

CEDAR status

as of 2018-10-26 0:00

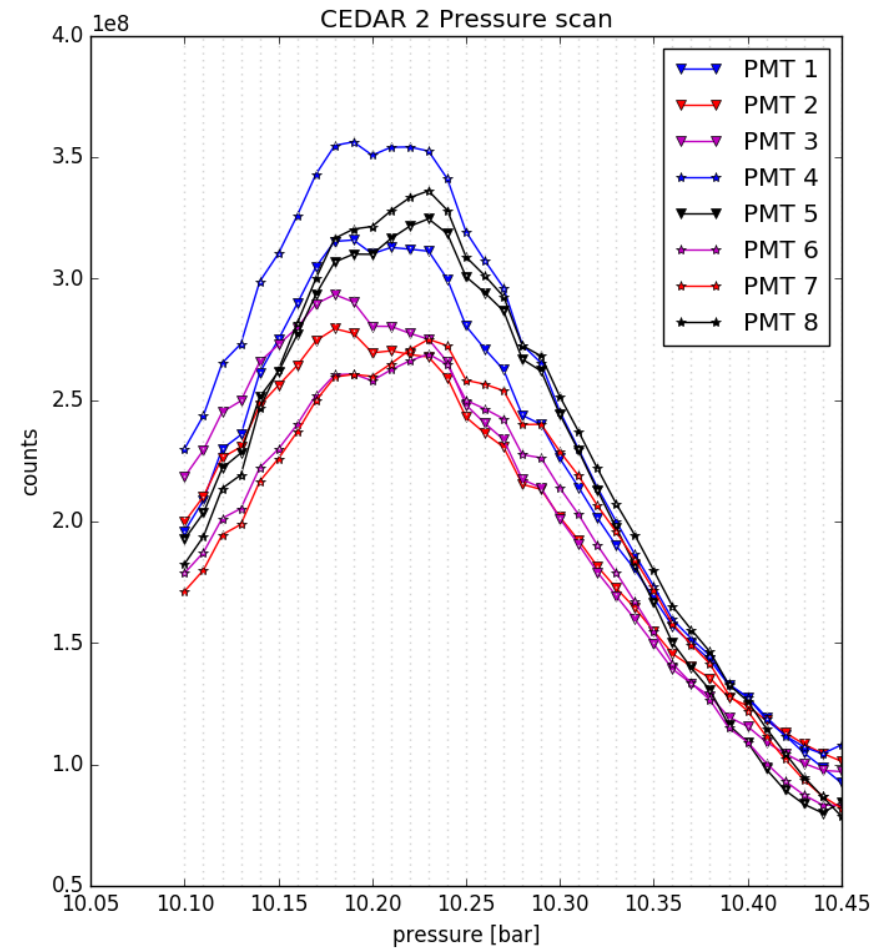
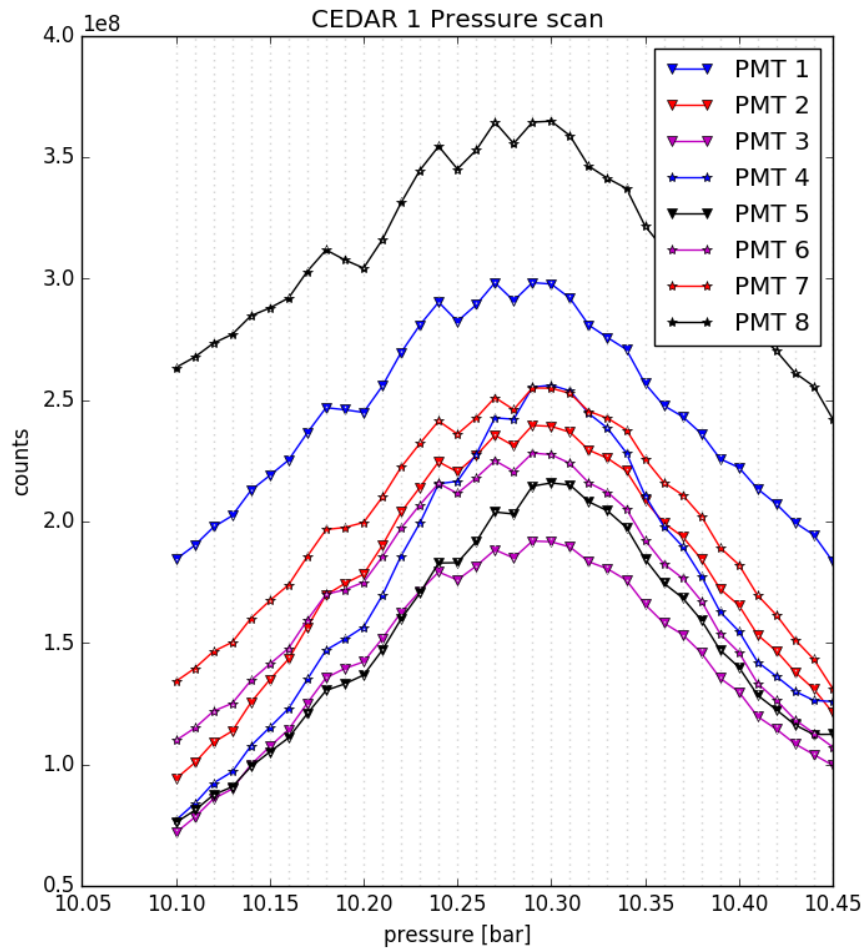
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Robert Kurjata, Vincent Andrieux, Benjamin Moritz Veit
with huge help from Igor Konorov, Vladimir Frolov and Fulvio Tessarotto

Status

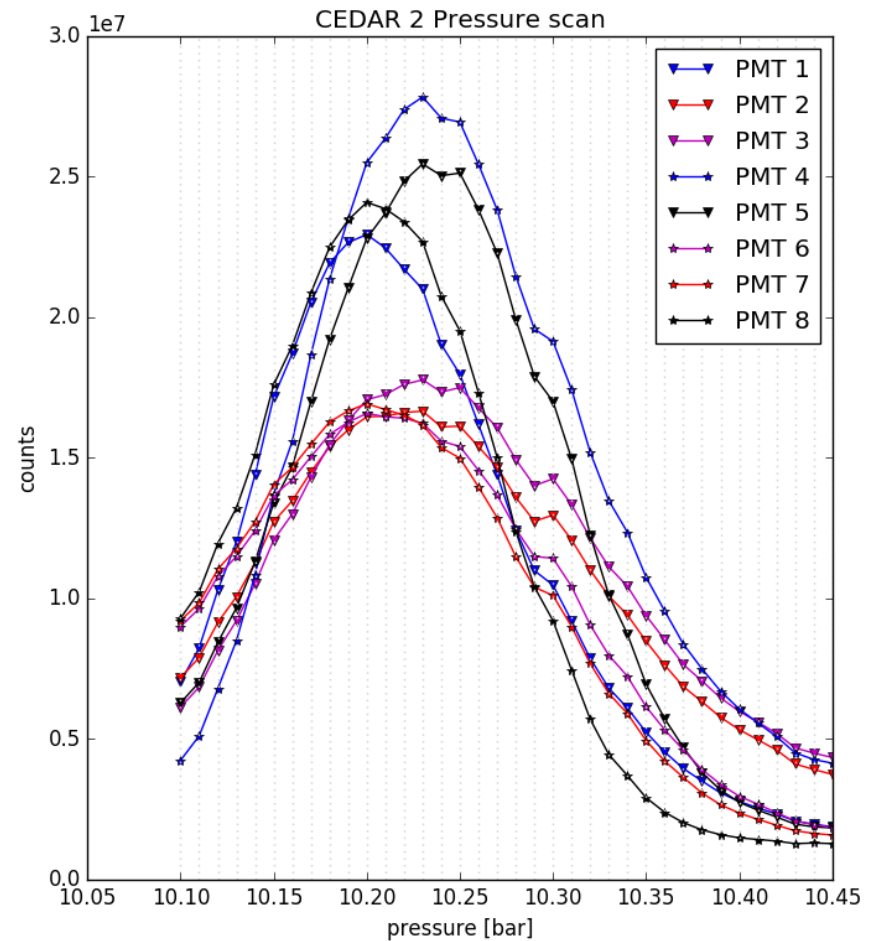
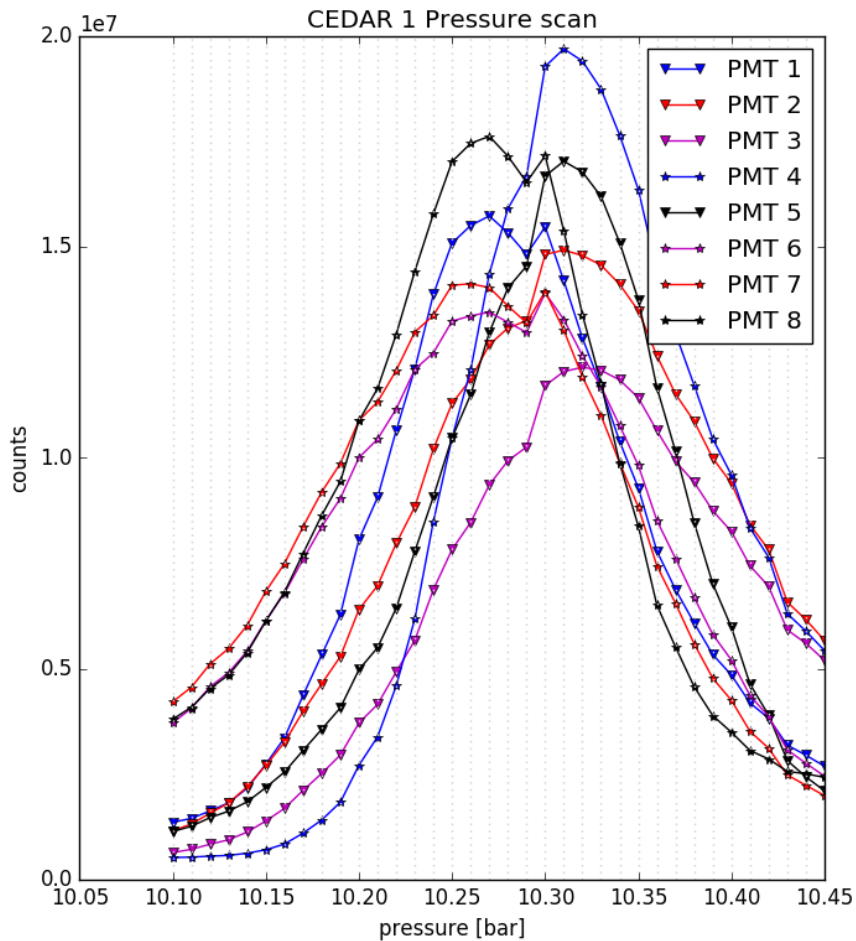
- Applied new alignment method based on position scans along X/Y and final adjustment using pressure scans
- Detectors are fully aligned for high intensity beam, to within 0.03 mm
 - CEDAR1: X = -4.24 mm, Y = -2.28 mm
 - CEDAR2: X = -0.45 mm, Y = 3.65 mm
- Pressure scan at high intensity pending to confirm position of CEDAR2
- Pending diaphragm scan 0.5 mm – 0.2 mm range for both CEDARs
 - After analyzing diaphragm scan the setup is done.
 - We need a plot of efficiency vs coincidence time and diaphragm opening to select proper settings for operation (compromise of efficiency vs purity).

Alignment (scalars, high intensity)



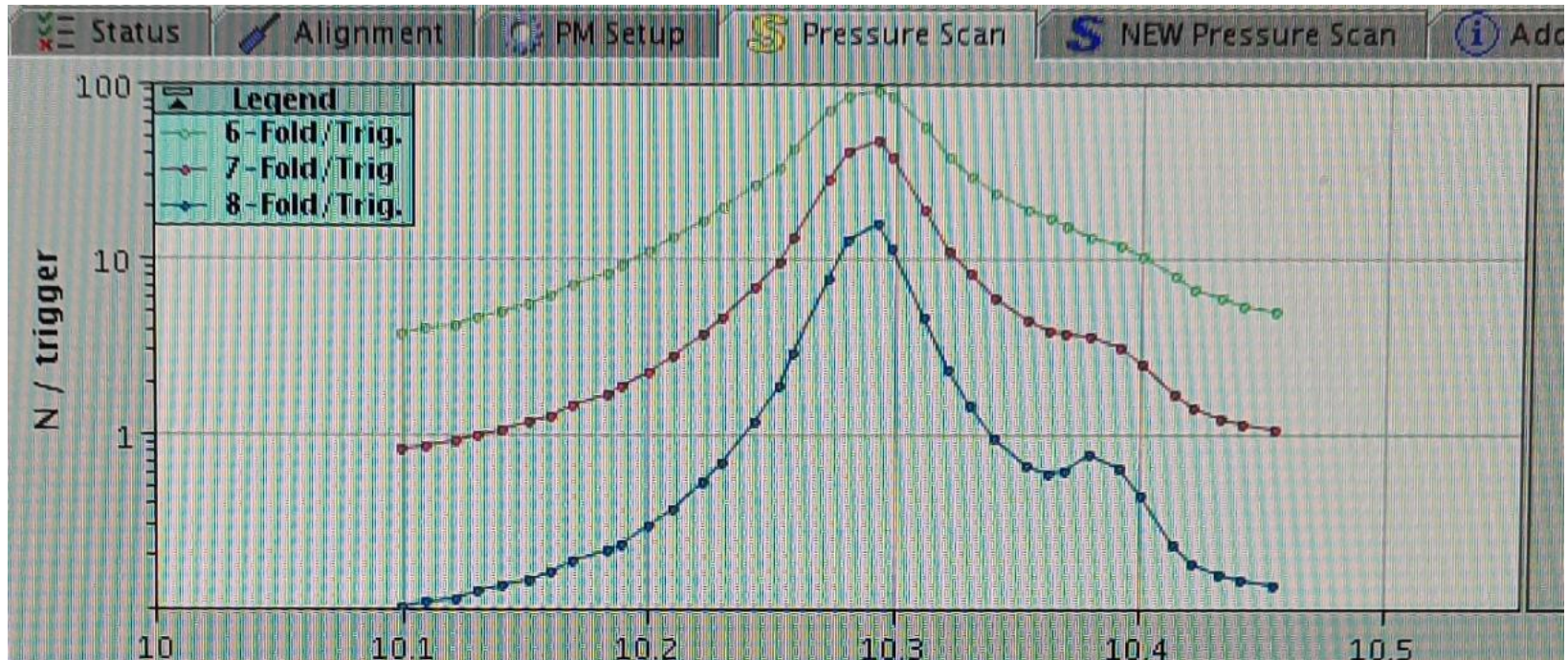
Not normalized to numer of beam triggers

Alignment (scalars, low intensity)



Not normalized to number of beam triggers

Pressure Scan – High Intensity

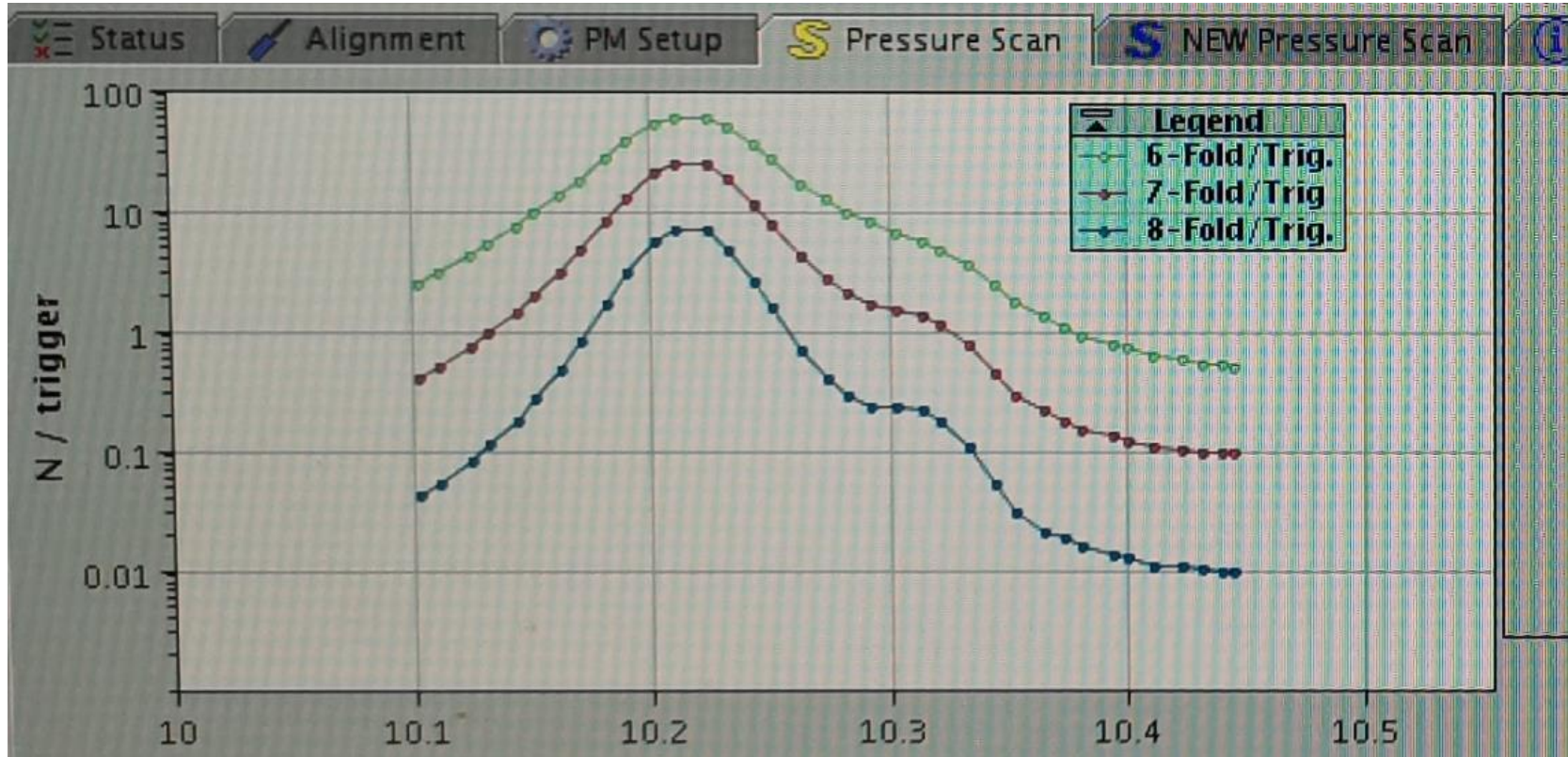


CEDAR 1 – fully aligned, LD = 0.35 mm

Date of scan: 2018-10-25, 9:40

Efficiency is arbitrary scale, as scintillators were OUT of the beam

Pressure Scan – High Intensity

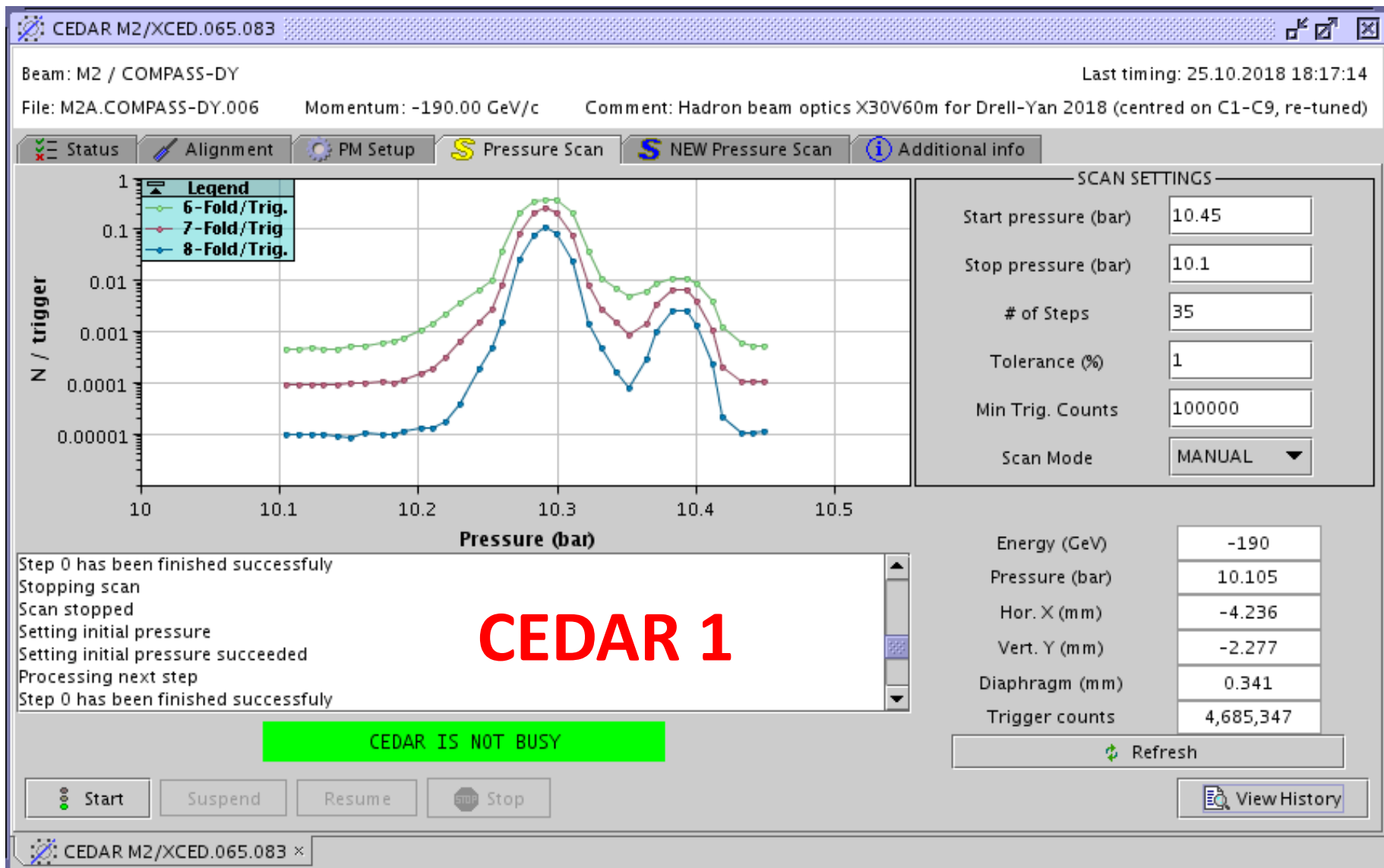


CEDAR 2 – misalignment +0.06 mm in X, LD = 0.35 mm

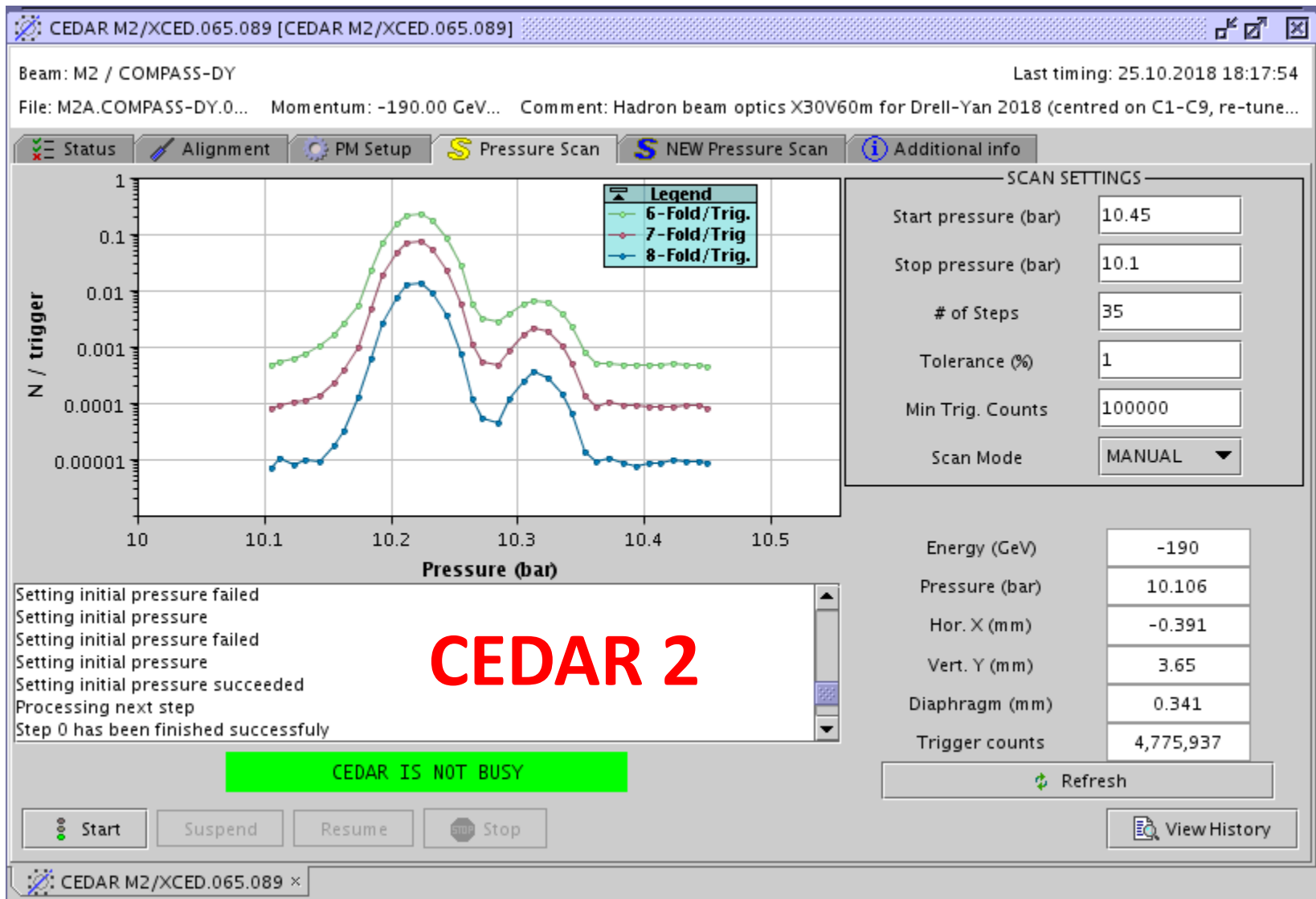
Date of scan: 2018-10-25, 9:40

Efficiency is arbitrary scale, as scintillators were OUT of the beam

Pressure Scan – Low Intensity

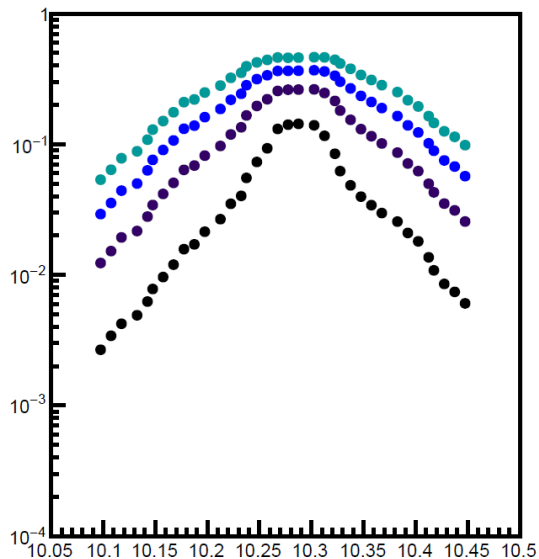


Pressure Scan – Low Intensity

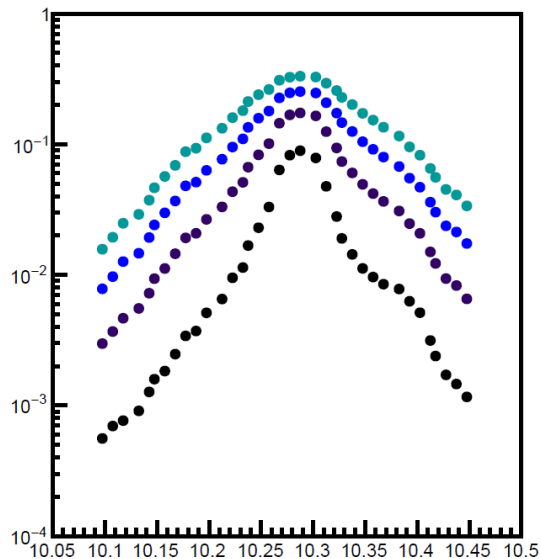


Pressure Scan – COMPASS DAQ

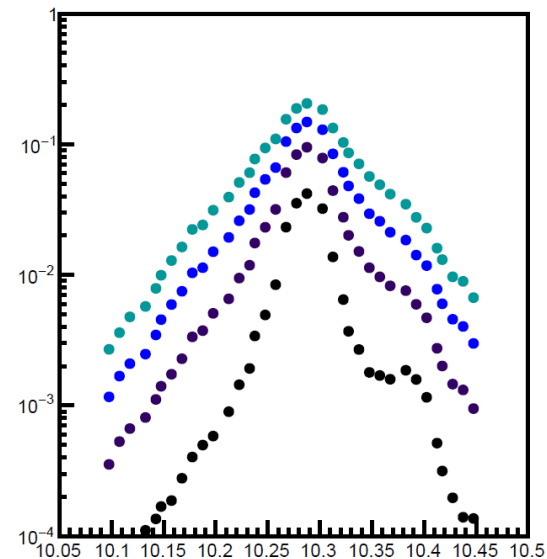
Cedar 1 6-fold



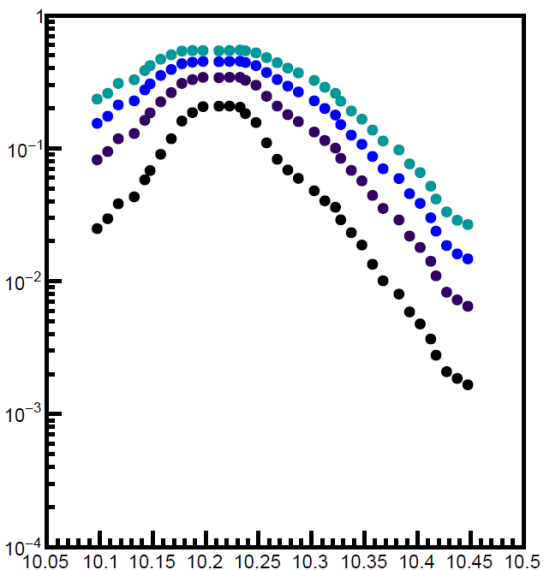
Cedar 1 7-fold



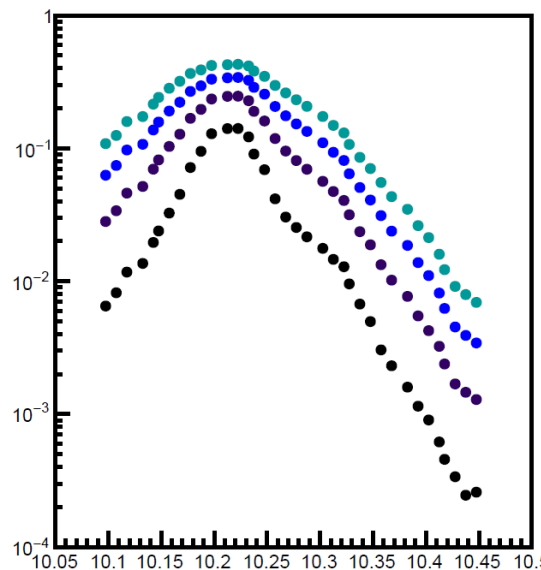
Cedar 1 8-fold



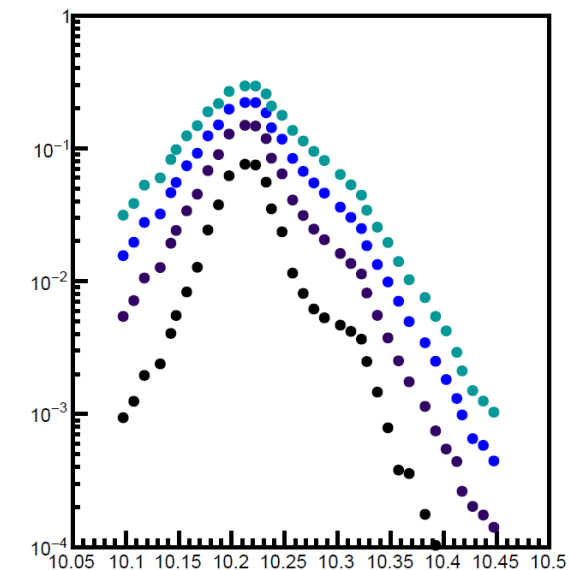
Cedar 2 6-fold



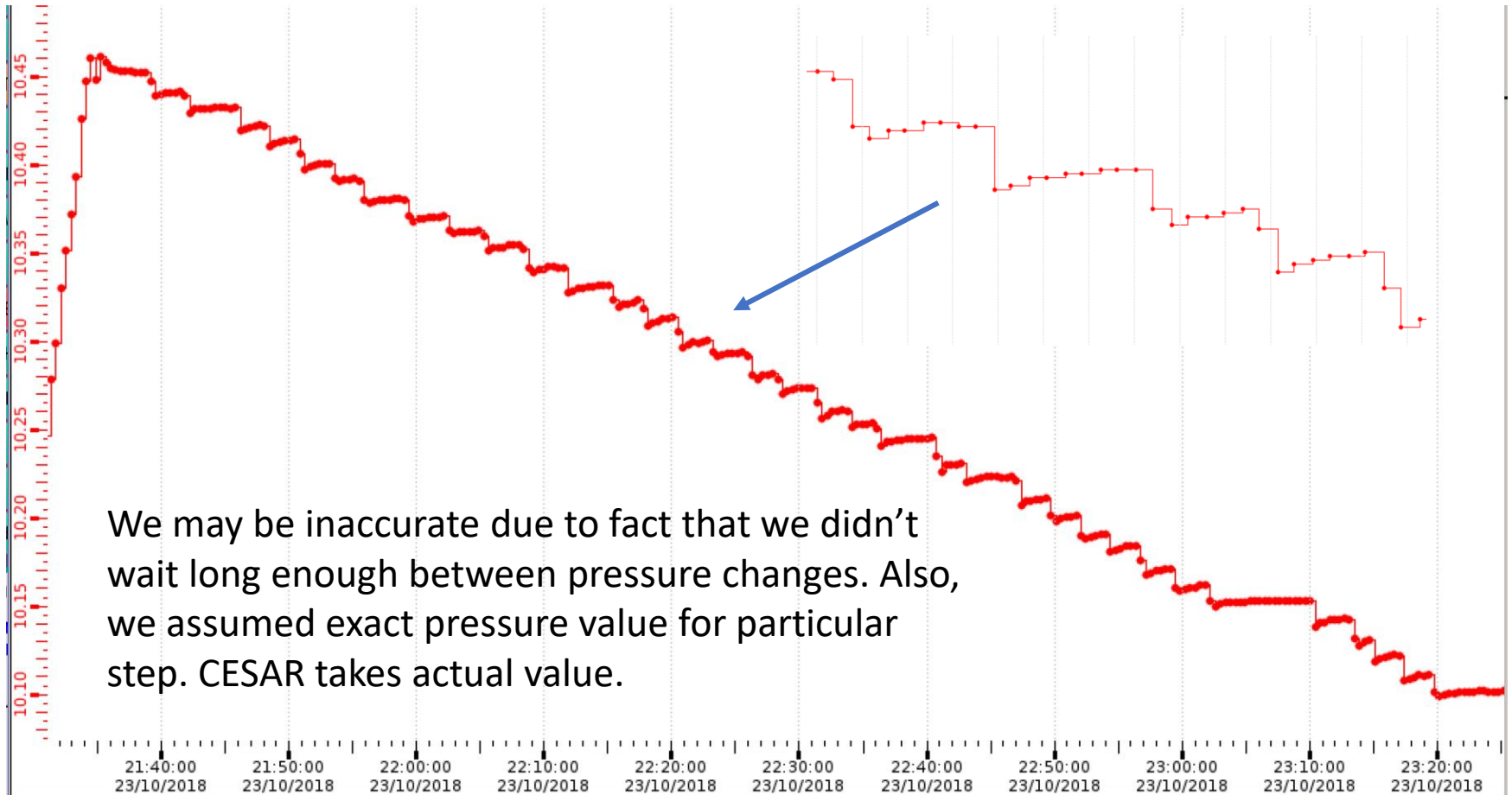
Cedar 2 7-fold



Cedar 2 8-fold



Pressure Scan – CESAR vs COMPASS



Rates at High Intensity

Signal (before alignment, pressure at what we thought was kaon, LD=0.35 mm or 0.4 mm)

CEDAR 1				
PMT 1	57 173 139	48 892 759	81 431 278	71 218 810
PMT 2	46 476 589	37 640 674	20 095 445	22 984 783
PMT 3	14 202 662	23 098 666	32 456 929	19 456 721
PMT 4	26 464 459	31 591 168	16 889 004	16 792 590
PMT 5	22 698 686	37 698 768	29 852 869	26 653 032
PMT 6	40 413 118	32 237 416	43 977 691	59 685 259
PMT 7	58 584 284	72 809 988	54 195 157	53 511 962
PMT 8	83 594 077	83 069 841	96 658 824	93 303 436

CEDAR 2				
PMT 1	54 253 340	67 626 183	59 623 202	51 713 281
PMT 2	45 638 841	52 931 703	45 670 261	42 801 770
PMT 3	52 361 902	50 100 287	37 258 006	33 852 286
PMT 4	41 859 929	31 603 368	44 527 598	50 201 827
PMT 5	36 428 313	43 524 045	44 959 162	41 989 160
PMT 6	40 377 073	43 012 832	27 352 721	35 148 828
PMT 7	35 952 058	46 422 558	59 895 339	52 999 674
PMT 8	72 896 505	58 320 844	37 314 732	49 841 972

Signal (before alignment, pressure = 11 bar, LD=0.1 mm)

CEDAR 1				
PMT 1	49 046 477	41 435 670	40 365 713	45 039 052
PMT 2	10 183 615	11 492 651	11 676 485	11 214 890
PMT 3	7 846 742	8 682 767	8 694 375	9 645 026
PMT 4	9 271 118	8 261 805	8 134 738	8 955 167
PMT 5	8 166 167	8 778 921	8 334 490	9 226 187
PMT 6	9 852 088	10 249 930	10 197 259	9 300 896
PMT 7	17 208 706	18 282 591	20 947 921	22 633 652
PMT 8	65 528 498	55 804 134	56 806 550	68 371 730

CEDAR 2				
PMT 1	14 107 243	15 452 718	15 062 901	12 266 704
PMT 2	9 198 899	11 509 368	10 885 207	10 987 097
PMT 3	10 198 512	9 890 152	9 636 501	9 642 816
PMT 4	10 224 072	9 840 401	9 941 011	10 613 274
PMT 5	9 420 869	10 028 134	9 629 414	8 707 123
PMT 6	7 815 415	8 031 328	8 302 551	8 081 509
PMT 7	9 409 212	10 556 166	10 097 783	8 988 603
PMT 8	13 316 881	12 509 418	11 571 065	11 962 916

Summary

- Alignment done – currently best that we can achieve for high intensity beam
 - Peaks alignet down to 10 mbar → mirror positioned to within 30 μm
- Pending detector studies (today):
 - Pressure scans at different discriminator thresholds
 - Diaphragm scans with pressure set to kaon and different discriminator thresholds
 - Timing accuracy at TDCs
- After analyzing diaphragm scan, we will set final pressure/diaphragm configuration