	1360	260	560	860	1420	1660	1800	1640	1780	1640	1780						
Run	33	1625	1625	1625	1625	1625	1625	1600	1600	280	580	880	1420	280	580	880	1380	280	580	880	1420	1640	1780	1650	1790	1640	1780						
Run	34	1600	1600	1600	1600	1600	1600	1575	1575	300	600	900	1420	300	600	900	1400	300	600	900	1420	1640	1780	1660	1800	1640	1780						
Run	35	1575	1575	1575	1575	1575	1575	1550	1550	320	620	920	1420	320	620	920	1420	320	620	920	1420	1640	1780	1640	1780	1650	1790						
Run	36	1550	1550	1550	1550	1550	1550	1525	1525	340	640	940	1420	340	640	940	1440	340	640	940	1420	1640	1780	1640	1780	1660	1800						
Run	37	1525	1525	1525	1525	1525	1525	1500	1500	360	660	960	1420	360	660	960	1460	360	660	960	1420	1640	1780	1640	1780	1640	1780						
Run	38	1500	1500	1500	1500	1500	1500	1450	1450	380	680	980	1420	380	680	980	1480	380	680	980	1420	1640	1780	1640	1780	1640	1780						
Run	39	1675	1675	1675	1675	1675	1675	1675	1675	320	620	920	1420	320	620	920	1420	320	620	920	1420	1640	1780	1640	1780	1640	1780						
Note: Other DC0, DC1, DC4 and DC5: 1675. DC5Y=1650. Keep BK as they are		Note: All other planes at 320/620/920/1420; Drifts 1X, 1Y, 3U and 3V always at 1420 V, 2X = 1320 V																				Note: increase software MAX to 1680/1820, all other planes at 1640/1780 V (6mm/10mm)											
Run		DC5X_Pi	DC5X_Wr	DC5Y_Pi	DC5Y_Wr	DC5U_Pi	DC5U_Wr	DC5V_Pi	DC5V_Wr	1X_Mesh	1X_G-Bt	1X_G-Tp	1X_Drift	2Y_Mesh	2Y_G-Bt	2Y_G-Tp	2Y_Drift	3V_Mesh	3V_G-Bt	3V_G-Tp	3V_Drift	ST03Y1_6mm	ST03Y1_10mm	ST03V1_6mm	ST03V1_10mm	ST03X2_6mm	ST03X2_10mm						
Run	41	1450	1450	1650	1650	1675	1675	1675	1675	320	620	920	1420	320	620	920	1420	320	620	92													

# Plateaus scans 2018 at 100 units on T6

Drift chambers DC0, DC1, DC4, DC5

Micromegas, Straw ST03

example: block #1

Action	No	DC0X_Pi	DC0X_Wr	DC1Y_Pi	DC1Y_Wr	DC4U_Pi	DC4U_Wr	DC5V_Pi	DC5V_Wr
Run		1675	1675	1675	1675	1675	1675	1675	1675
Run	1	1675	1675	1675	1675	1675	1675	1675	1675
Run	2	1650	1650	1650	1650	1650	1650	1650	1650
Run	3	1625	1625	1625	1625	1625	1625	1625	1625
Run	4	1600	1600	1600	1600	1600	1600	1600	1600
Run	5	1575	1575	1575	1575	1575	1575	1575	1575
Run	6	1550	1550	1550	1550	1550	1550	1550	1550
Run	7	1525	1525	1525	1525	1525	1525	1525	1525
Run	8	1500	1500	1500	1500	1500	1500	1500	1500
Run	9	1675	1675	1675	1675	1675	1675	1675	1675

1V_Mesh	1V_G-Bt	1V_G-Tp	1V_Drift	2U_Mesh	2U_G-Bt	2U_G-Tp	2U_Drift	3X_Mesh	3X_G-Bt
320	620	920	1420	320	620	920	1420	320	620
240	540	840	1340	240	540	840	1340	240	540
260	560	860	1360	260	560	860	1360	260	560
280	580	880	1380	280	580	880	1380	280	580
300	600	900	1400	300	600	900	1400	300	600
320	620	920	1420	320	620	920	1420	320	620
340	640	940	1440	340	640	940	1440	340	640
360	660	960	1460	360	660	960	1460	360	660
380	680	980	1480	380	680	980	1480	380	680
320	620	920	1420	320	620	920	1420	320	620

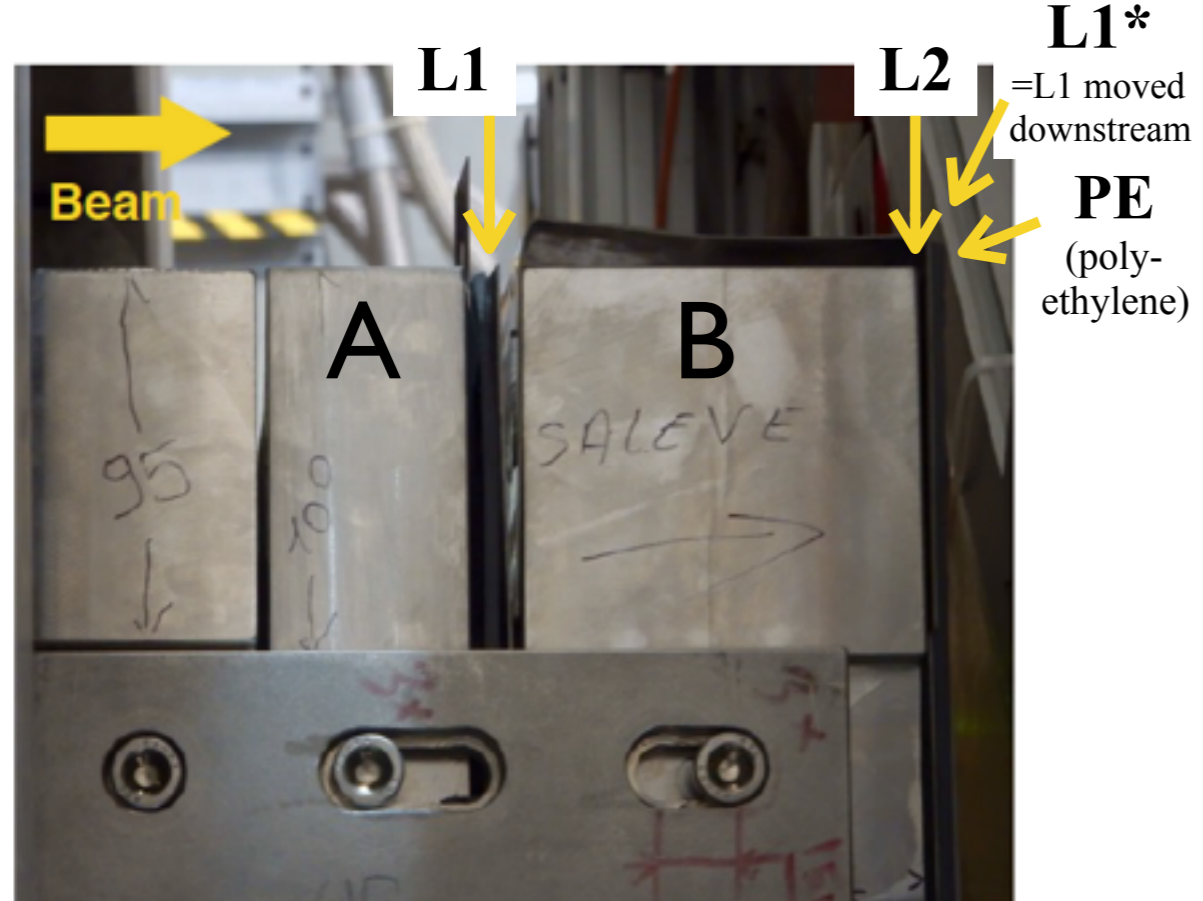
ST03Y1_6mm	ST03Y1_10mm	ST03Y2_6mm	ST03Y2_10mm
1640	1780	1640	1780
1630	1760	1630	1760
1620	1740	1620	1740
1600	1720	1600	1720
1580	1700	1580	1700
1560	1680	1560	1680
1540	1660	1540	1660
1520	1640	1520	1640
1500	1620	1500	1620
1640	1780	1640	1780

2018 plateau		40mm	180mm	500mm
Lithium 1 in	0	282788	282653	282707
~100 units on T6	1	282790	282654	282709
	2	282791	282655	282710
	3	282792	282656	282711
<b>resulting run numbers</b>	4	282793	282657	282712
	5	282798	282658	282713
	6	282799	282659	282715
	7	282800	282660	**282717
	8	282801	282661	**282718
	9	282824	282662	**282719
	11	282825	282663	**282720
	12	282826	282664	**282721
	13	282827	282665	282722
	14	282828	282666	282723
	15	282829	282667	282724
	16	282830	282668	282725
	17	282831	282669	282726
	18	282834	282670	282727
	19	282835	282671	282729
	21	282836	282672	282730
	22	282837	282673	282732
	23	282838	282674	282733
	24	282839	282676	282734
	25	282840	282677	282735
	26	282841	282678	282736
	27	282842	282679	282739
	28	282843	282680	282740
	29	282844	282681	282861
	31	282845	282682	282862
	32	282846	282683	282863
	33	282847	282684	282864
	34	282848	282685	282865
	35	282849	282686	282882
	36	282850	282687	282881
	37	282851	282688	282876
	38	282852	282689	282875
	39	282853	282690	282867
	41	282854	282691	282868
	42	282855	282692	282869
	43	282856	282693	282870
	44	282857	282694	282871
	45	282858	282695	282872
	46	282859	282696	282873
	47	282860	282697	282874

\*\* ST03 Y2 6mm tripped

# Lithium tests @ 120 units on T6 & 500mm target & solenoid ON & chicane not moved

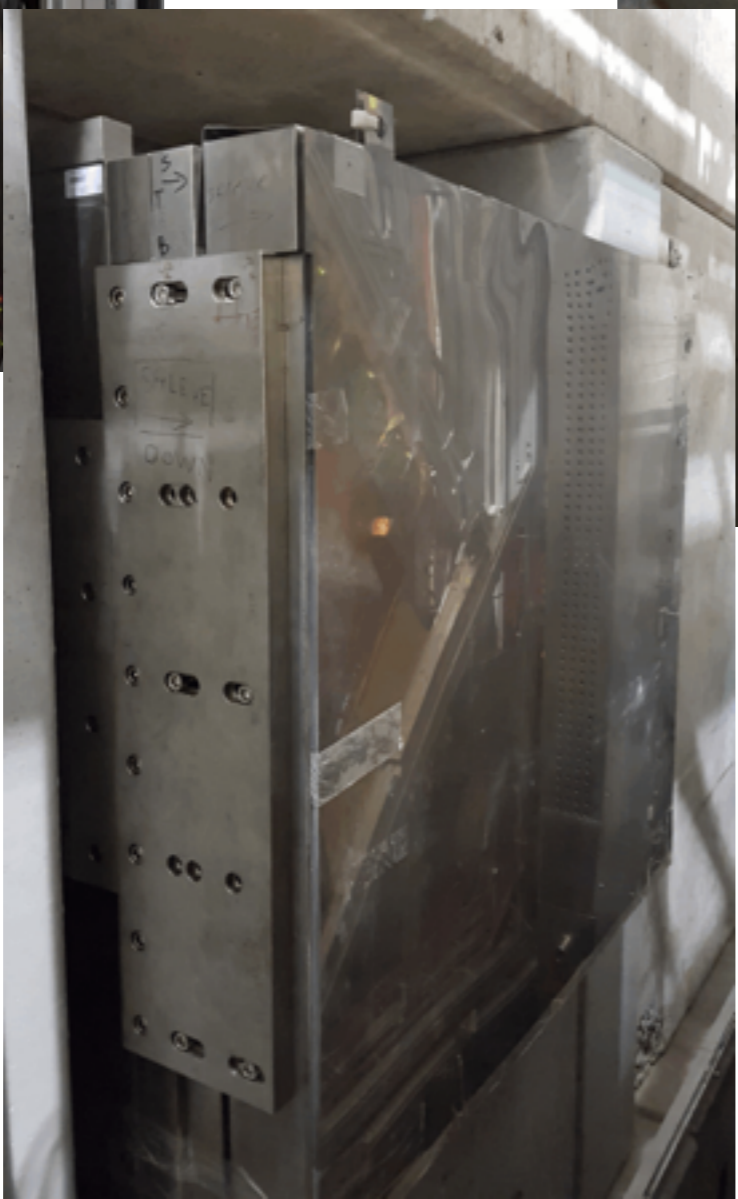
config	dates 2018	changes before installation	run numbers	L1	L1*	L2	PE
1	April 19 - May 8	—	<i>Before BMS removal: 282890 (179), 282891 (13), 282892 (56), 282893 (200), 282894 (200).</i> 282896 (200), 282897 (200), 282898 (200), 282899 (200), 282900 (104), 282901 (10), 282902 (19), 282903 (147), 282919 (9), 282920 (72)	X			
2	May 8 ,11:30-18:00	DC4 fix, solenoid OFF	282925 (200), 282926 (200), 282927 (200)				
3	May 8, 18:00 - May 9, 10:00	solenoid on	282938 (91), 282939 (200), 282940 (200), 282941 (200)				X
4	May 9, 10:00 - May 10, 10:00		282971 (200), 282972 (21), 282973 (200), 282974 (26), 282975 (200)		X	X	
5 (2015)	May 10, 10:00 - ...	No DC4 (garage) bad DC5 threshold	282991 (200), 282992 (200), 282993 (200)	X		X	X



**Planning:**

- Thursday morning (backup: Thursday afternoon):  
remove (L2 & L1\*), add L1, L2, PE

- 282926: bad beam extraction (only beginning)
- 282925, 282926: no RW
- 282974, 282975: no SciFi15U
- 282991-282993: no DC4, wrong threshold DC5





# Drell-Yan data taking

- Chicane moved Thursday evening
- Target magnet: solenoid to dipole Thursday evening
- Beam file with chicane
- First Drell-Yan events with pion beam & transverse target polarization Thursday night!
- Friday morning: beam tuning (Johannes)

TCSinfo

DAQ#	Run	Spill	Spill #	Evt #
0	ffffff	0	20	60463
1	0	0	0	0

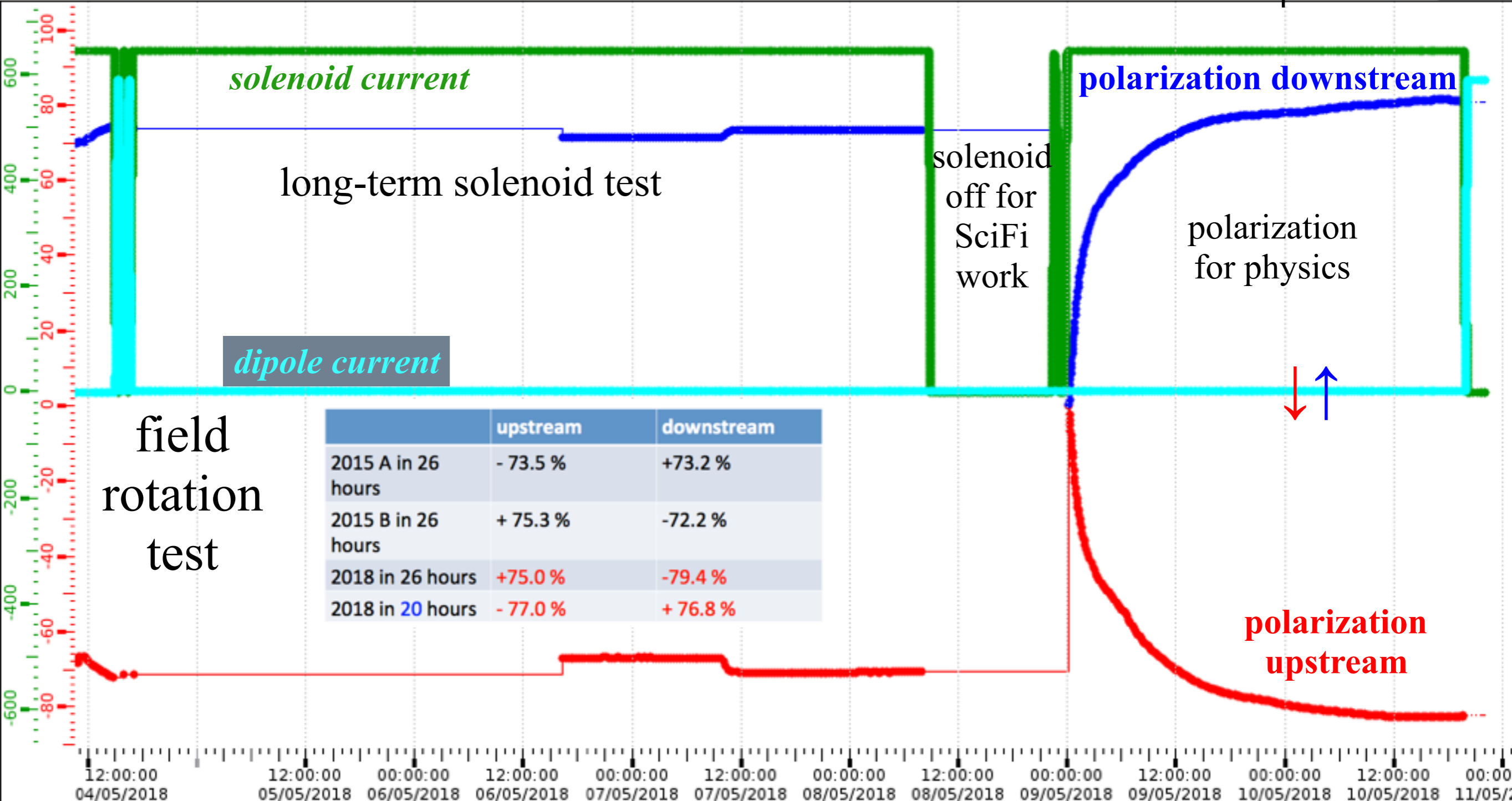
  

channename	incount	outcount	divide	new setting
0	MLAST	1860	1860	1
1	MT	423416	0	0
2	OLAST	3596	3596	1
3	OT	57799	0	0
4	CT	31535	3154	10
5	VI	4266148	0	0
6	Halo	1545379	0	0
7	BT	13940633	349	40000
8	LASLAST	13998	13998	1
9	LAST	45785	0	0
10	TRand	44975	44975	1
11	NRand	434041	0	0



Fri Sat Sun Mon Tue Wed Thu

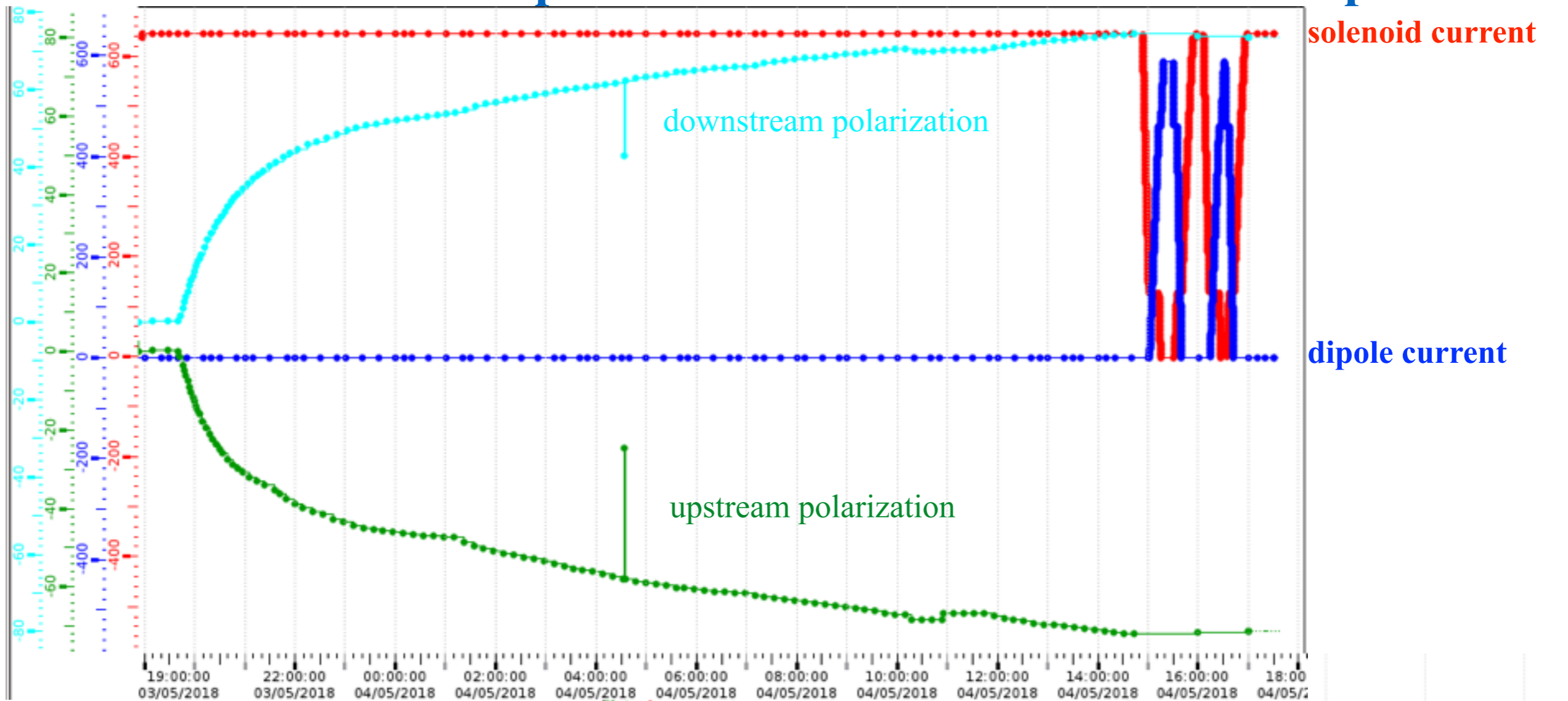
Time Range Y Axes Other 1:1 log auto scientific Close



10/05/2018 22:07:52

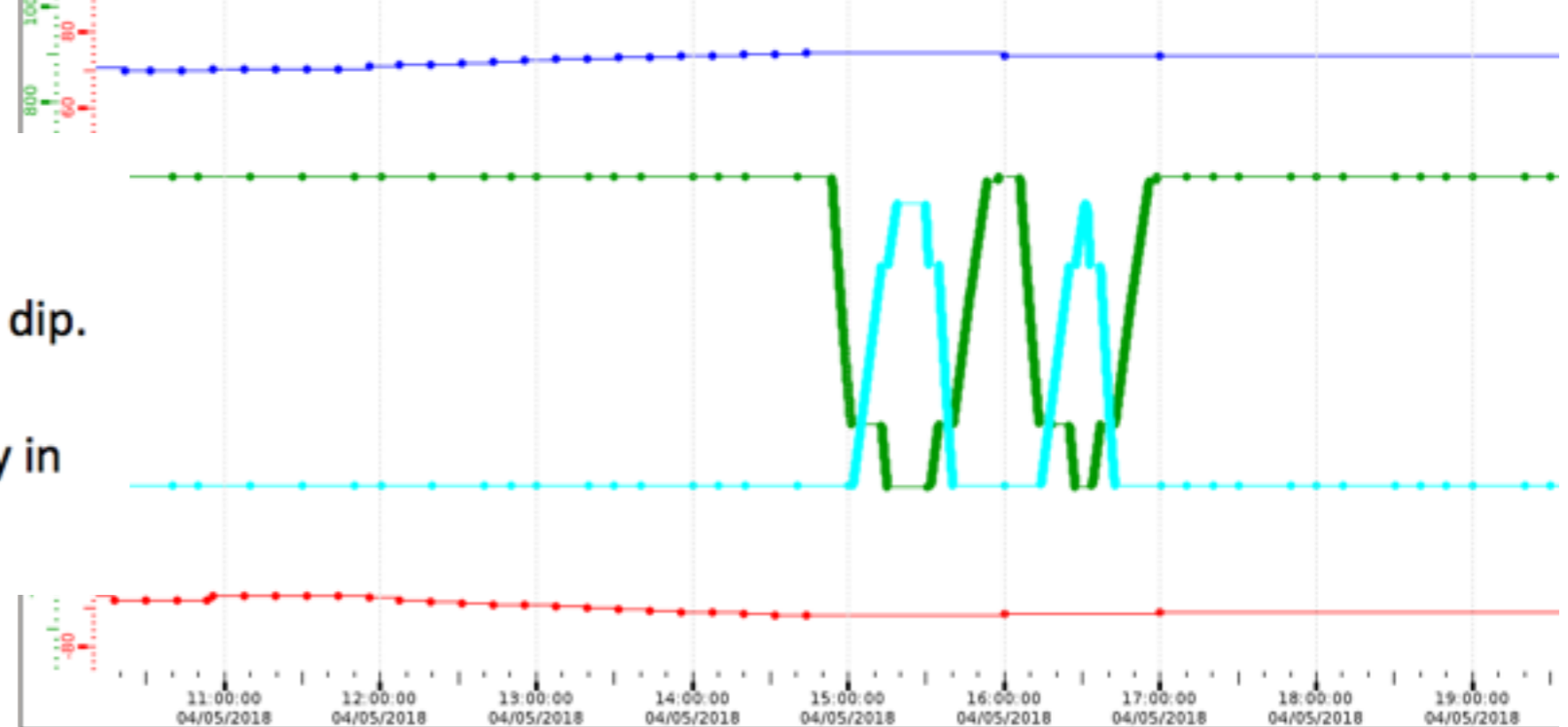
- ✓ NMR upstream average % -82.42
- ✓ NMR downstream average % 80.89
- ✓ Ptgt\_Magnet\_IE1000 A -1.60
- ✓ Ptgt\_Magnet\_IE2000 A 587.52

# Field rotation & polarization loss with old new SMC procedure



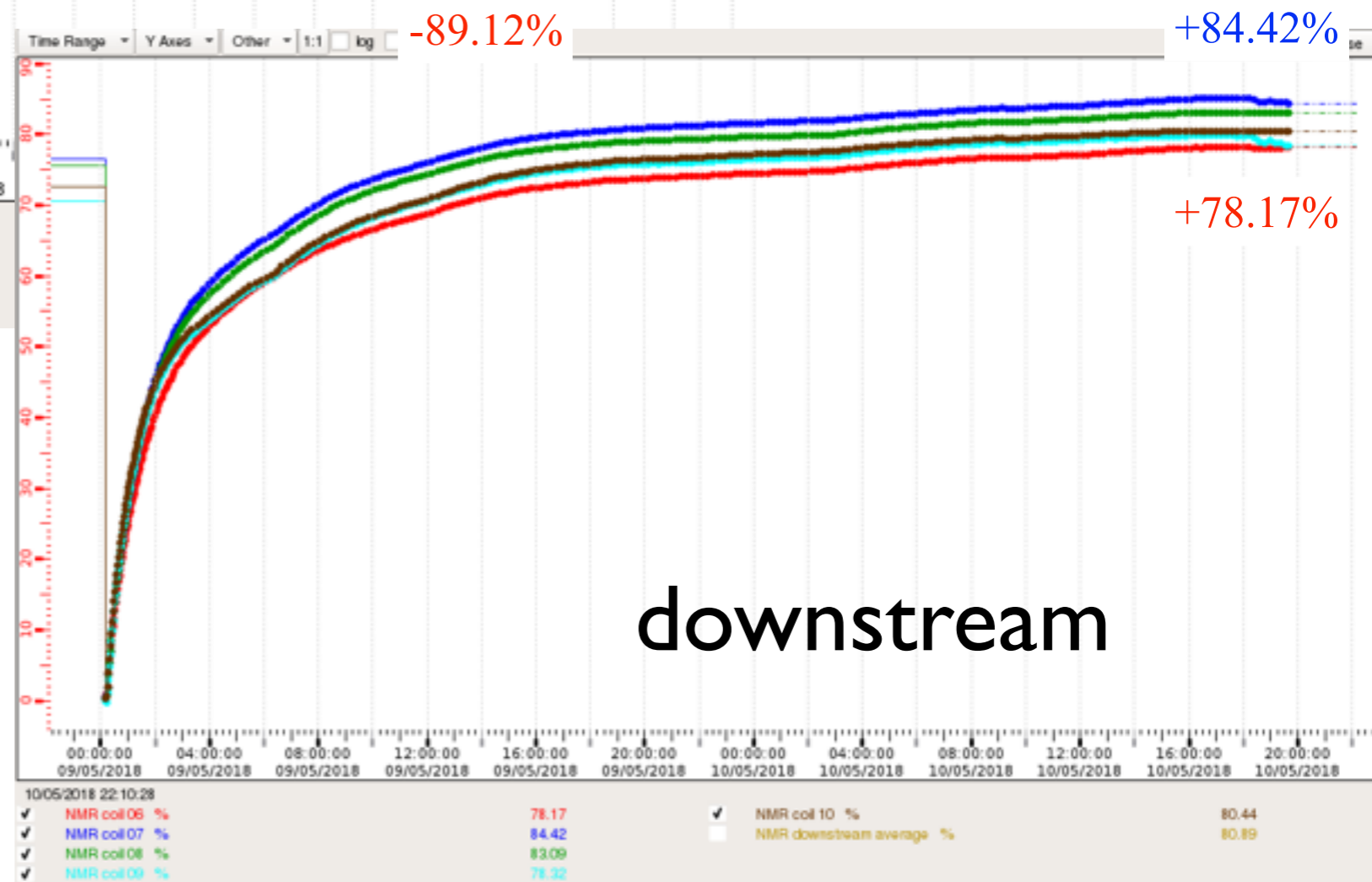
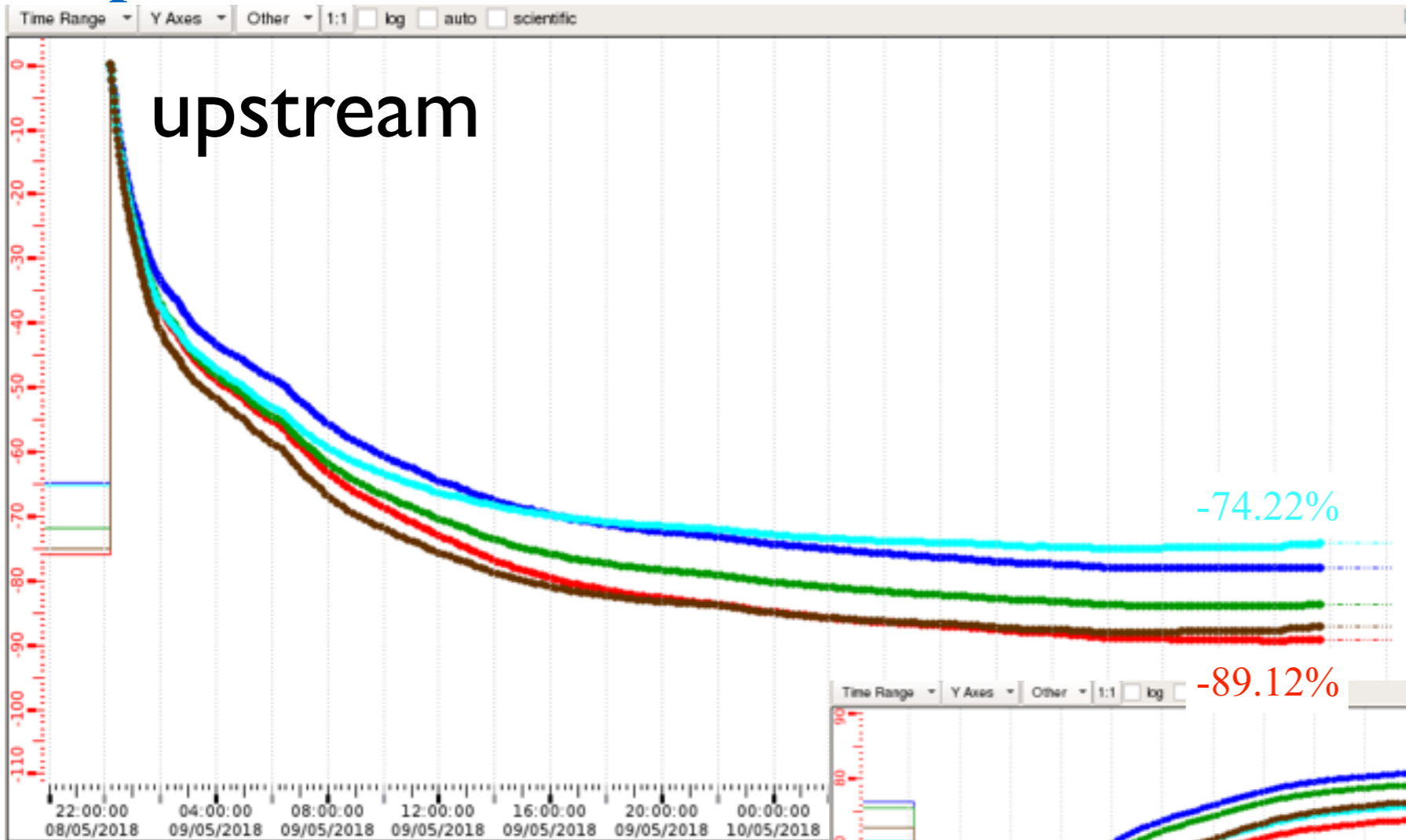
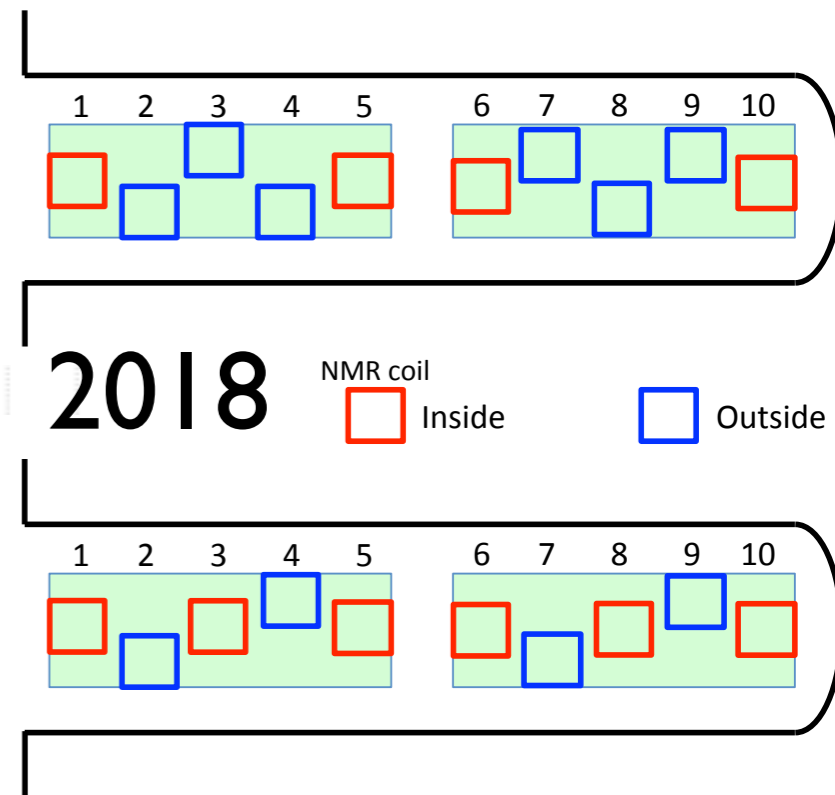
## New procedure test result

- 0.50 % loss in 2015 from sol. to dip. (from dip. to sol.) with trim coils OFF
- **< 0.10 % loss** with trim coils ON oppositely in 2018 (new procedure)



# Dispersion between NMR coils 2018

NMR coils location in 2015





## Problems & interventions

- Actually not too many: some noisy channels here and there or missing planes, usually fixed quickly
- **ST03:**
  - Tripping HV channels
  - 2 ports cause oscillations in LV of 3rd port. 2 cards identified, but difficult to access and water cooled. Delay intervention until next long MD. For the time being, the 2 ports are excluded.
  - May 2: attempt to exchange very warm Normabarre connector (and fan unit) causes power cut on Jura side. Culprit might have been cable that provides power to the fan unit.
- **PA01\* (PS01)** intervention: catch problem can be solved without pulling chamber in garage
- **DC4** readout: regularly disappearing ports due to connector, cable, **card?** Recently super successful: exchange of F1 card. 2x May 10.
- Have to keep a close look at cooling water in 888

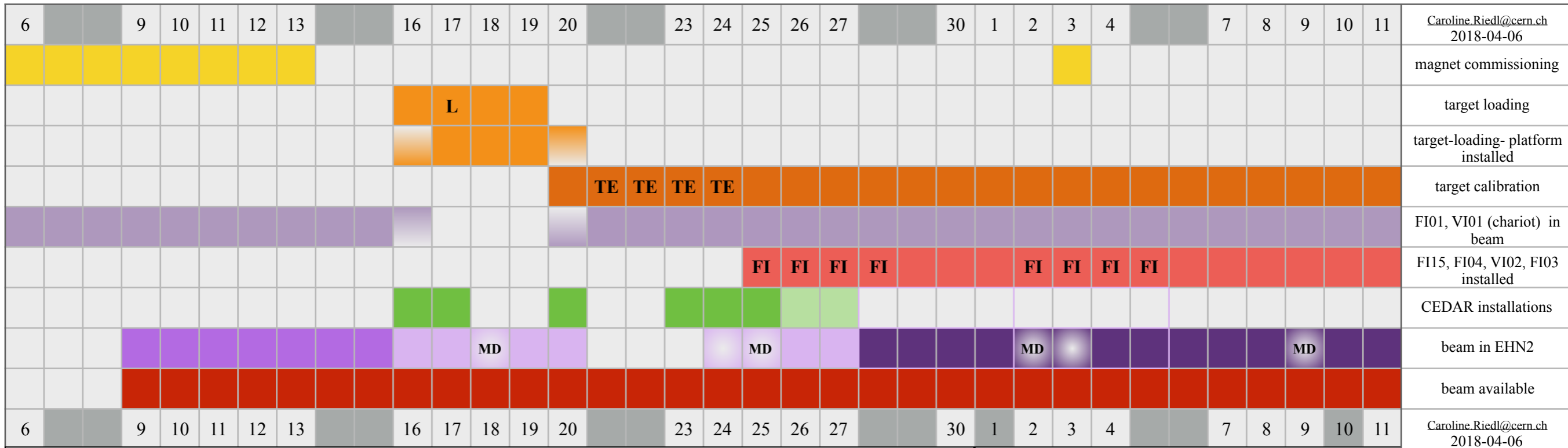


# Notes

- Since May 9: new  $^{22}\text{Na}$  source for the random trigger: true random trigger rate increased from 10k to 160k
- Integrated radiation dose of environmental monitor: to be published in DCS (by Christophe)
- 18T02: runs 282180-282943
- Period 18W01 runs 292944++

# Preparation of COMPASS 2018 DY run - no change since April 6

today ↓



April 2018

May 2018

April 9-15: muon beam day & night

April 16-20 & 25-27: muon beam with multiple interruptions due to target loading & COMPASS installations; beam in the night

April 28++ hadron beam day & night with increasing intensity + muon beam at certain times

(\*) defined as “FIs installed + 2 weeks”

	target loading	physics (*)	reason for change
current	April 17	May 14 (or earlier)	push magnet commissioning to be only 4 weeks
Bonn March 22	April 24	May 21	startup of LHe production delayed
TB February 20	April 17	May 14	
CM January 25	April 17	May 14	mobile LHe dewars & skip empty target calibration
TB December 4	May 8	June 4	cooling tower consolidation
perfect world schedule	March 27	April 23	



## Detector experts:

- Check settings in DCS - deviations from reference?
- Continue your tireless work on MurphyTV errors.
- Update cool references at 120 units and 500mm!

**Thanks to all shifters, experts, and coordinators!**

**Good luck Annika!**

**Drell Yan 2018**



# Detailed info & day-by-day



## Friday May 4 - solenoid ON

- Reduce 100mm target to 40mm target with pion beam, 50 units on T6, increasing
- 13:30 access for mu-metal of FI15, and for ST03 (cables 26 & 29, cards are difficult to access)
- 14:30 **target magnet: field rotation** solenoid+  $\longrightarrow$  dipole+  $\longrightarrow$  solenoid+  
(2x because 1st time there was problem with trim coils & Sylvain had to be called)  
Result: better than 2015. Reminder: new-old SMC procedure
- 15:00 increase of intensity to 100 units on T6
- 18:00 -23:00 muon alignment beam for **SciFi threshold scans (FI01, FI15, FI03, FI04)**

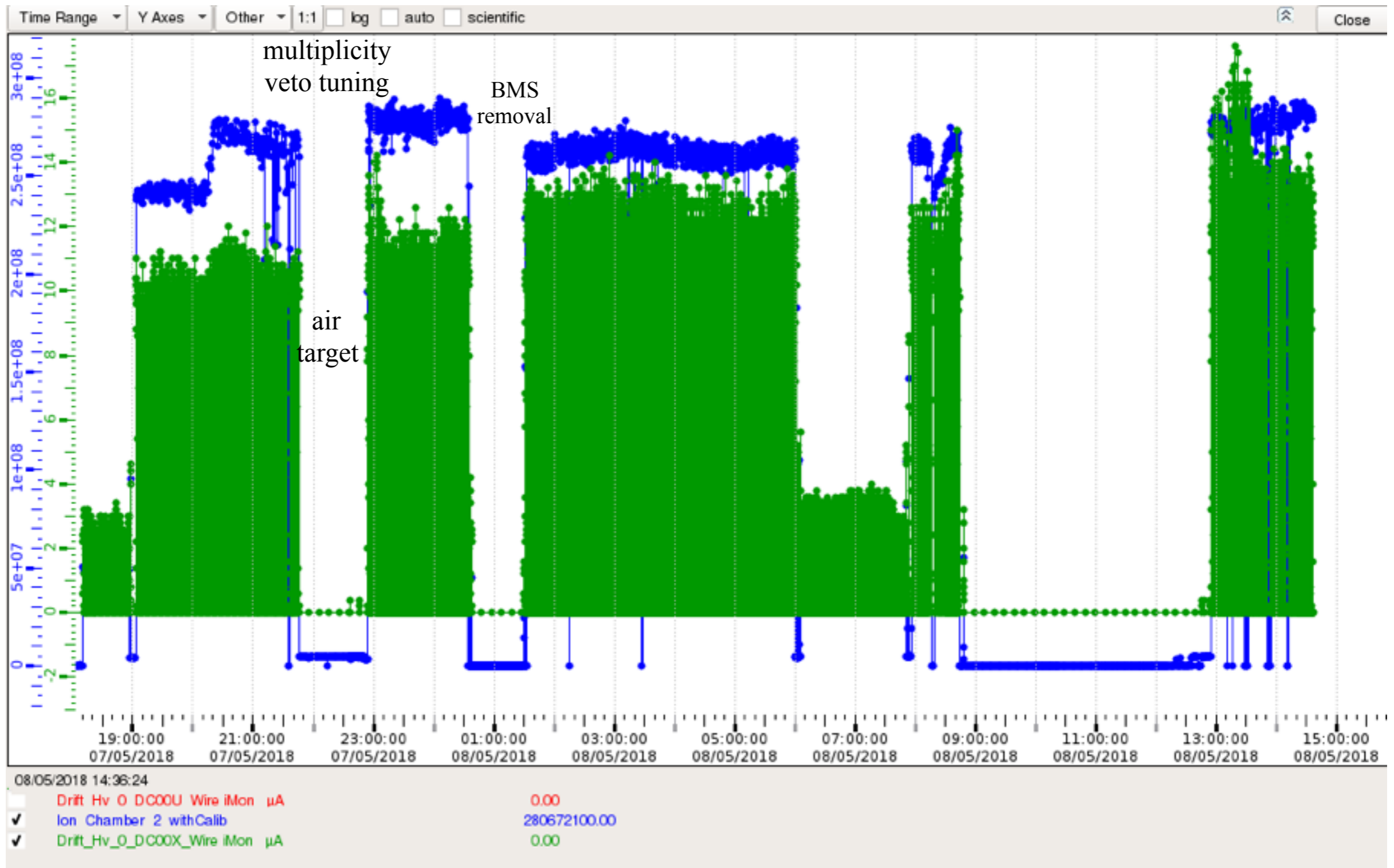
# Saturday May 5 - solenoid ON

- Go to thicker target:
  - < midnight: 40mm target
  - midnight: 500mm, **radiation alarm** (DCS & accustic) at around 3 muSv/hour on PAXN2112
  - 0:25: 100mm, no alarm
  - 0:45: 300mm, alarm
  - 1:20: 180mm, no alarm: stay there
- Saturday afternoon: contacted (by e-mail) Johannes and Dipanwita (EN-EA) and RP
- **Plateau scans @ 180mm for DC0/1/4/5, MMs, ST03: 2:00 - 4:30 & 6:00-9:13, 47 runs of each 20 spills (4:30-6:00 no beam)**
- **Alignment runs mu-** (SM1 & SM2 ON then OFF)
- RP updates the upper limits in 888. We can go to **500mm target @ ~105 units on T6 without alarm.**
- **Plateau scans @ 500mm target**
  - Trip of **ST03Y2 6mm**, can be raised in steps and with very slow ramp-up speed
  - Over current in **DC05X** DCS alarm, unclear why, turned off and later on again without problem. Trip later in the night. Probably related to too low trip limit.
  - **DC01V** noise, had appeared some days ago. To be fixed.

# Sunday May 6 - solenoid ON

- **Plateau scans @ 500mm with DC5-X** not ramped higher than 1600
  - **DC5V threshold scan**
  - 9:30-15:15 no beam due to BLM
  - **Continue DC5 threshold scan**
  - **Plateau scans @ 40mm**
  - **Plateau scans @ 500mm, “missing runs”**
- **DC00U1** missing 257/11 (fixed by access) and 257/14
  - **DC5X-plane trip:** have to decrease HV to 1600V. Raising the trip limit from 10uA to 60uA solves the problem of over current and trips.
  - **ST03V1** noise returns
  - **ST03Y2 6mm** trips
  - **MW1:** MA01Y4, MA01Y3, MA02X1 noisy
  - **SciFi15** SRCids 130 + 23 missing, X1/X2/Y1 affected; fixed by Johannes G. Sunday morning after phone call with Rainer (powercycling of module)
  - **W45** noisy channels

# Monday to Tuesday



# Monday May 7 - solenoid ON

- Finish plateau scans @ 500mm, “missing runs”, almost finished
- 9:00 access 30min for chicane
- 9:30 meet with Frederic Aberle from RP
- BA2 cooling problems - no beam 8:50 - 13:30
- 13:30 beam back with 108-111 units on T6
- 15:30: finish plateau scan at 500mm @ 105 units
- 17:00: access for DC4
- Switch to nominal beam intensity: 120 units & 500mm target & pion beam
- 21:15: tuning of multiplicity veto with air target (Jens)
- 2:00: remove BMS

• DC04 missing 260/11

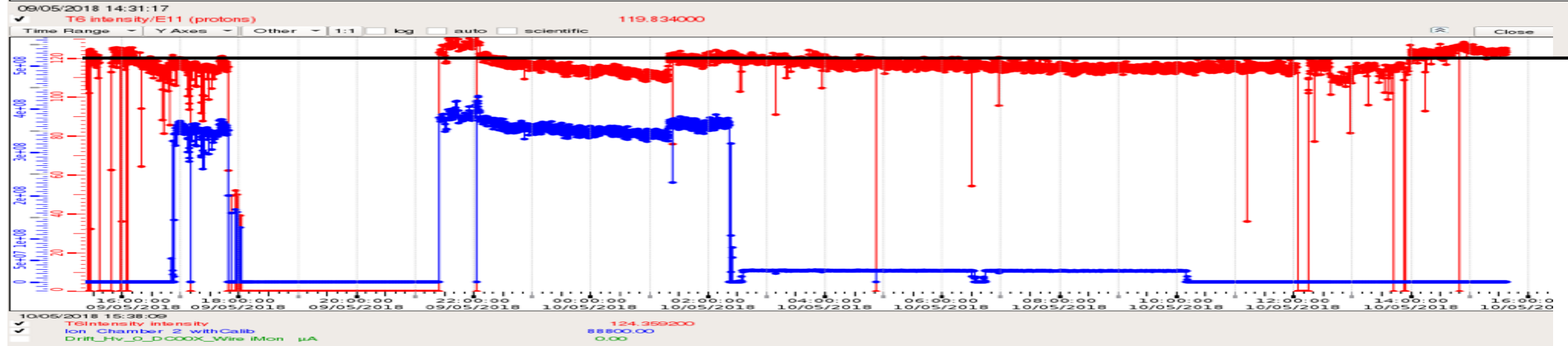
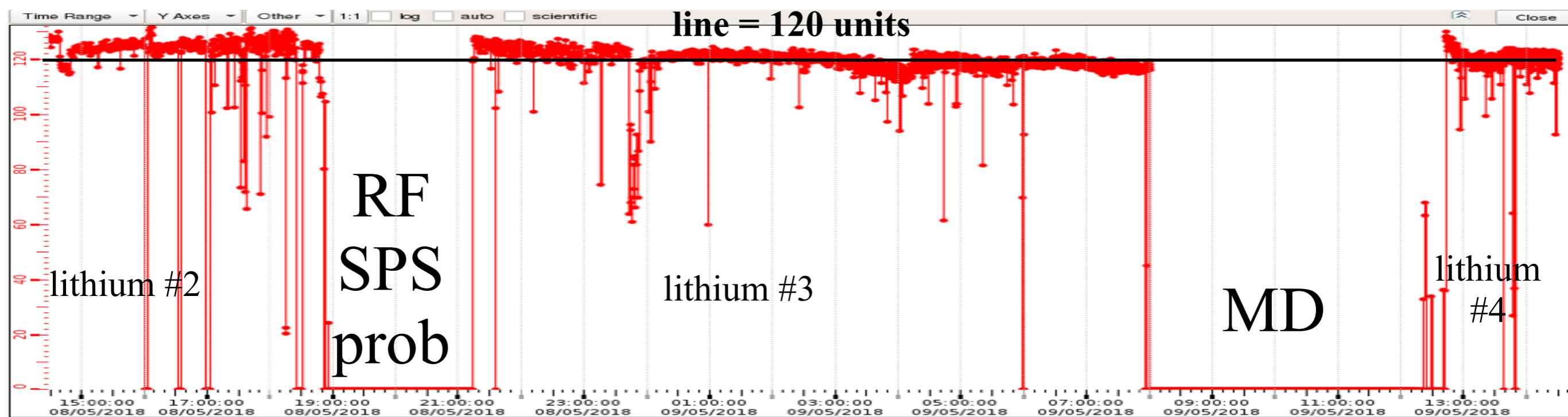
- First DY trigger mix data were taken at 14:00

## Prescaler setup for run 282878

Trigger element	Short name	Division factor	In rate (1st spill)	Out rate (1st spill)
Dimuon Trigger (Middle and LAS)	MLAST	1	1919	1919
One muon Middle Trigger	MT	0	144988	0
Dimuon Trigger (Outer and LAS)	OLAST	1	4781	4781
One muon Outer Trigger	OT	0	72219	0
Calorimeter Trigger	CT	20	245674	12284
Inner Veto	VI	0	13351277	0
Halo Trigger (H2 AND H4Outer)	Halo	0	1332594	0
Beam Trigger	BT	40000	56721561	1419
Dimuon Trigger LAS	LASLAST	1	79918	79918
One muon Trigger LAS	LAST	0	549463	0
True Random	TRand	1	10077	10077
Noise Random	NRand	0	1229708	0

282878 14:06 14:37 45 detector\_test Good OK

MLAST,  
OLAST,  
CT, BT,  
LASLAST,  
TRand  
test with drell-yan trigger mix



## Tuesday May 8- solenoid ON / OFF

- 120 units & 500mm target & pion beam
- 6:00-8:00: DC5 threshold scan @ 40mm target
- 8:45: solenoid OFF
- 9:00: move FI01 [12 mm Saleve] & FI15; survey FI03, FI01, FI15  
Put exactly as in 2015.
- Interventions in 888:
  - RICHwall: 1.5h
  - MW1
  - W45 noise
  - DC4
  - Site visit of CV for various cooling issues
  - 11:30: removal of L1 lithium
- Lithium studies #2 @ 120 units & 500mm target
- 18:00 lithium: add PE sheet.
- 21:30 Alignment with solenoid OFF: SM1/2 OFF, then SM1/2 ON
- ~ 22:00 turn ON solenoid and start polarizing.
- ECal & HCal calibration with muon beam file at 40mm, 600 spills
- Lithium studies #3 @ 120 units & 500mm target

### Remaining RED:

**480, 481, 482 MW1**

-> solved through reloading

**432 RW**

**460 MWPC**

# MD Wednesday May 9 - solenoid ON

**Remaining RED  
in MurphyTV:  
NONE!!  
Nice!  
That's how it  
should be!!**

- 5:00 power cycle of switches in SM1 rack and on gallery
- 6:00 Bend06 faulty, SPS called
- 8:00 start of MD
- 8:30 EN-EA technicians for chicane hydraulic jacks: repair of valve & test of system, works!
- 10:00: change to lithium config #4: 2 lithium sheets at very backend of absorber, no PE.
- **MW1** intervention
- **PA01\*** (**PS01**) intervention: catch problem can be solved without pulling chamber in garage
- **DC04** intervention at patch panel, fine later in the afternoon
- New  $^{22}\text{Na}$  source for the random trigger: true random trigger rate increased from 10k to 160k
- CT restored after unscheduled intervention had made it disappear
- 14:00-15:00 Tests of beam intensity (Johannes): too many losses
- 14:30: M2 beam line cooling failures of magnets
- 17:00-23:30 (17:45-21:25 no beam from PS): DC5 threshold scan



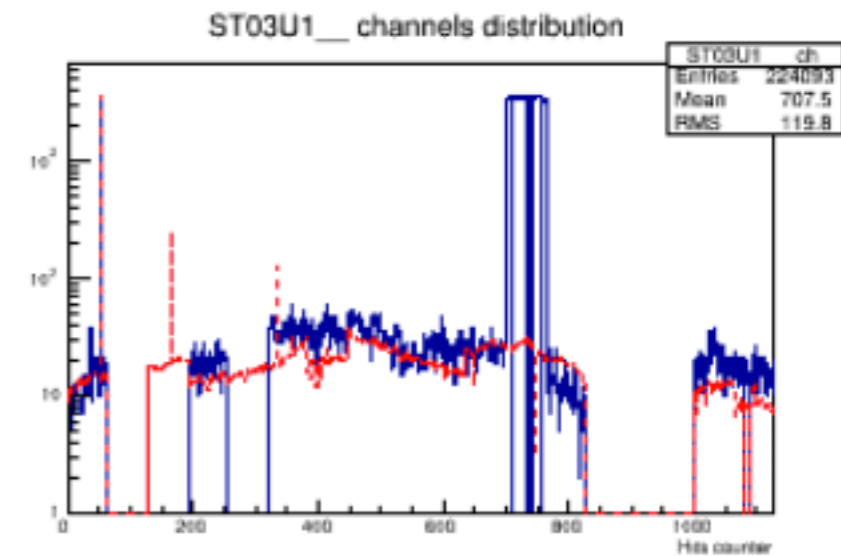
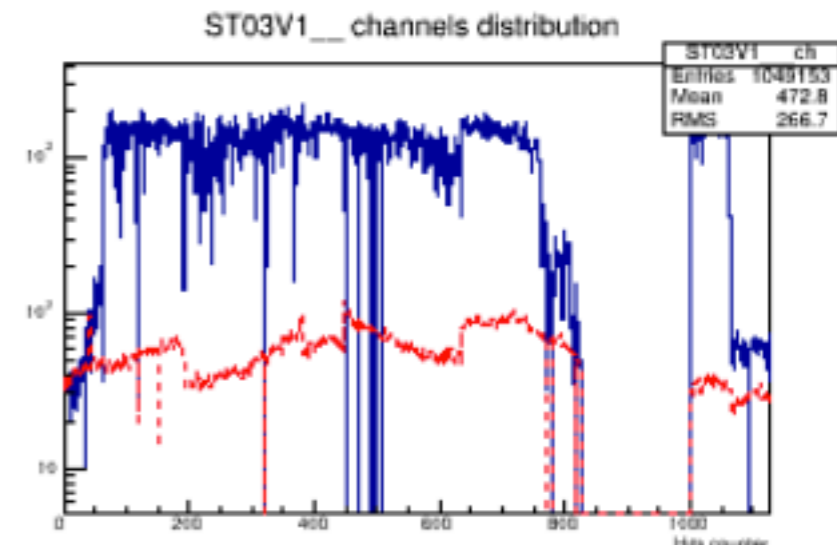
# Thursday May 10 - solenoid ON —> dipole

- 23:30- 2:30: Data taking with pion beam & current lithium configuration (#4) at 500mm and 120 units
- 2:30-10:00 Proton radius runs (for TPC) with 120 units muons
- 06:30 Access to reboot pccore21 (reboot engine for PRM had gotten stuck)
- 10:00: install final lithium configuration (#5)
- Intervention for **DC4** readout (pulled in garage)
- 17:00: move HCal2 & ECal2 to Jura by 50cm for PRM
- 17:00-19:45: pion beam for lithium #5 configuration
- 20:00 move chicane
- 20:00 access for DC4, MWPC; move calos back to nominal position
- 20:00 turn on target dipole

since 1:40: 100% error on  
SciFi15 (870,852)  
SCFI15U1, SCFI15U2  
FI15U1 (Beam Monitor)  
—> fixed by expert  
BMS 240, 241, 244 missing;  
powercycled crate

# ST03

- Observations:
    - ST03V1 (srcID 324): noisy
    - Fluctuation of current in LV channel 7
    - Warm Normabarre connector & cable; the total power is less than 2.5kW, should not warm up the cable that much.
  - May 2: attempt to exchange Normabarre connector (and fan unit) causes power cut on Jura side. Culprit might have been cable that provides power to the fan unit.
  - Vincent: if port 13 of srcID 321 is excluded, the noise in ST03V1 disappears. Both ports are related to ST03U1:
    - srcID = catch 321 port 10 (cable #26) & port 13 (cable #29)
    - 2 cards identified, but difficult to access and also water cooled. Delay intervention until next long MD. For the time being, the 2 ports are excluded and therefore there are no oscillations in the LV.
- There also seems to be correlation with HV? Noise appeared during night of threshold scan, even though the 2 ST03V1 ports were excluded, then noise disappears on its own.
- ST03Y2 6mm trips, can be very slowly ramped up again.



# Cooling

- About all of the following points, Vincent is in contact with Hassane from CV.
  - Target pump room: temperature gradient, side of pumps too warm. Bad ventilation? Cooling cannot account for oscillations of temperature
  - Temperature of tap water in 888: was issue for MW cooling (EIO tube secondary cooling) April 30 & May 1, measured to be 30 C on May 1, also afterwards found to be warmer than usual (also rest rooms in 888). Bill Bannister and Hassan site visit May 2, explanation well pump (—> Vincent)
  - Cooling of BMS barrack: will get quote for improved shielding
  - Cooling unit for GEMs on Jura side not providing sufficient power? is OK now
- Planned interventions for DAQ room ACs May 16++
- NMR rack temperature (water outlet). Cooling water pump had stopped, refilled water and started again. Raw water is used for primary cooling, distilled is closed circuit. Last time filled in March. Affects polarization measurement. When cooling not sufficient, then polarization is measured to be too low. Phase transition of NMR cable.

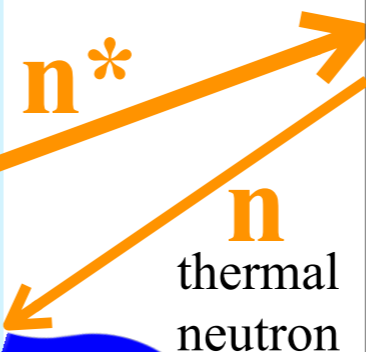
# Why a lithium absorber?

courtesy Matthias Grosse Perdekamp

1. Spallation neutron created in hadron absorber



2. Thermalization on heavy elements (concrete blocks, steel support frames, ...)



3. Capture of thermal neutron on heavy elements

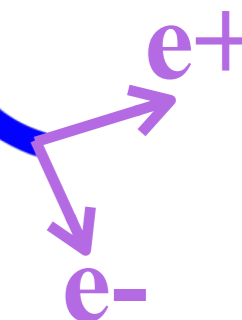


4. De-excitation of nucleus & emission of gamma

25C°=1meV

$\gamma$

**DC0**

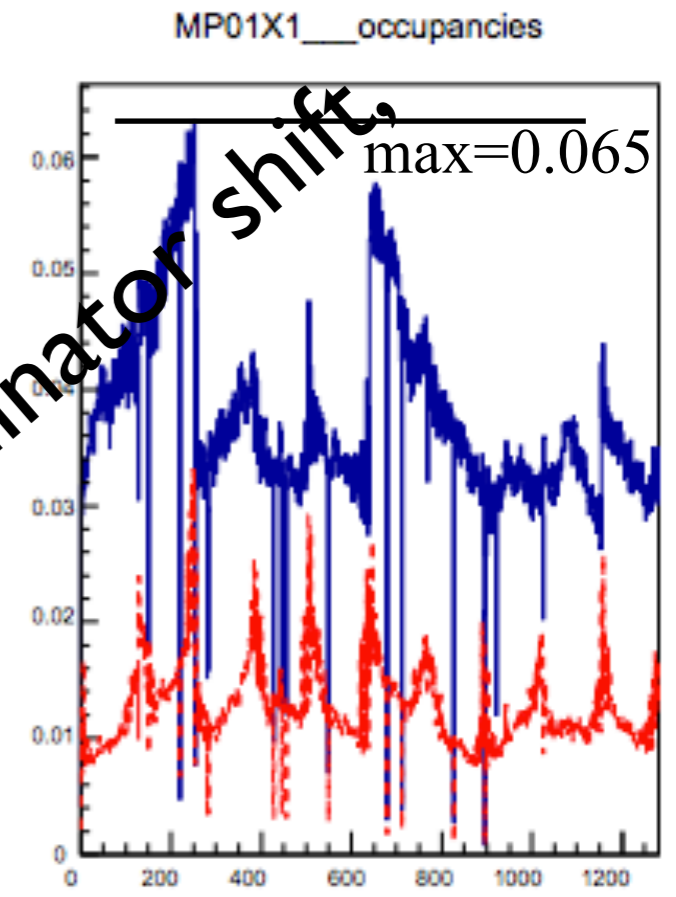
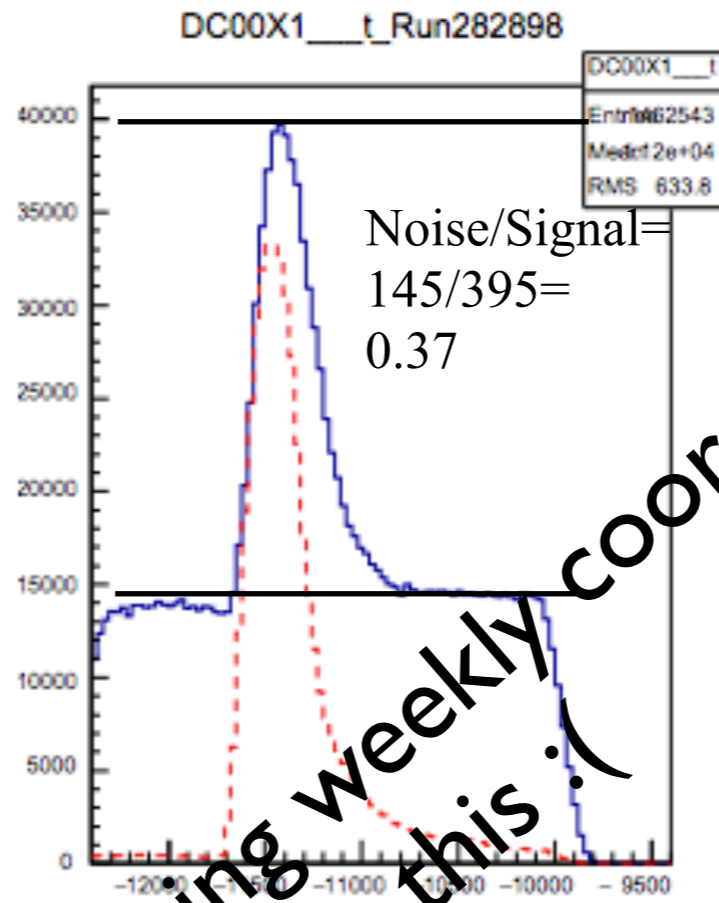
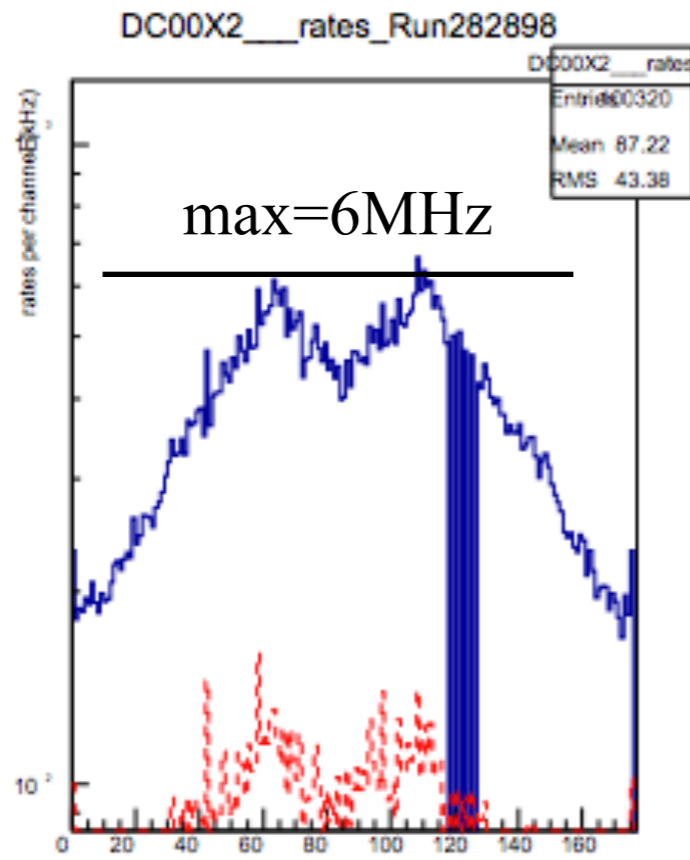


Insert neutron absorber here:

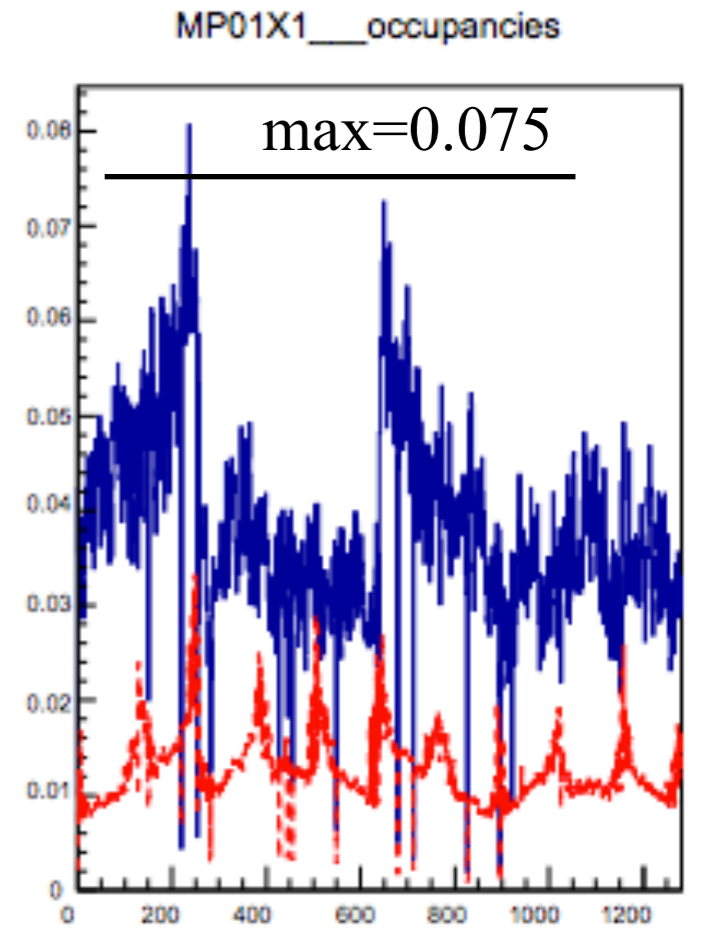
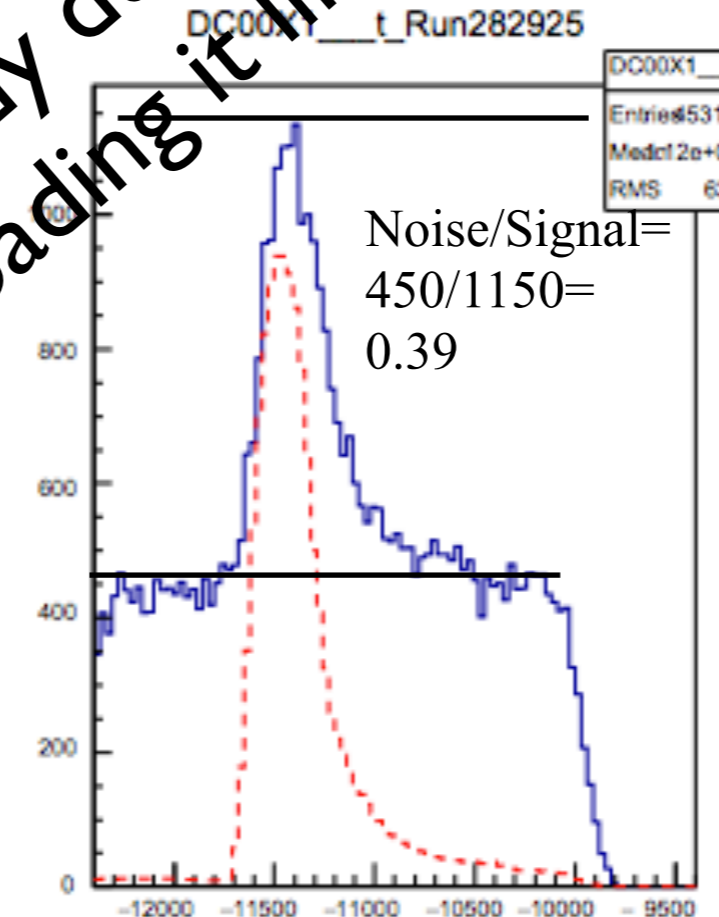
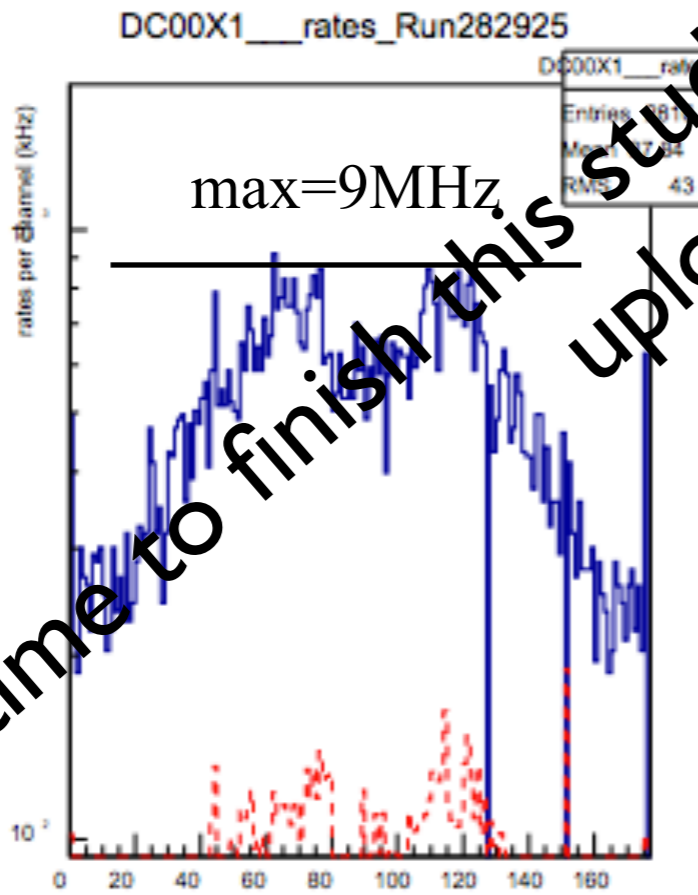
- $n + {}^6\text{Li} \rightarrow {}^3\text{H} + {}^4\text{He}$  : stop in air, do not reach DC0
- $n + \text{B} \rightarrow \text{B}^* \rightarrow \text{B} + \gamma_{500 \text{ keV}}$  : reaches DC0
- Both Li and Bo are good in absorbing low-E neutrons

Required energy cutoff: very small (meV)  
 Required thermalization & capture time:  
 very large (~50μs)

282898  
 (L1 - -)  
 119 units on T6  
 $ion2 = 2.64 \cdot 10^8$



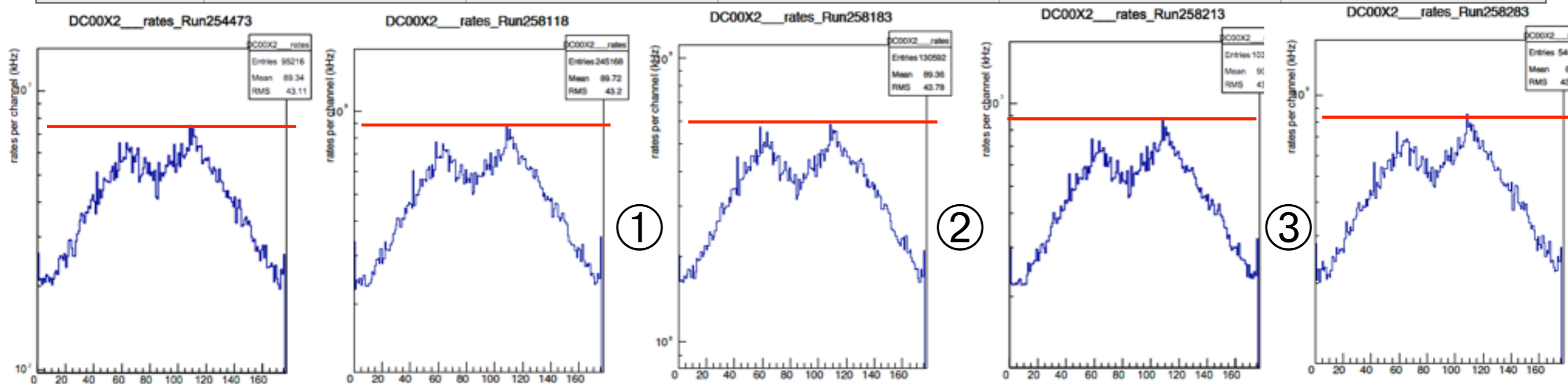
282925  
 (---)  
 124 units on T6  
 $2.76 \cdot 10^8$



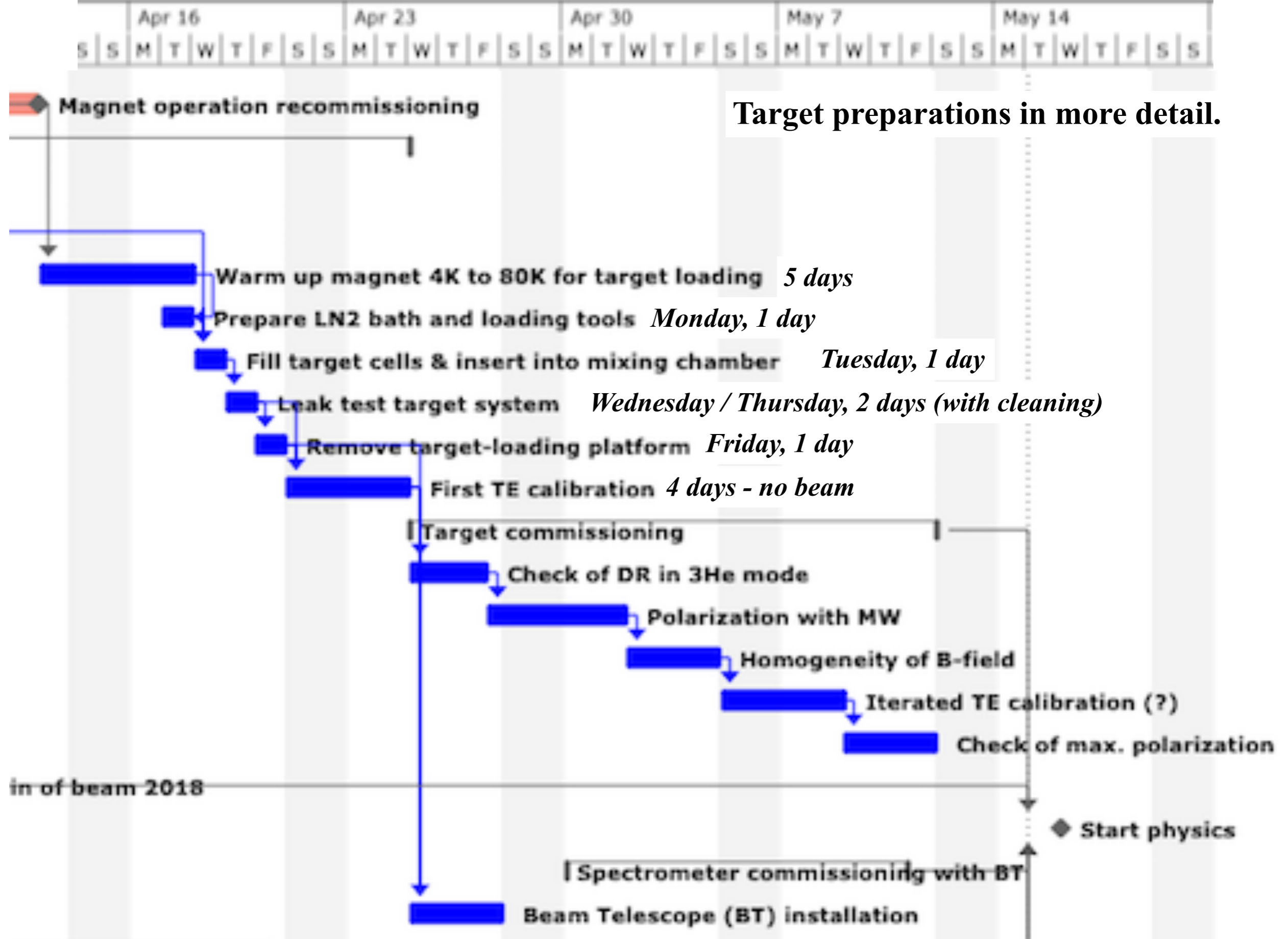
no time to finish this study during weekly coordinator shift, uploading it like this :-(

# Rates per channel in DC00-X2 - 2015

date	Nov 29, 2014	June 9, 2015	June 11, 2015	June 12, 2015	June 14, 2015
run	254,473	258,118	258,183	258,213	258,283
ion2	$3.93 \cdot 10^8$	$4.10 \cdot 10^8$	$4.17 \cdot 10^8$	$4.59 \cdot 10^8$	$4.80 \cdot 10^8$
config	(- - -)	(L1 L2 -)	(L1 - -)	(L1 - P)	(L1 L2 P)
peak rate / ch [ $10^3$ kHz]	0.7	0.9	0.6	0.9	0.8

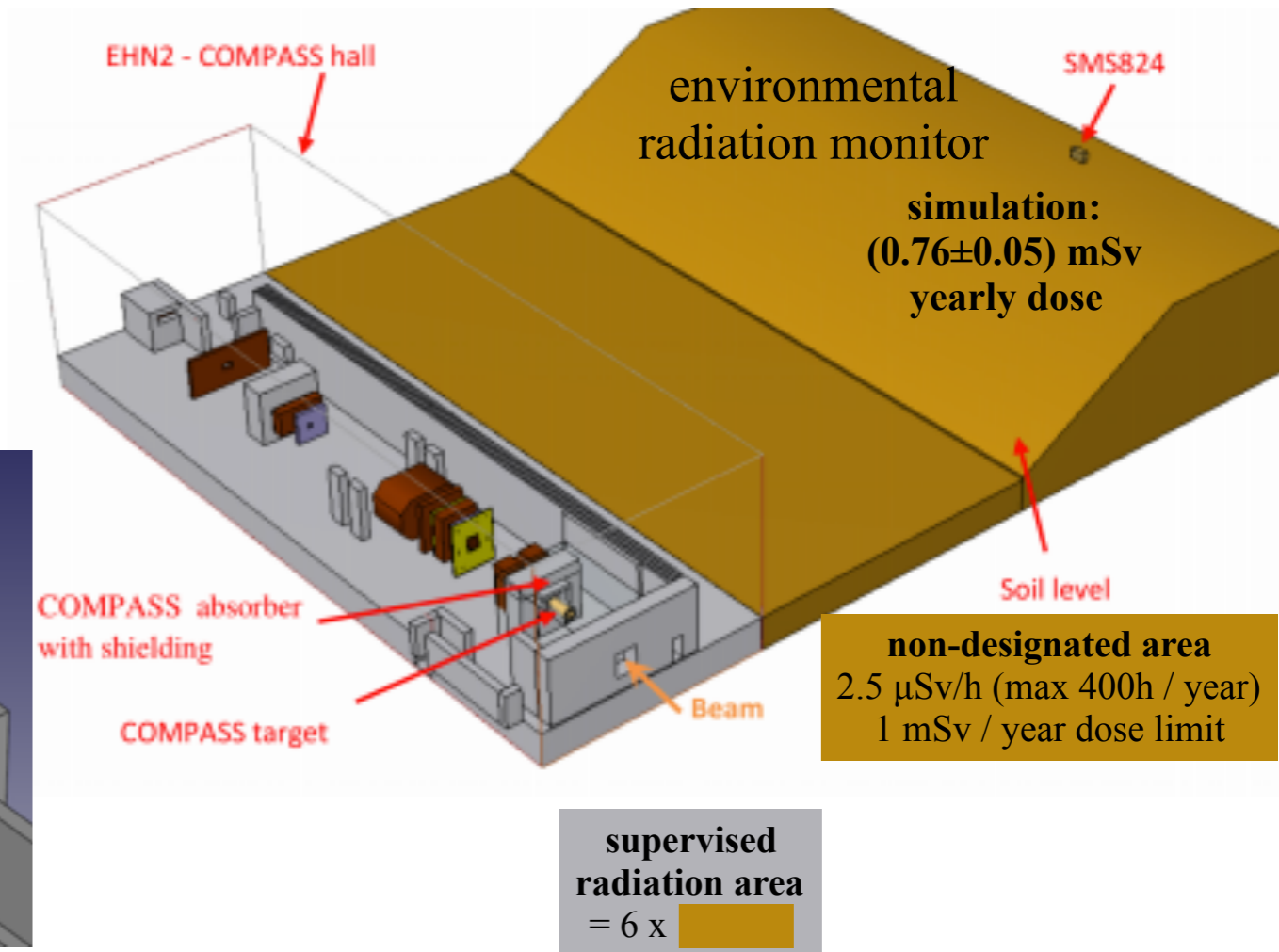


- Observation ①: after removal of lithium-2, decrease of rate by 50% (@ ~ same beam intensity)
- Observation ②: after adding polyethylene, increase of rate by 50% (@ 10% higher beam intensity)
- Observation ③: after adding lithium-2, decrease of rate by 30% (@ 5% higher beam intensity)
- BUT be careful with the interpretation...
  - A low rate / channel can be due to inefficiencies because too many particles are present.
  - A high rate / channel can mean there are many (unshielded) particles.

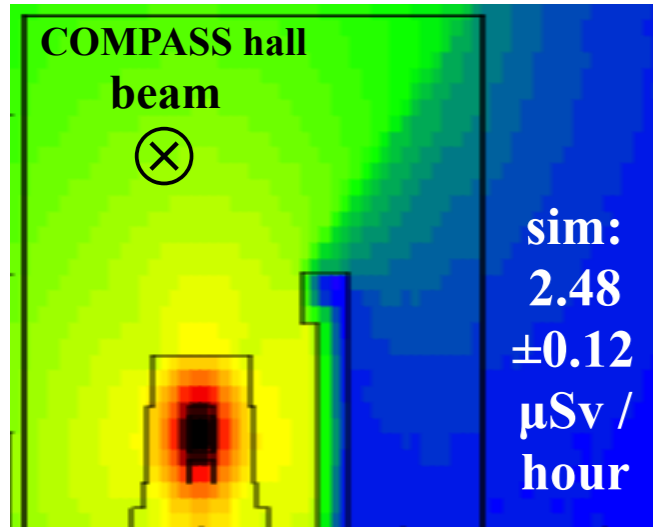
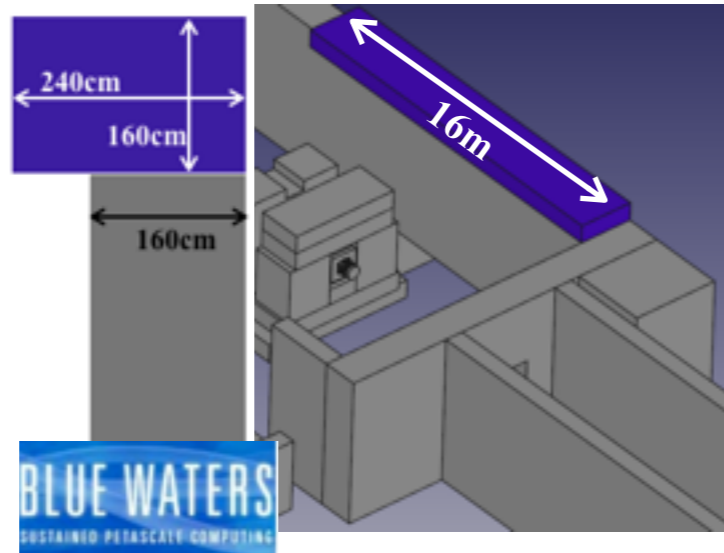


# Improved shielding for COMPASS 2018 run

- Improvement of shielding for better radio protection at intensity  $10^8$  pions / second
- Simulation with FLUKA (A. Maggiora)
- Exploiting massive parallel computing resources of Blue Waters.



*new balcony shielding*



- Improvement of PLC shielding to reduce the risk of SEEs (Single Event Effects). 2015: 9 SEEs during magnet operation, each causing  $\sim 48$ h loss



**concrete** 80cm = factor 10 reduction in (high-energy) neutron flux, factor 3 thermal neutrons  
**polyethylene**  $\sim 2$ cm to thermalize neutrons  
**boron-carbid** sheet to absorb thermal neutrons (measured to be main source of radiation at PLC location)



