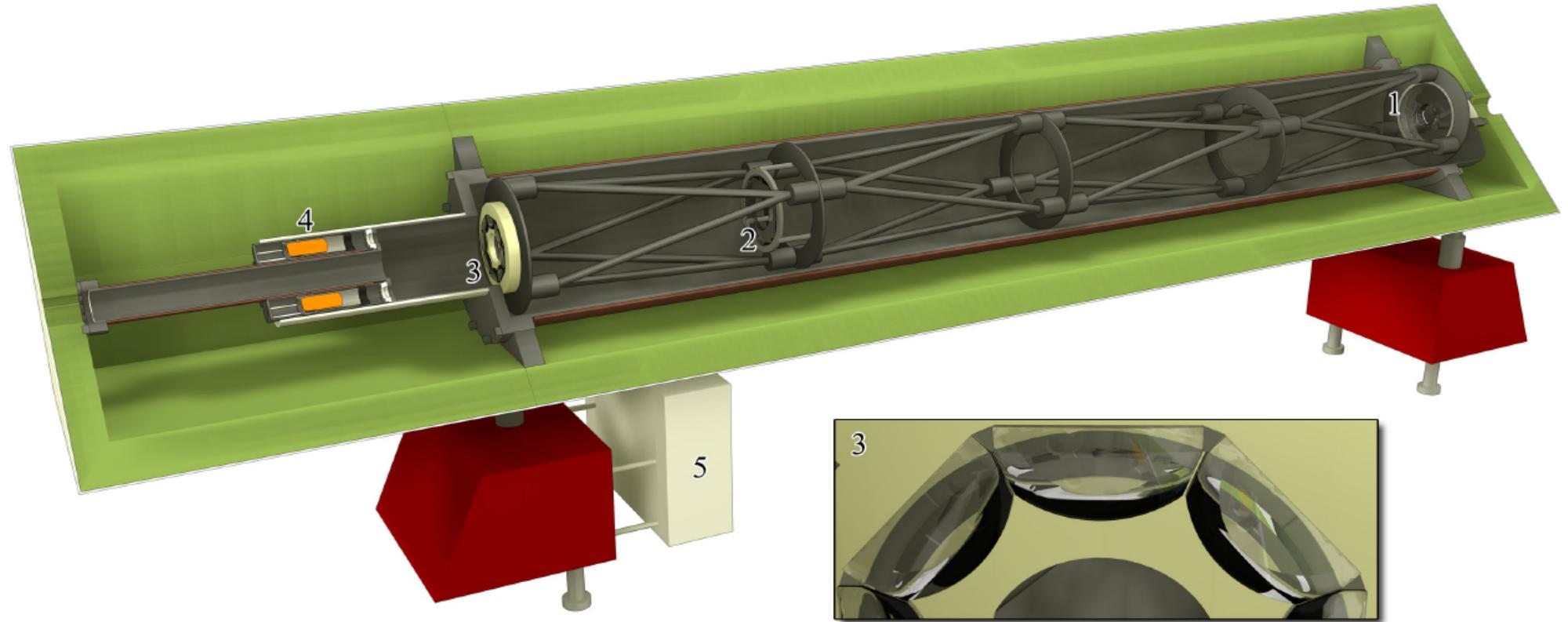
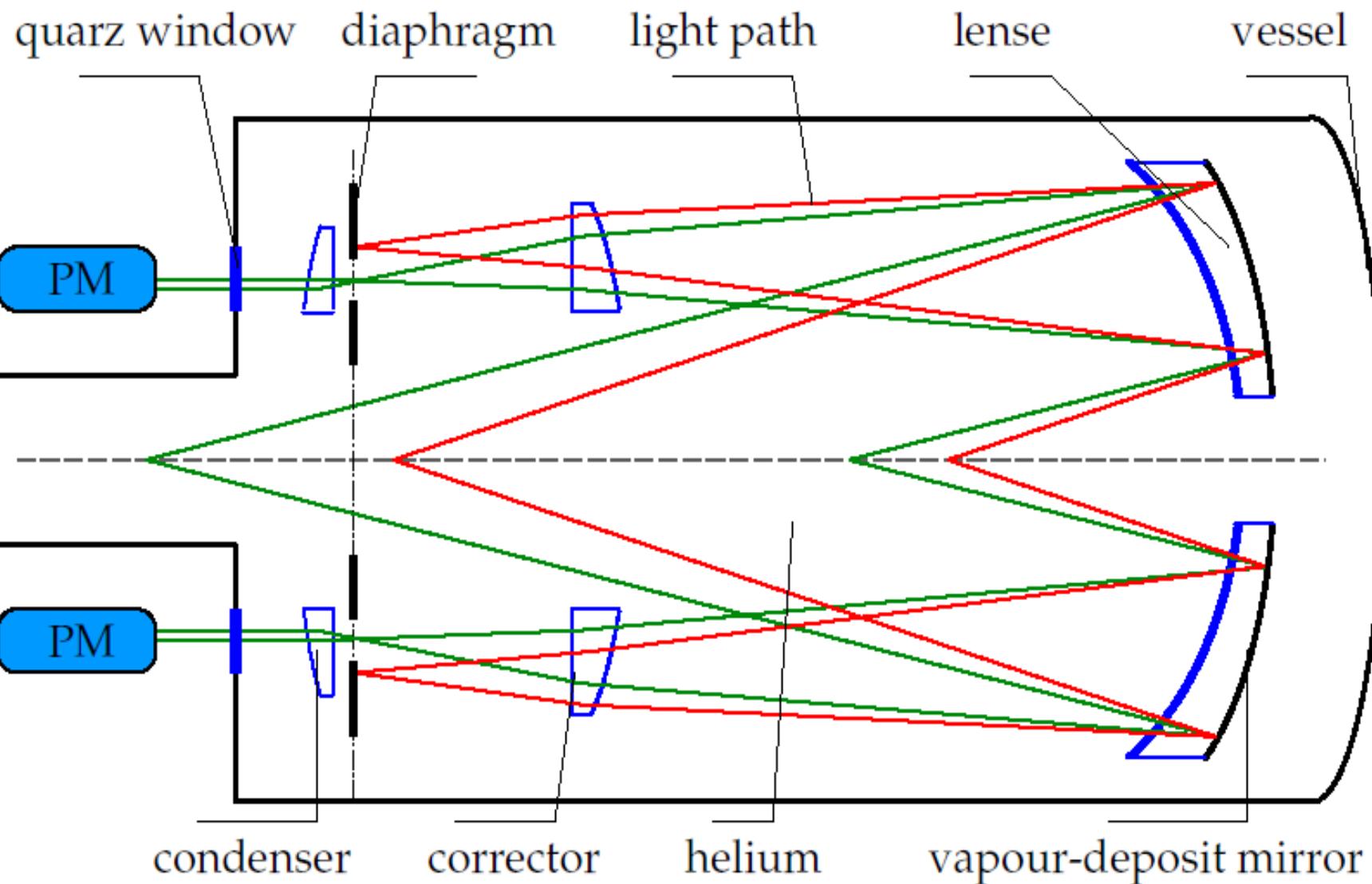


Details on the operation of CEDAR detectors



Functional principle



Responsibilities

CEDAR 1 / 2

Splitted
analogue
Signal of 16 PMs

M 2 group by Jens Spanggaard

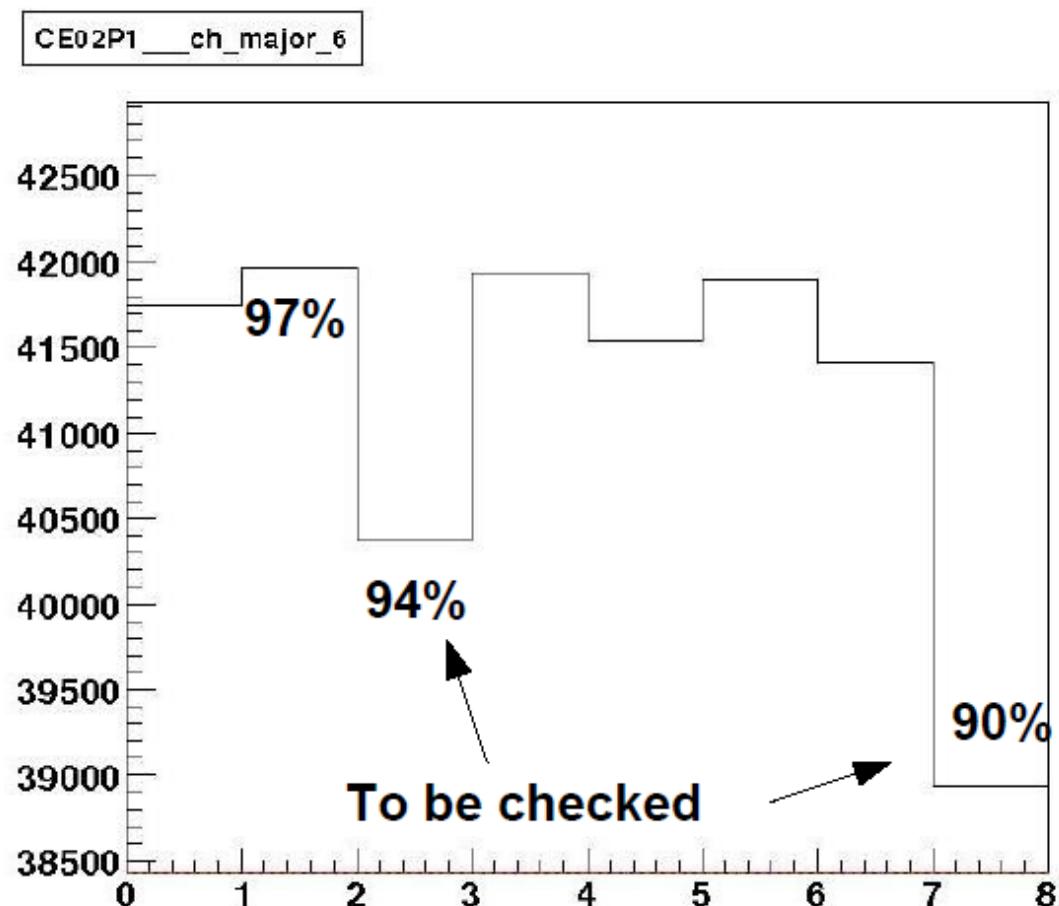
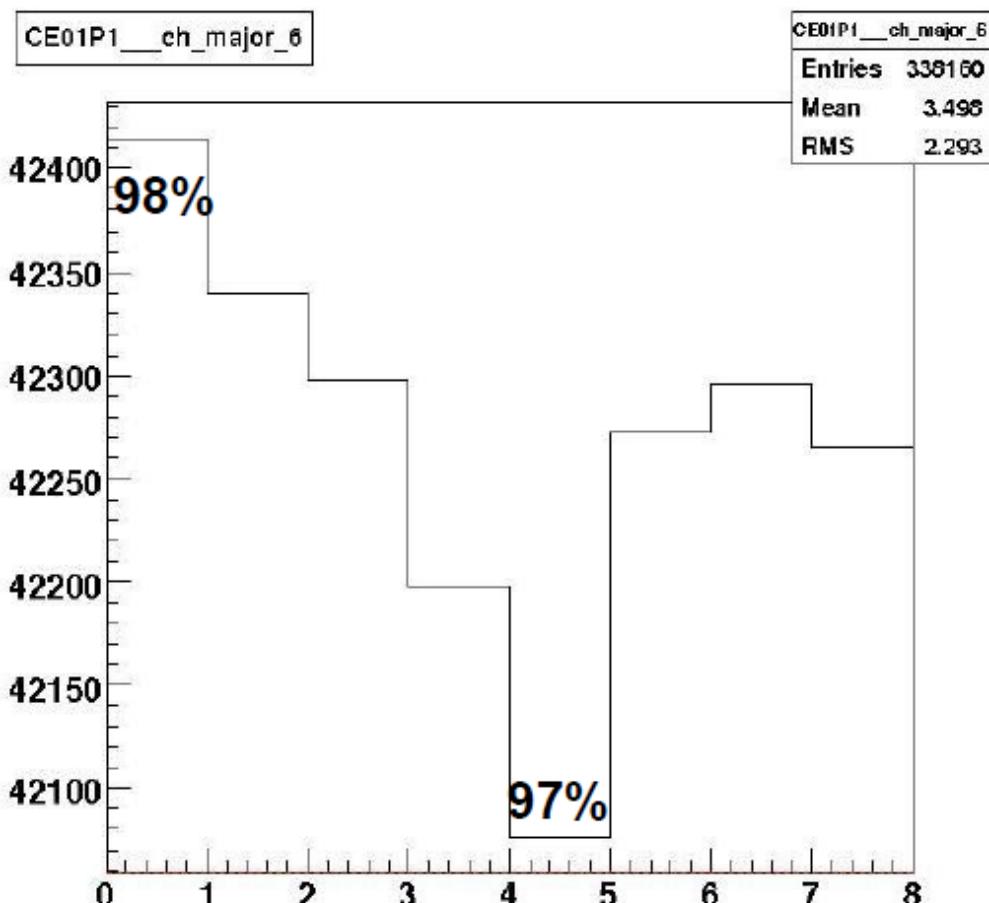
- PM settings (HV and threshold)
- Monitoring software
- First alignment and support

Compass site

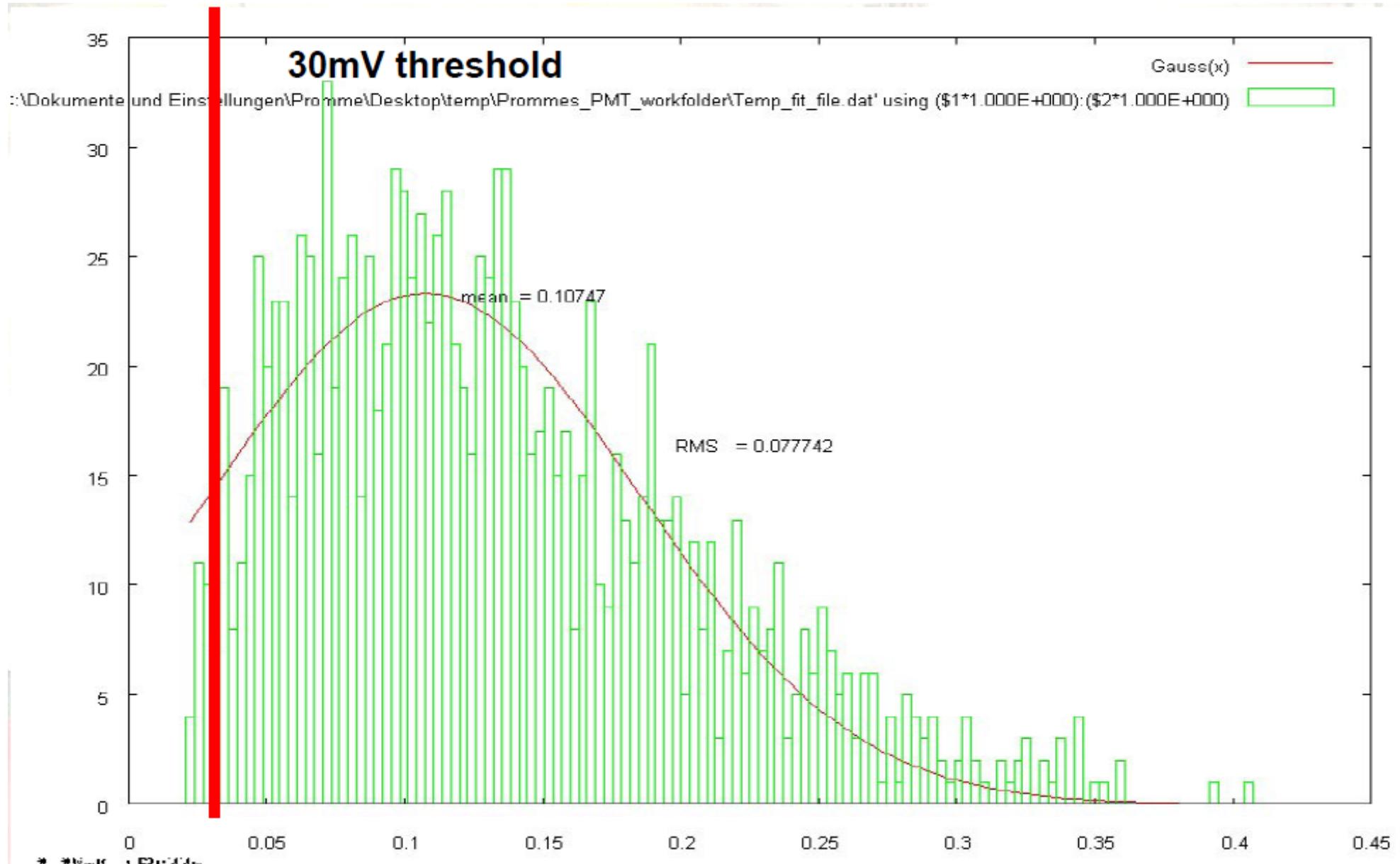
- Crosscheck of setup done by M 2 group
- Finalization of alignment in beam, lid and pressure settings
- DAQ of splitted signals
- DCS display for shift crew

Quality of PMs

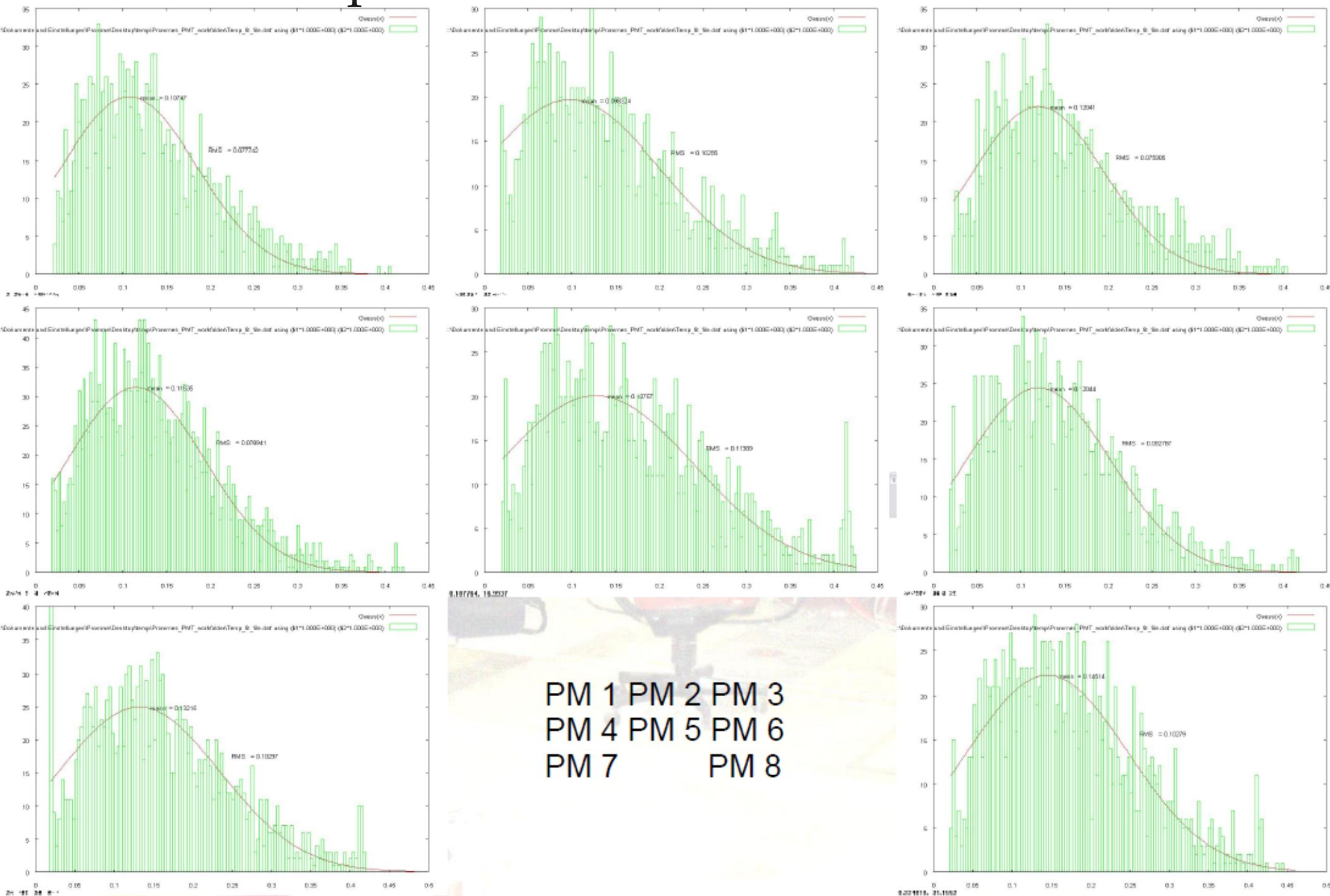
Lid fully opened: all particles are seen



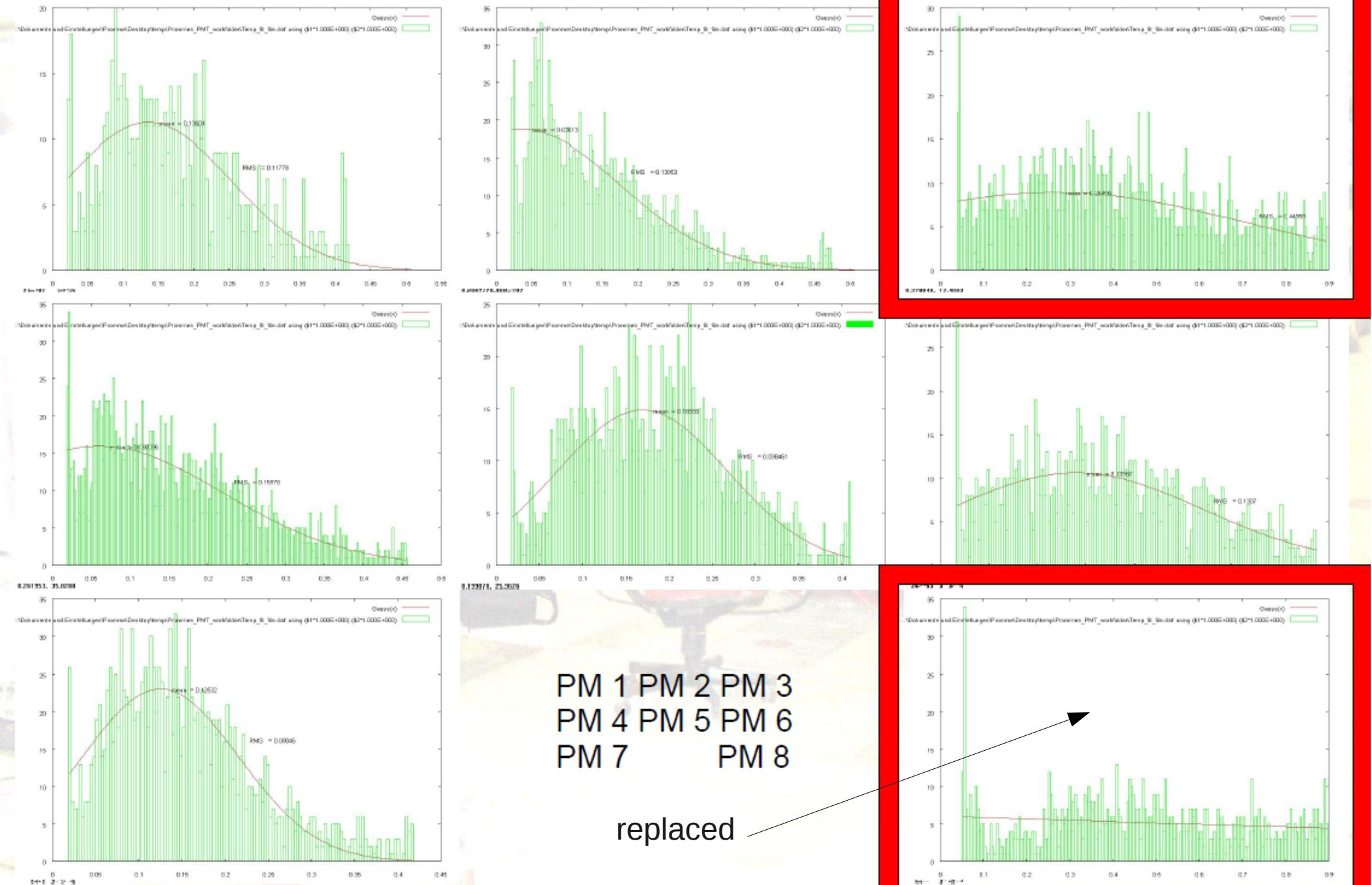
Amplitude distributions



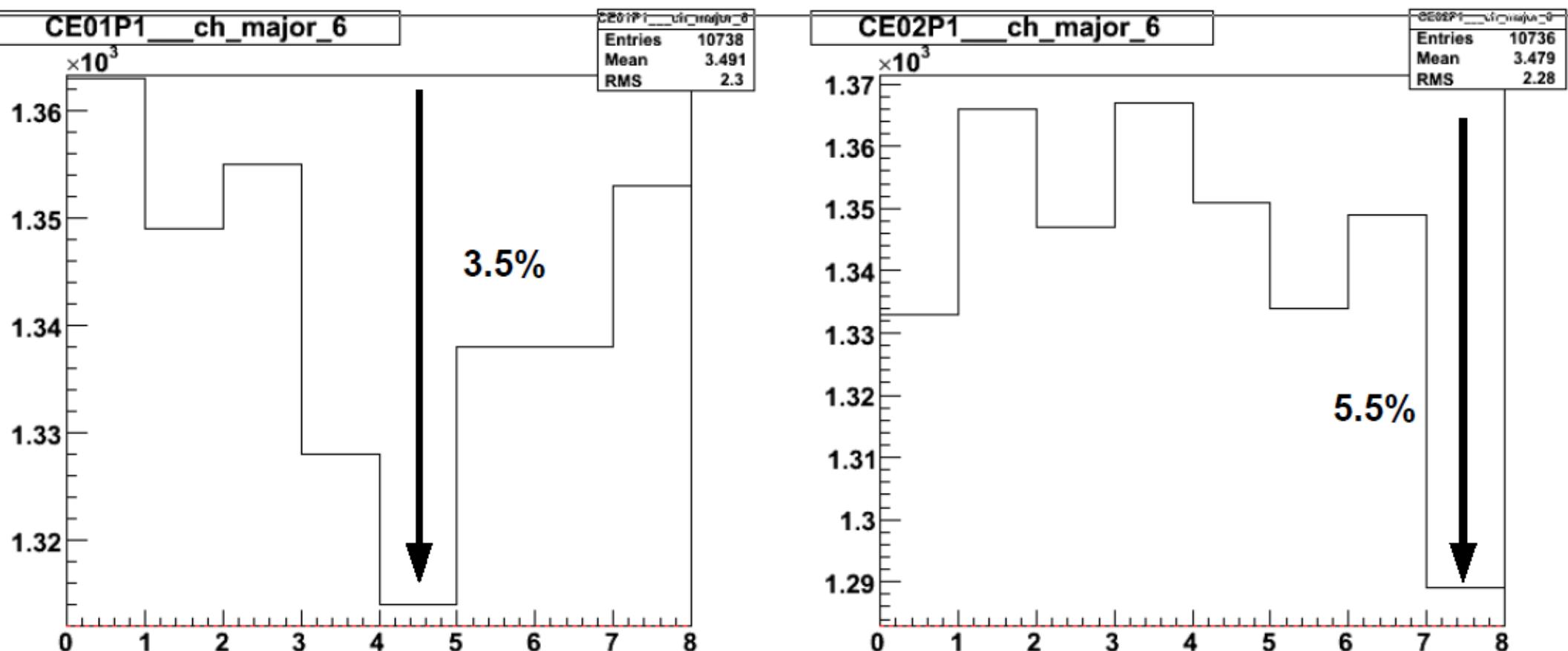
Amplitude distributions CEDAR 1



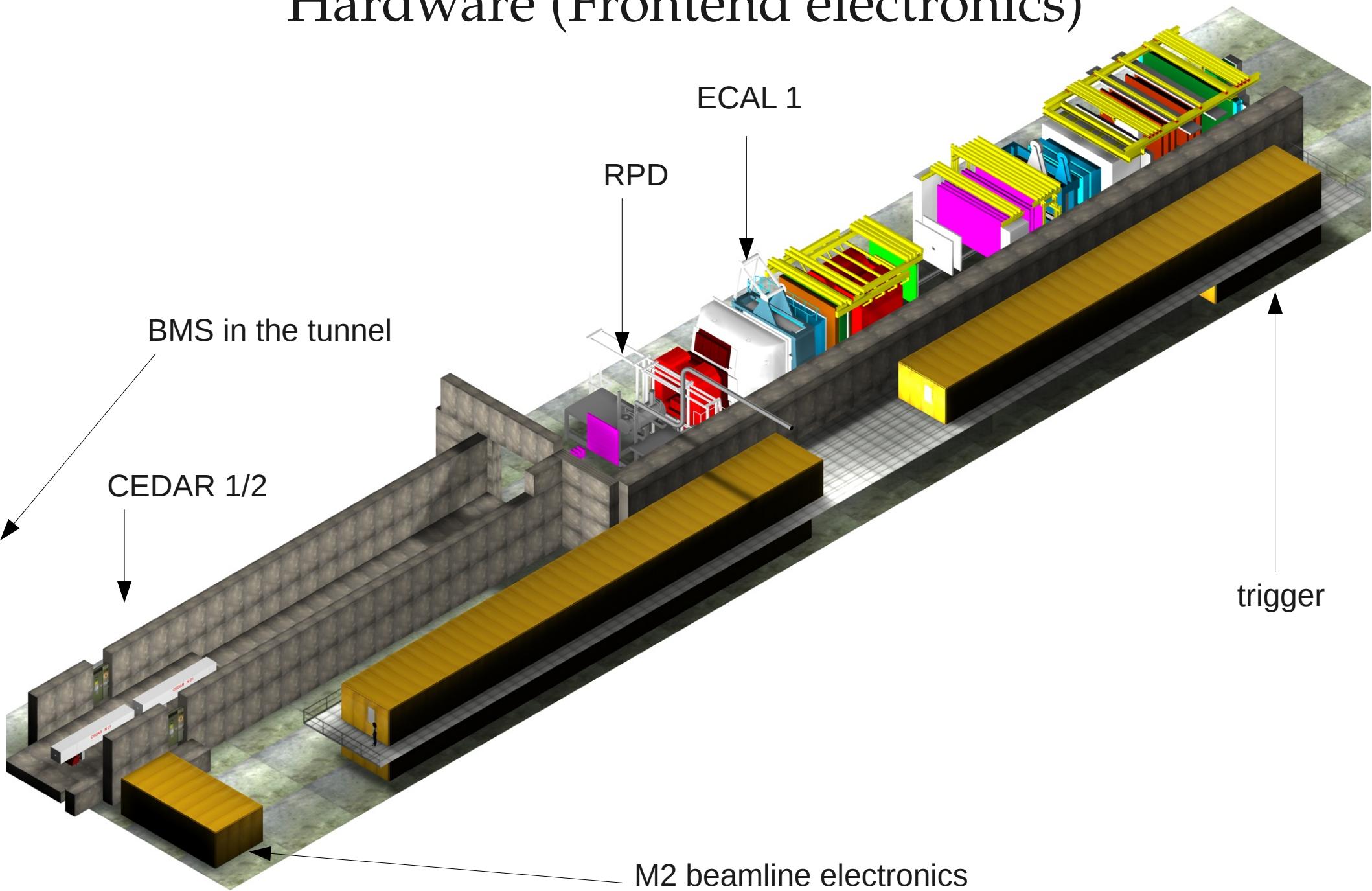
Amplitude distributions CEDAR 2

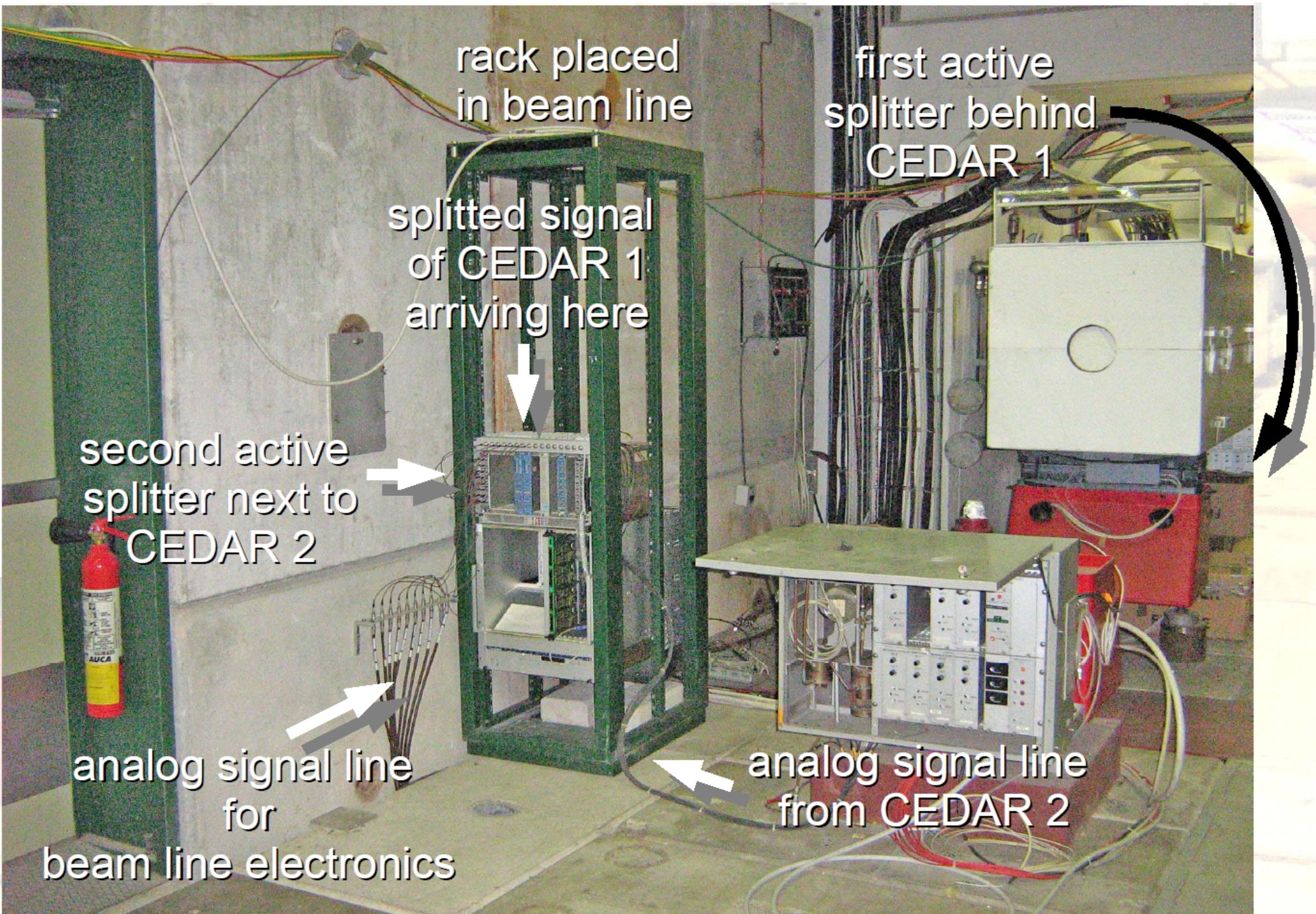


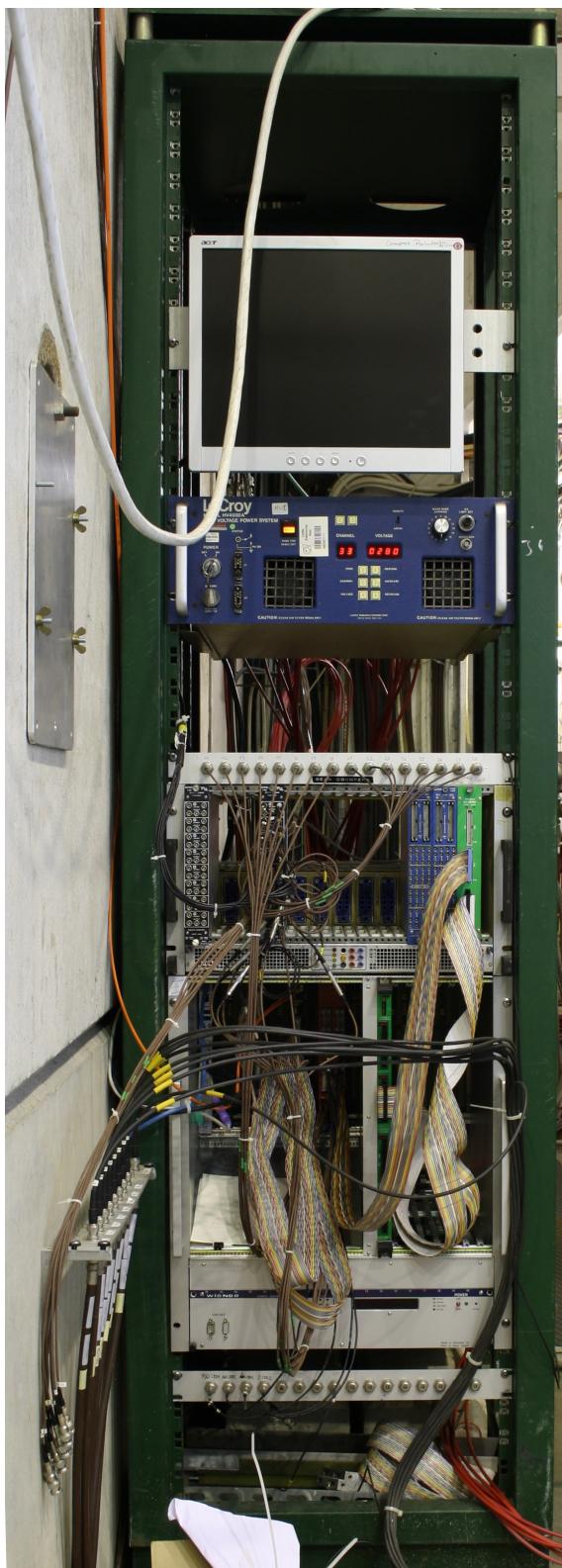
Uniformity after replacement



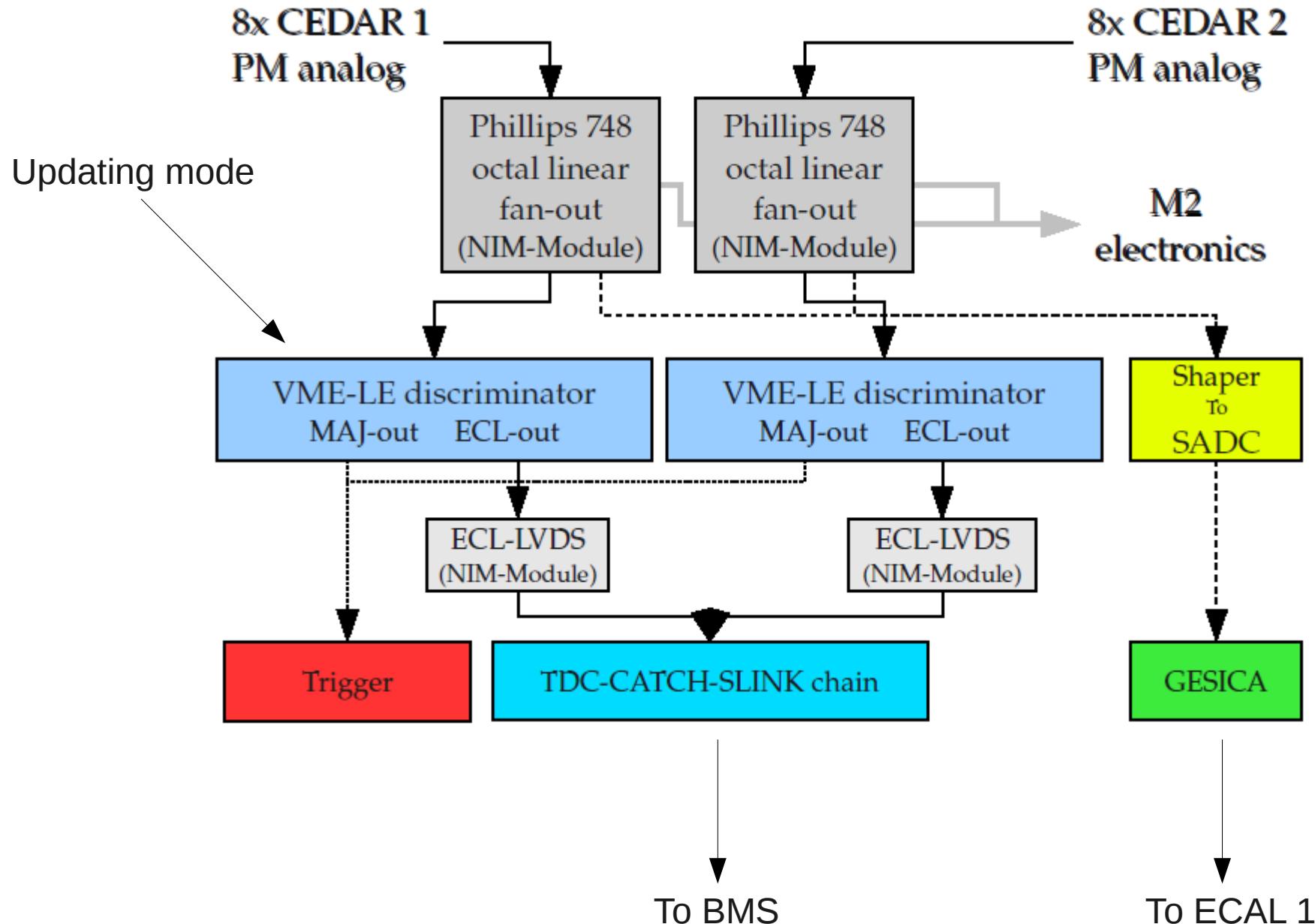
Hardware (Frontend electronics)



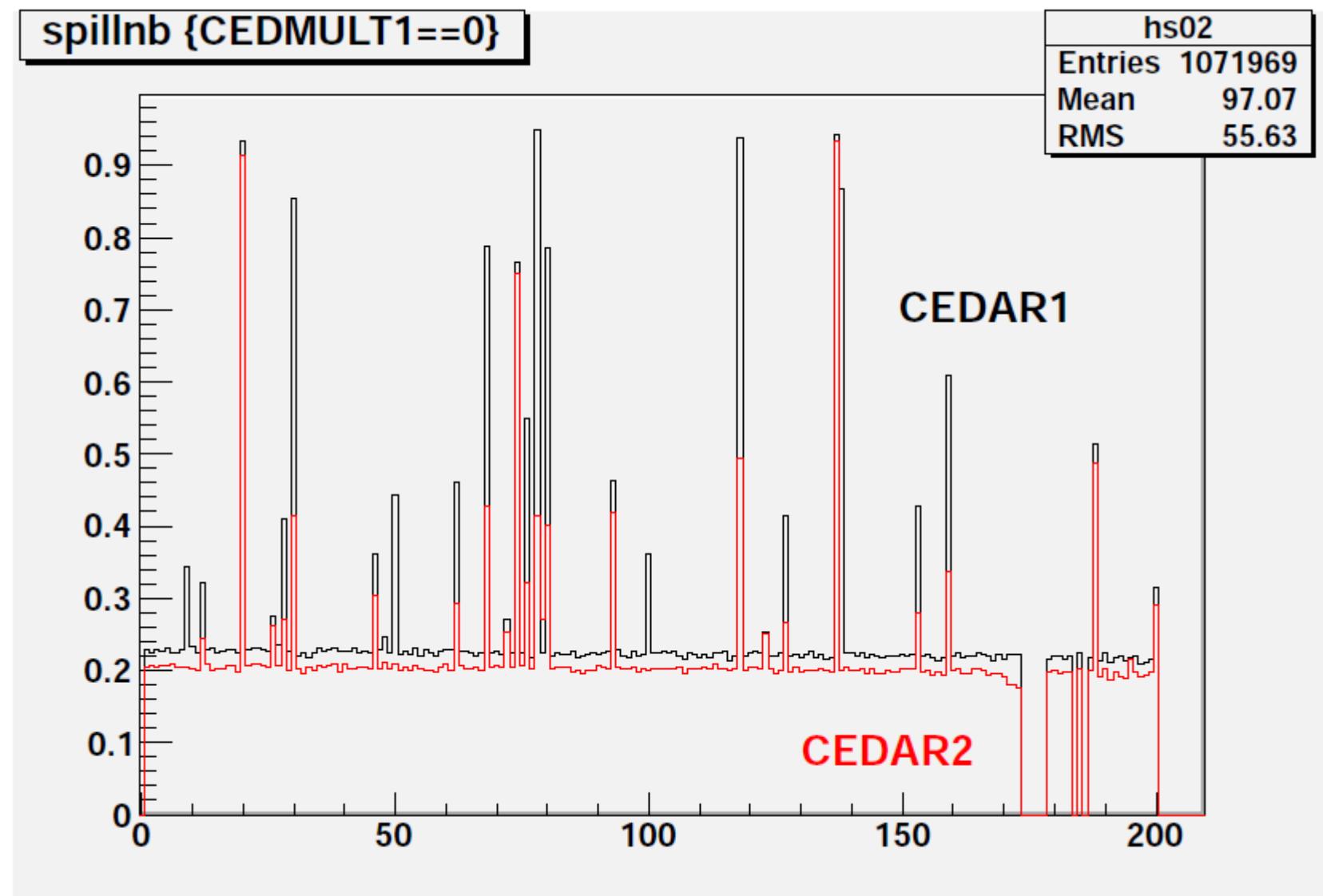




Trigger time and dead time issue



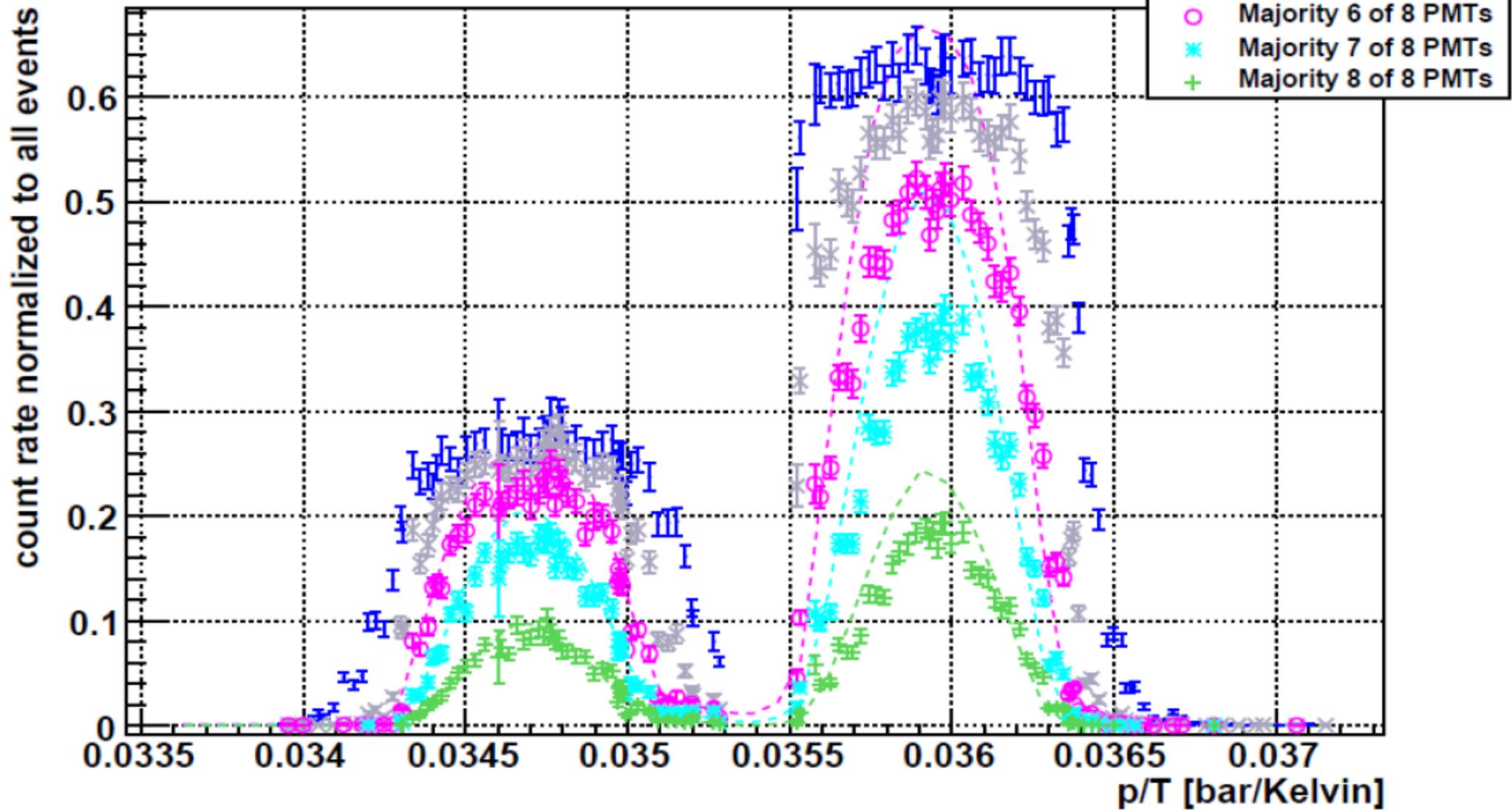
Buffer overflow in Primakov run 2009



Solution: Connect to electronics in the HALL instead of BMS

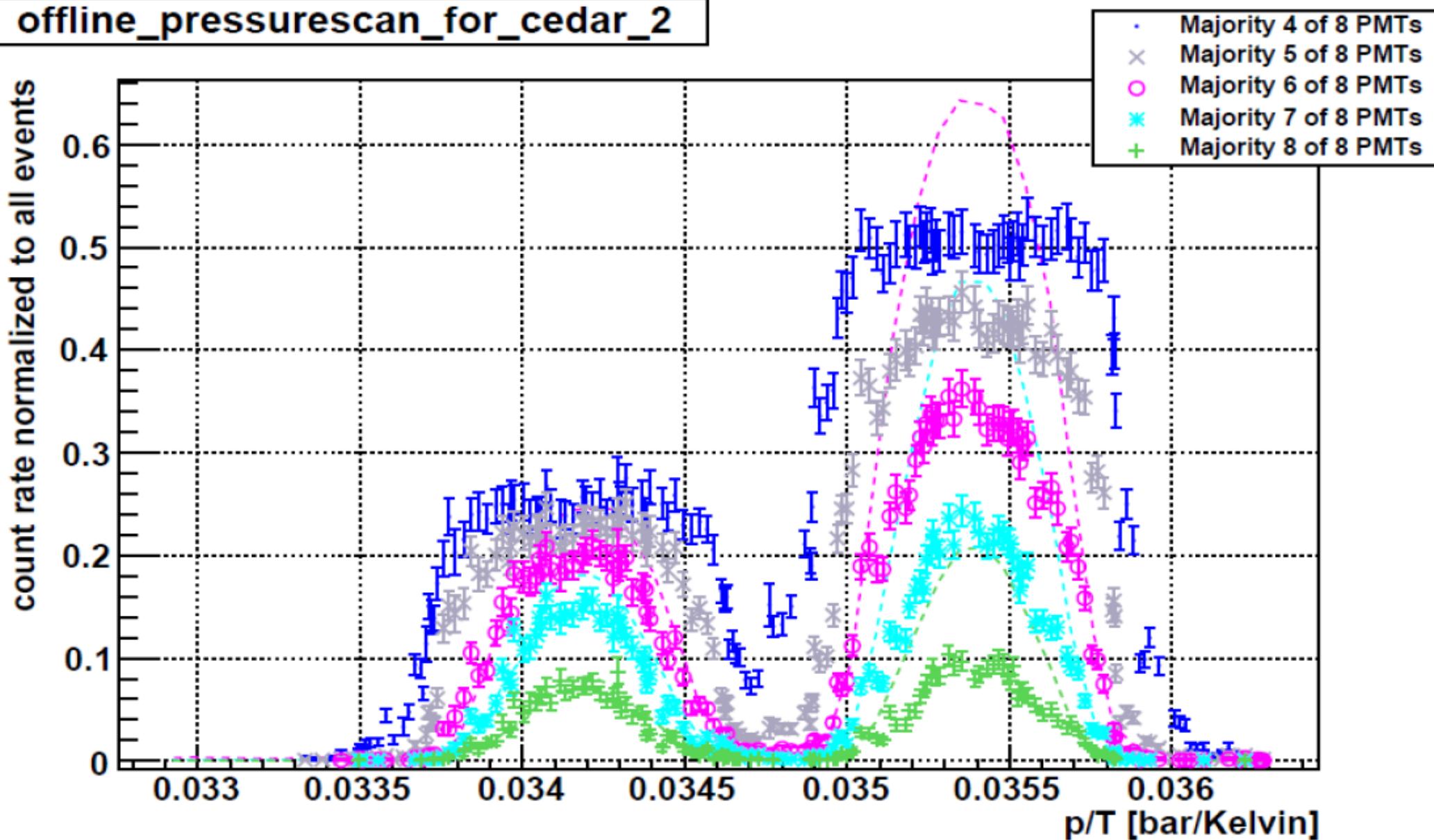
Dead time issue

offline_pressurescan_for_cedar_1



Dead time issue

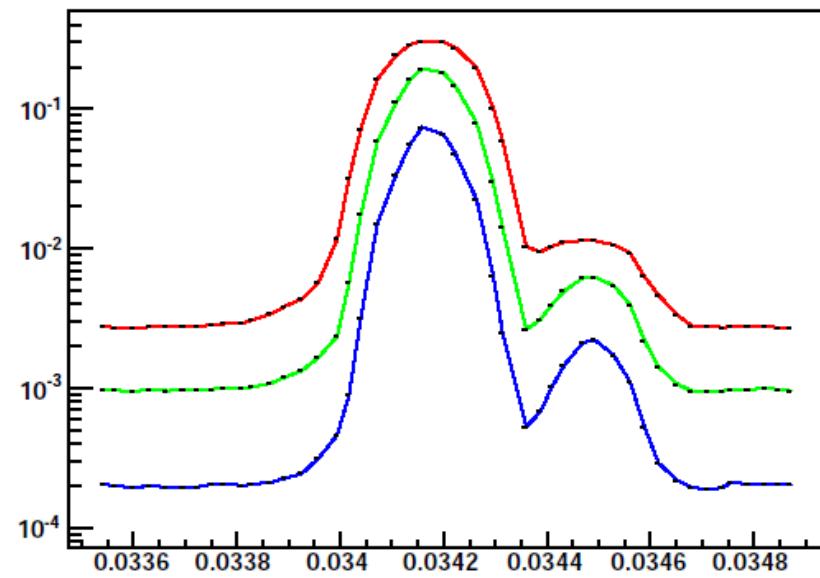
`offline_pressurescan_for_cedar_2`



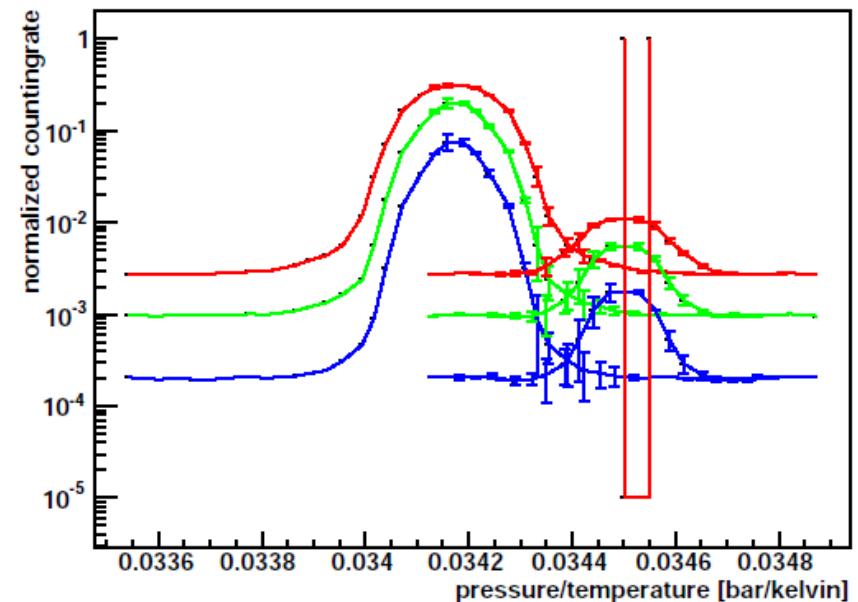
Solution: switch over to non updating mode + try to remove noise

Determination of the correct setting

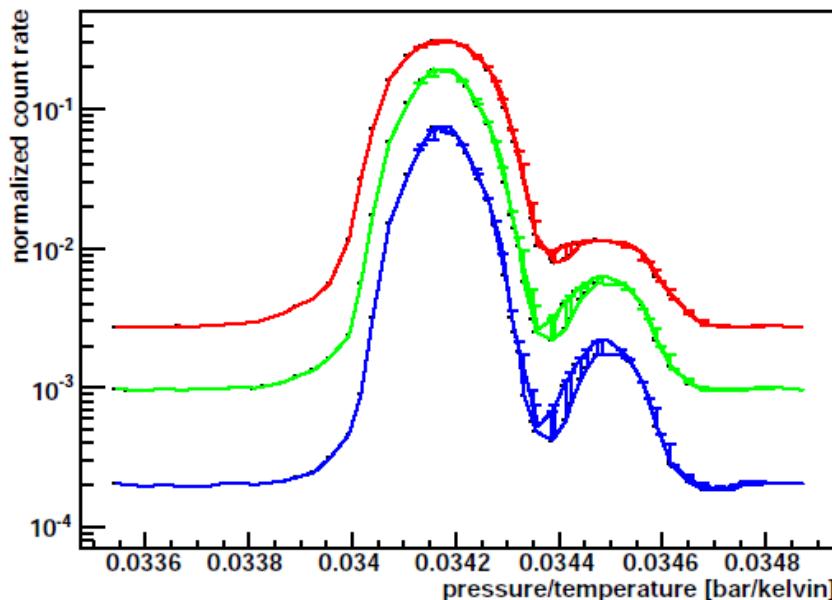
loaded pressure scan



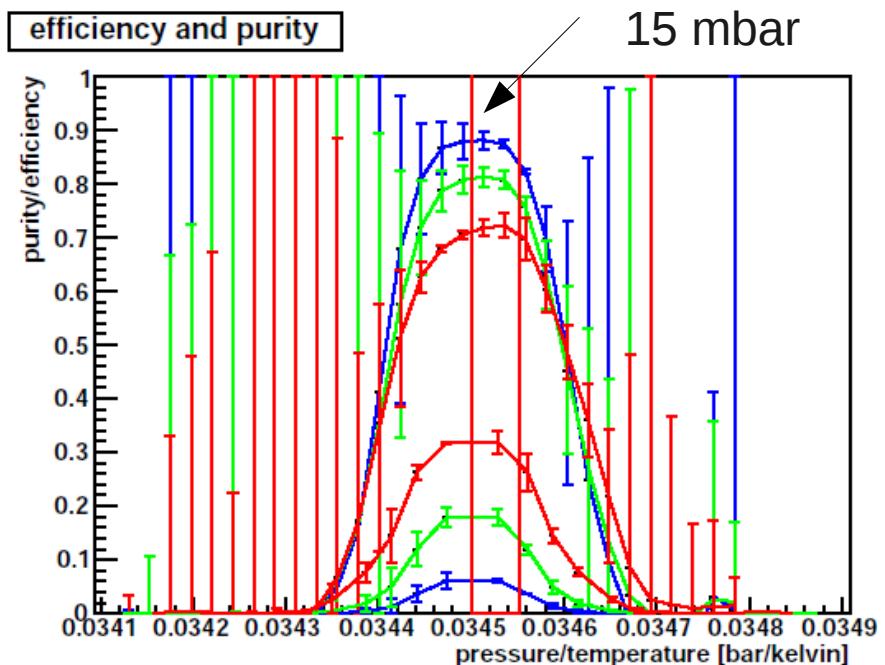
graphs by adding evaluated partial graphs



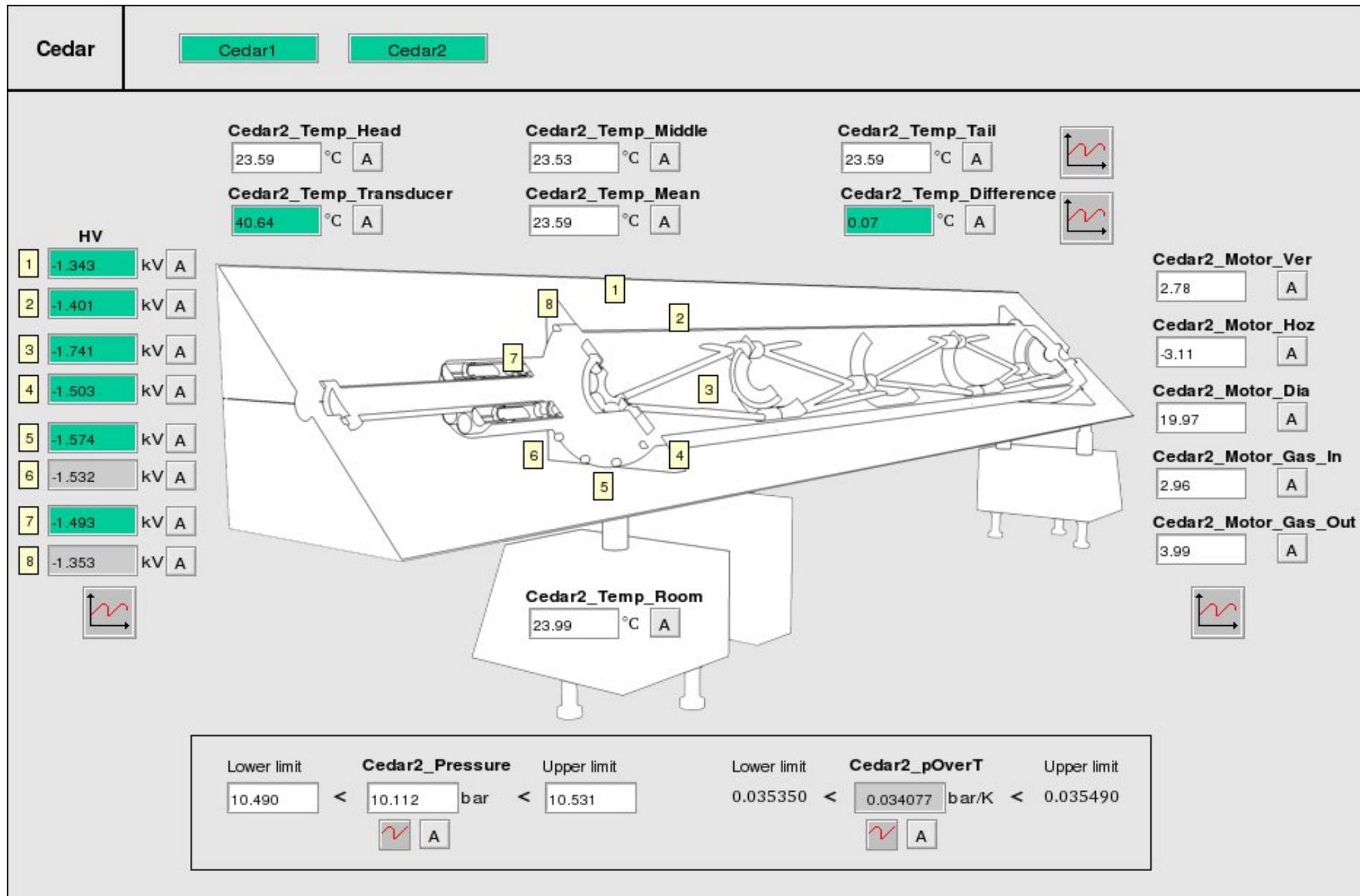
comparing results with original pressurescan



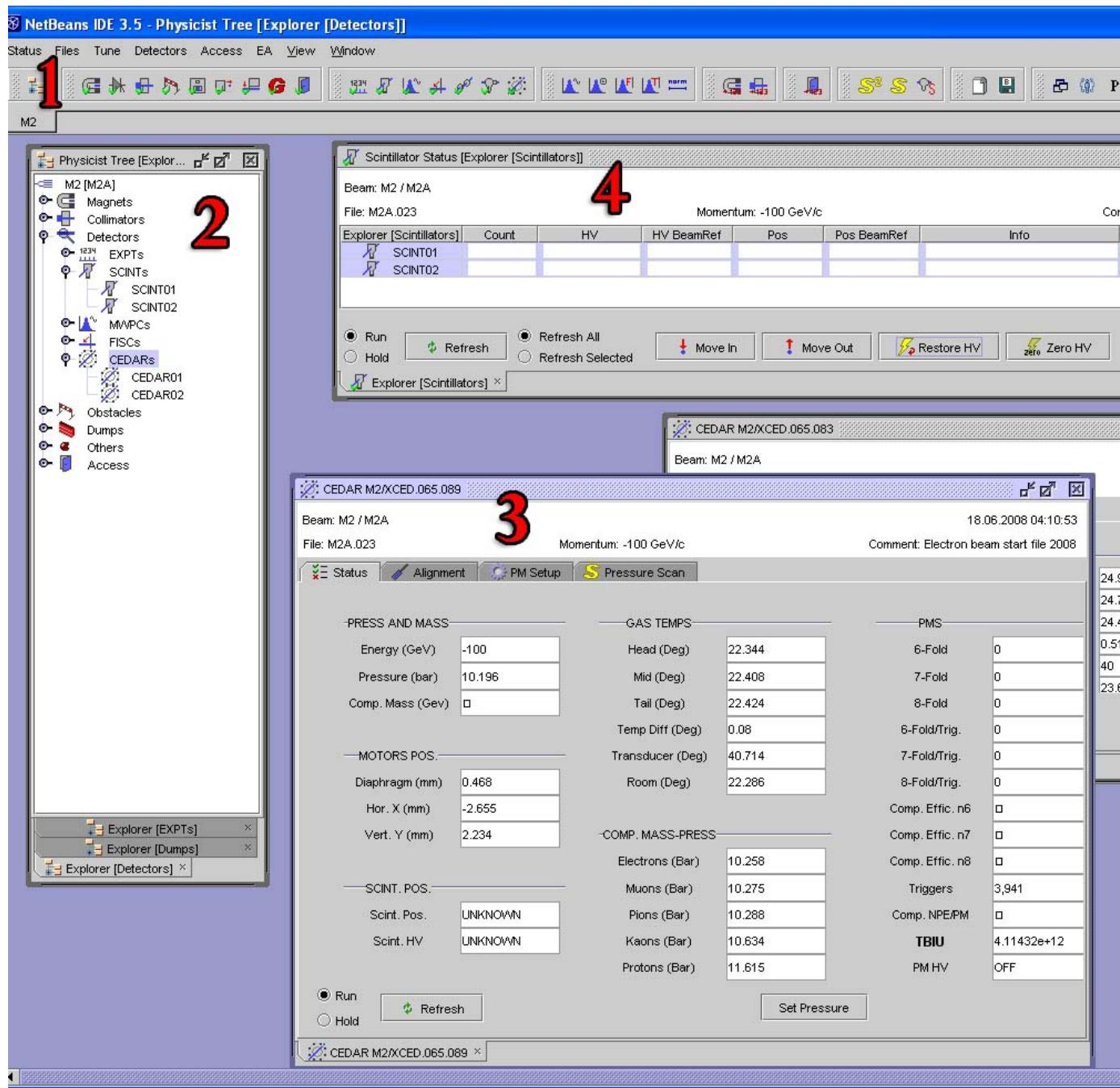
efficiency and purity



DCS alarm



Issue: Setting the correct pressure



Pressure can be set as accurate as ~5 mbar

Solution:
reduce
the step size

New Issue:
Pressure scans will take longer

Issue pressure loss

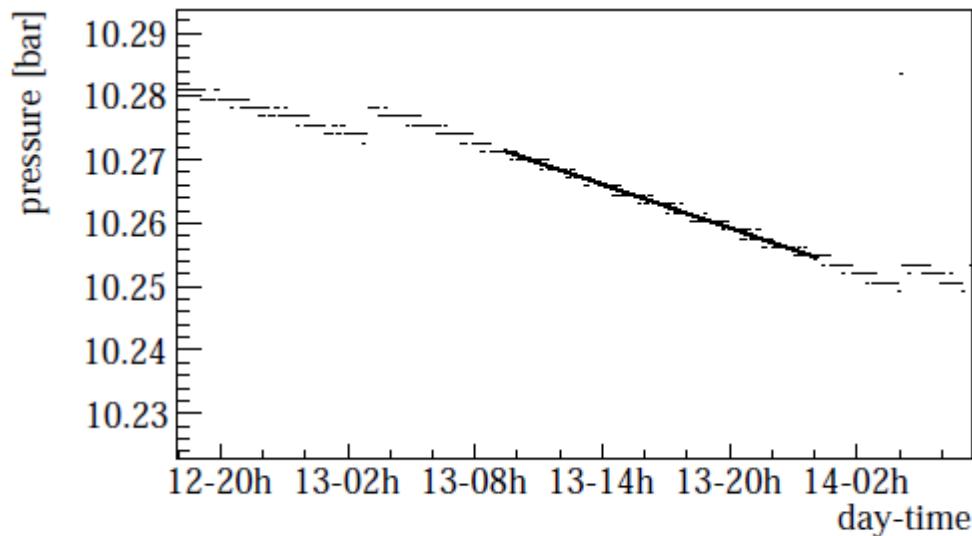
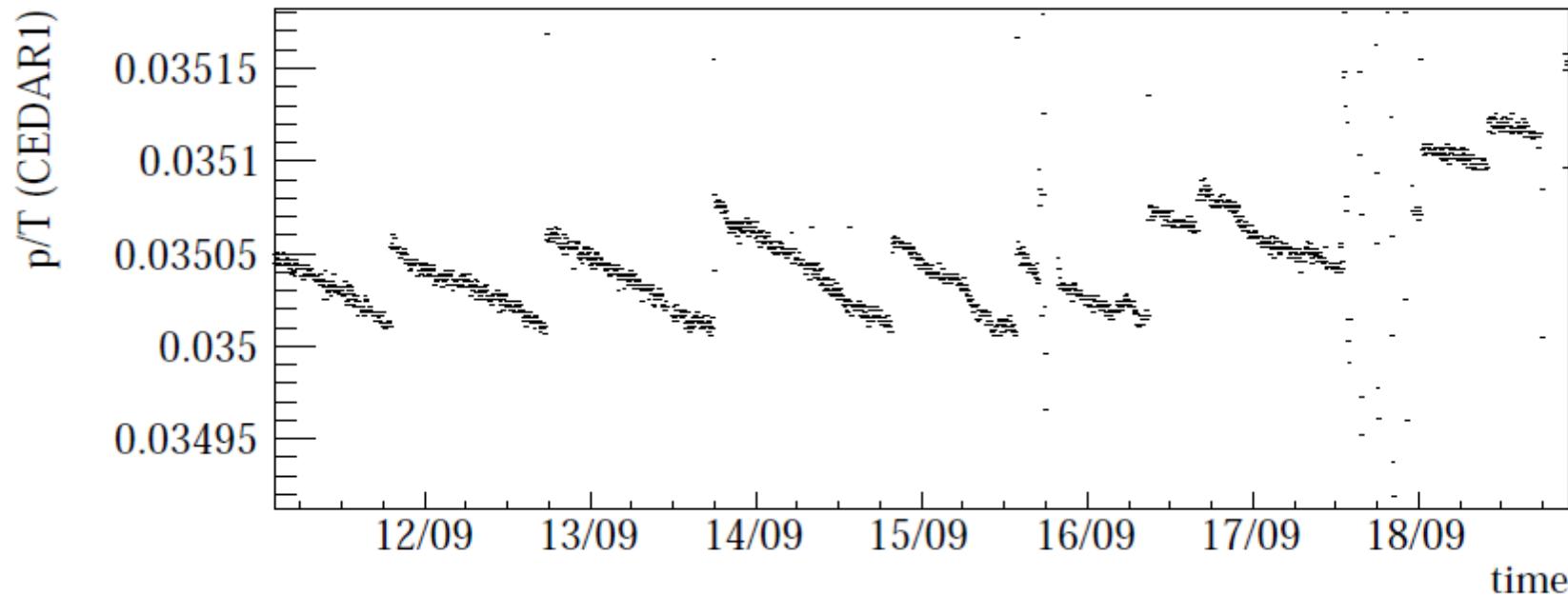
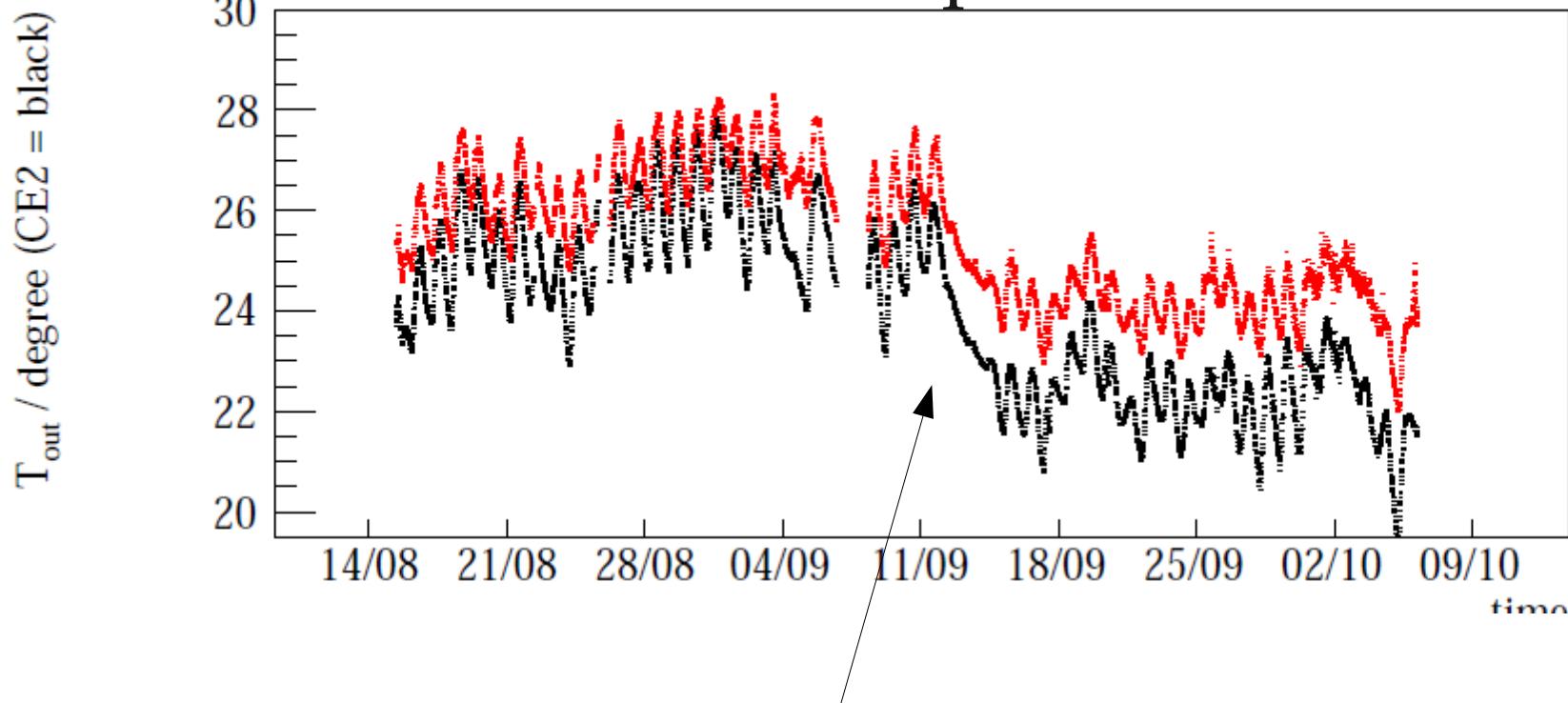
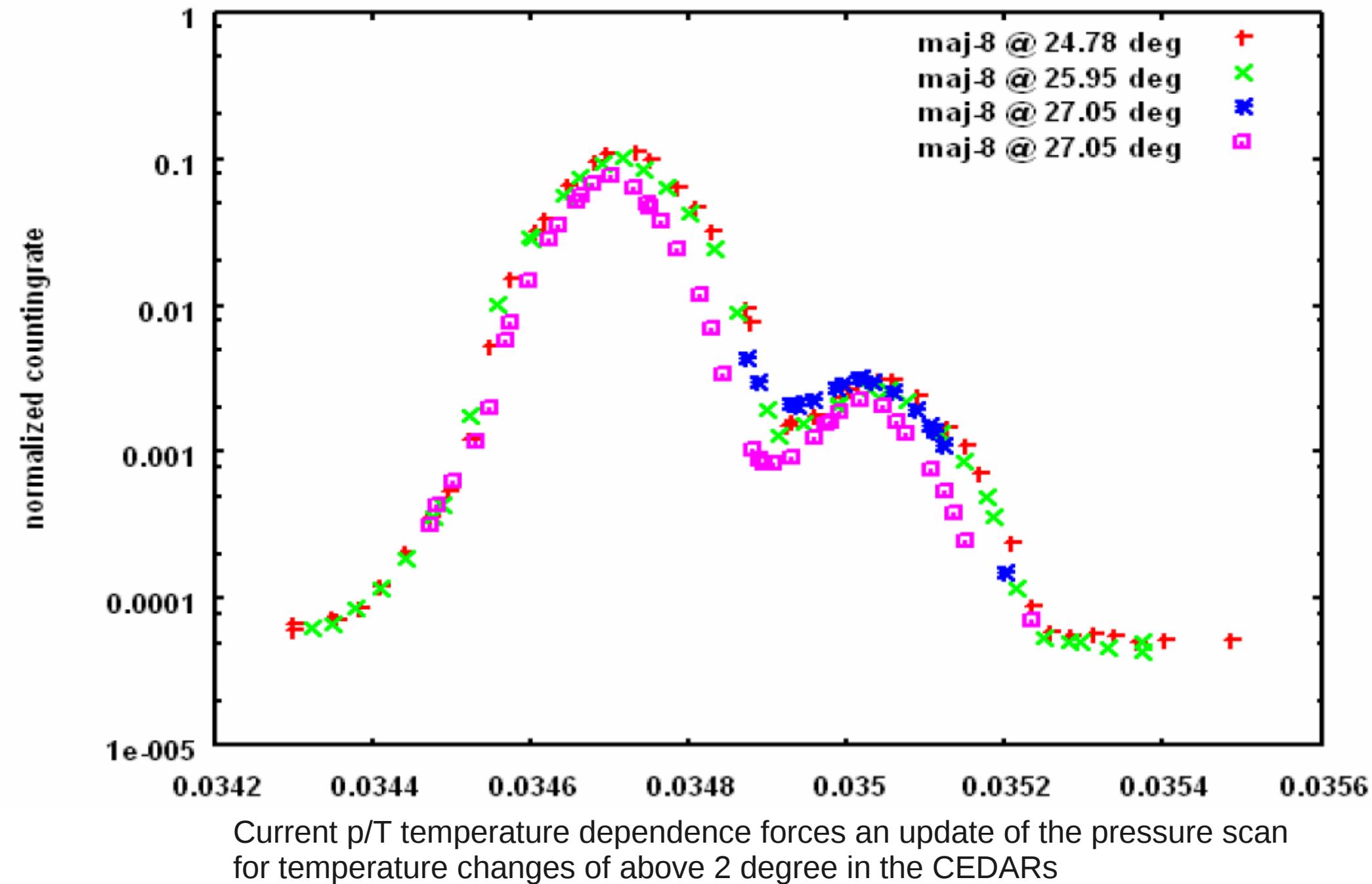


Figure 3.13: Recorded pressure of CEDAR 2 the 13th of September 2008. A loss of 27.4 mbar helium pressure per day is observed between refilling the CEDAR gas.

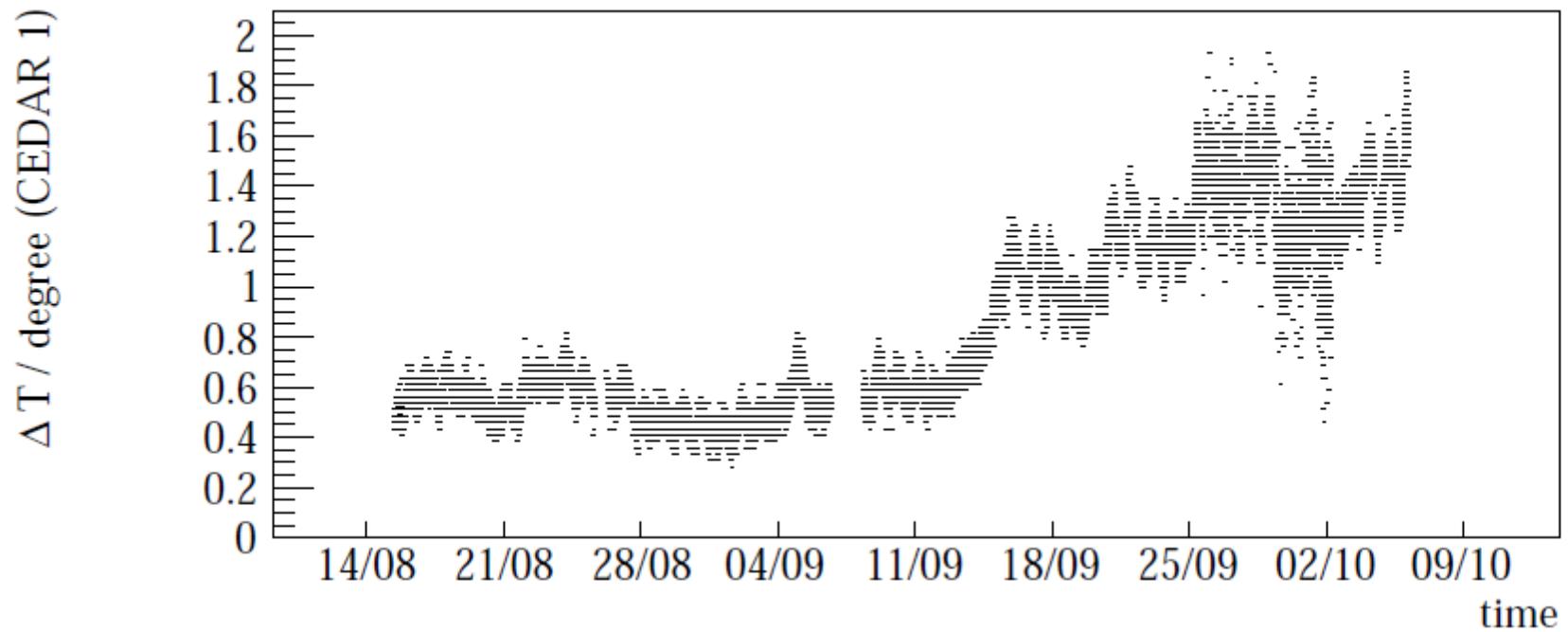
Even more an issue: p/T non uniformity



Pressure scans at different temperatures



Issue: mean p/T value in the CEDARs

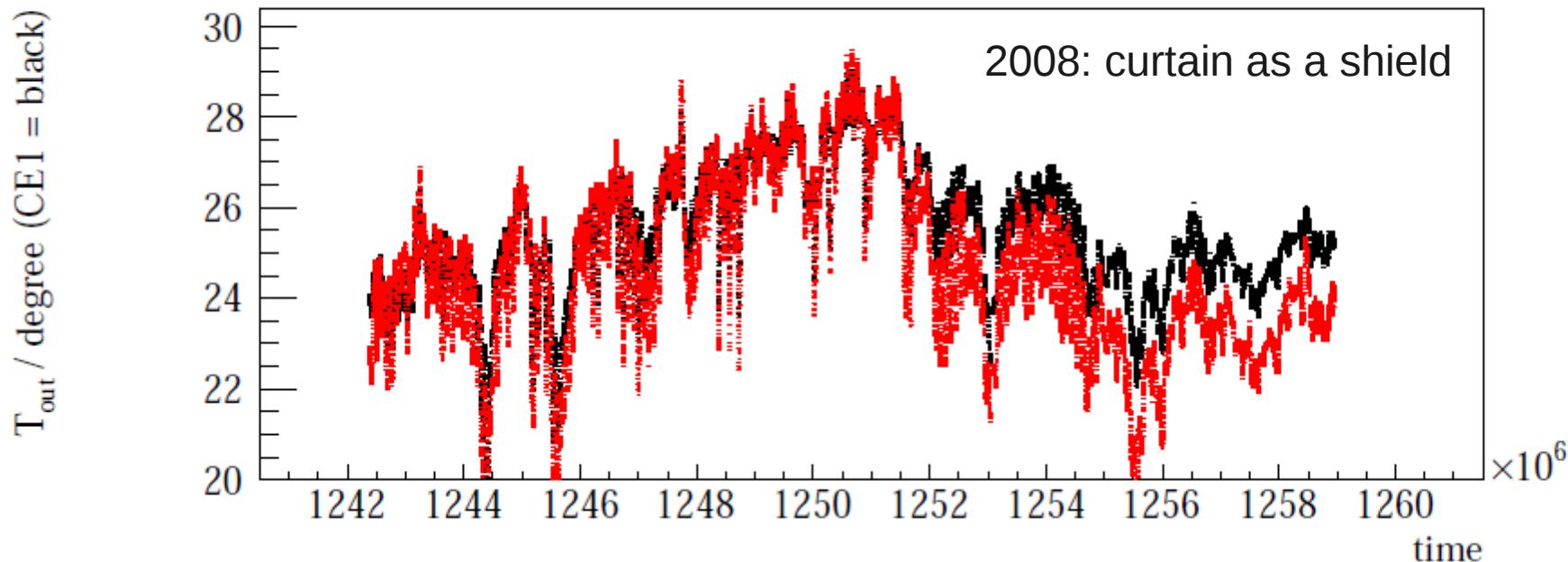
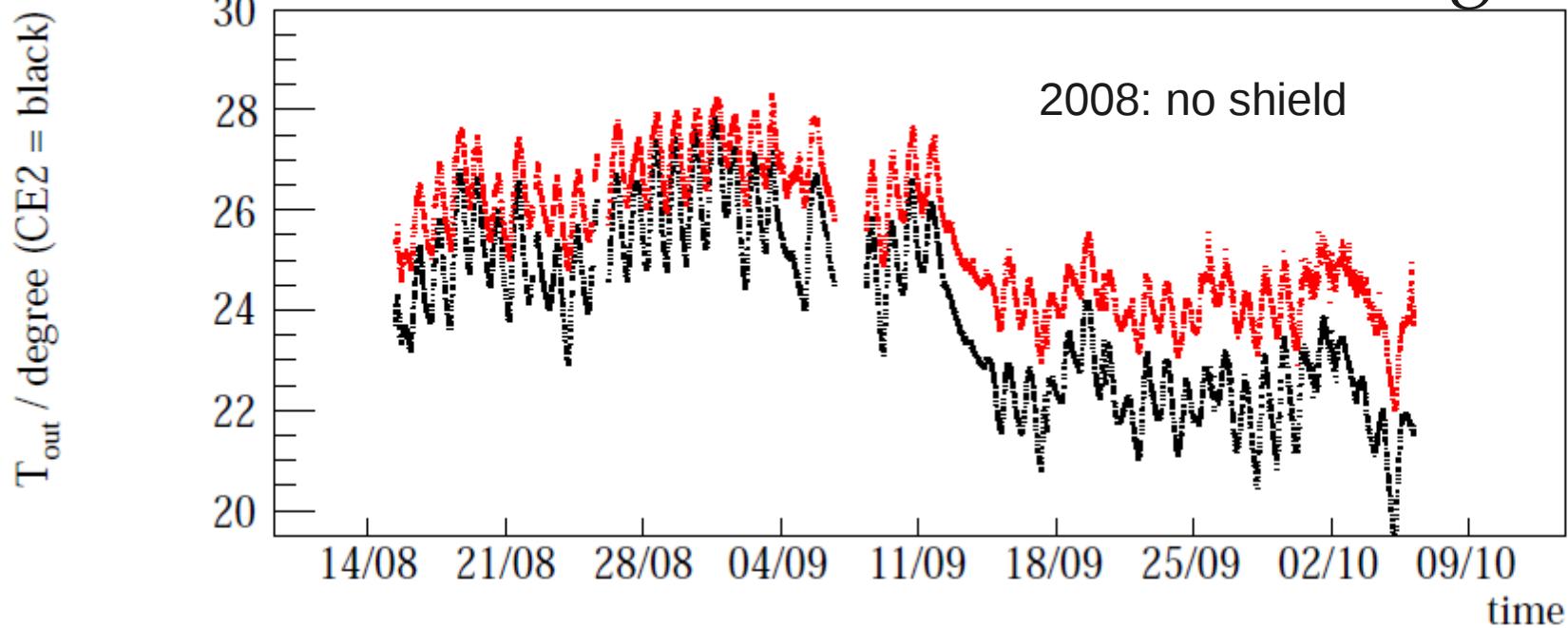


Large uncertainty for a p/T value due to large non uniformity of temperature

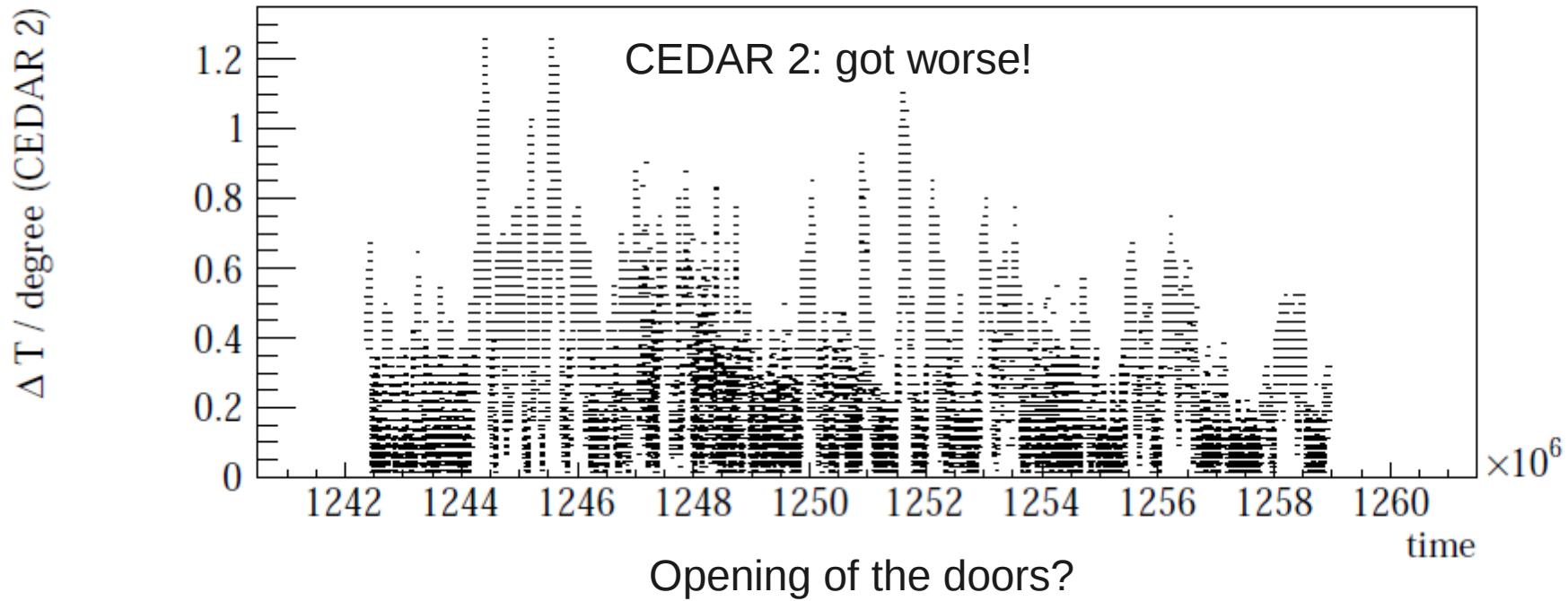
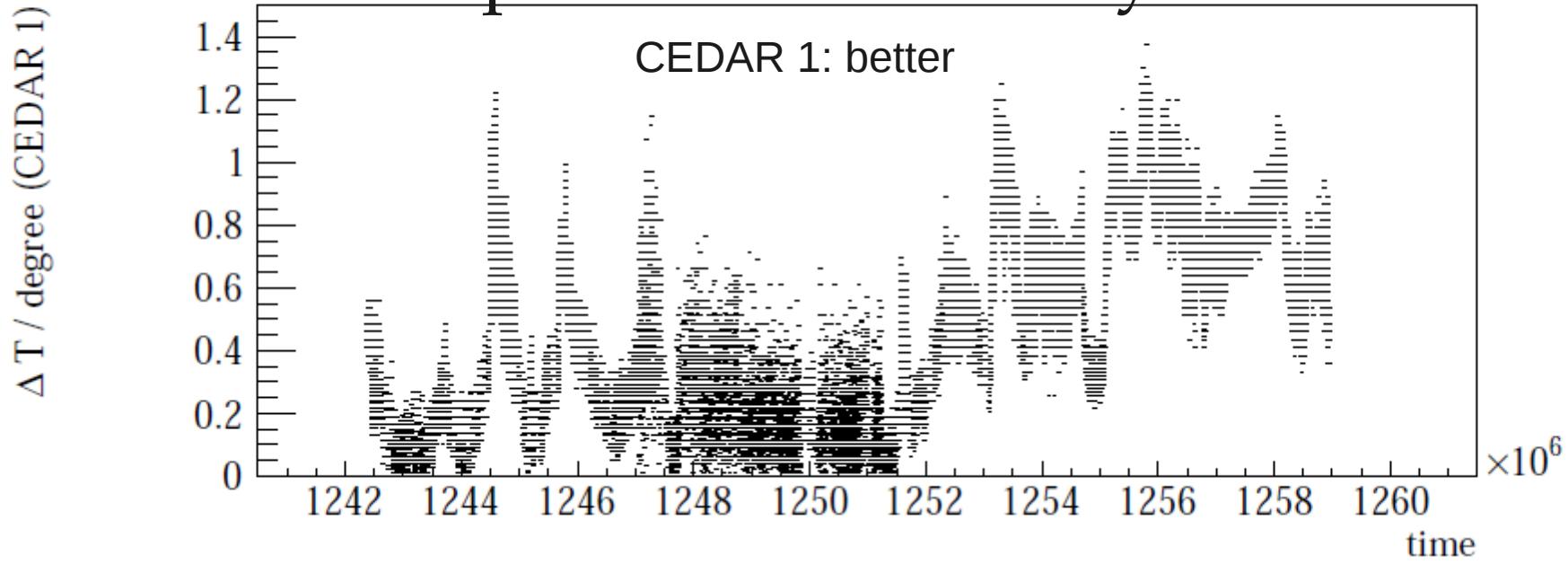
Unphysical solution: take only one measured temperature, for example the mid one

Solution 2: reduce the non uniformity → shield the CEDAR against beam tunnel heat

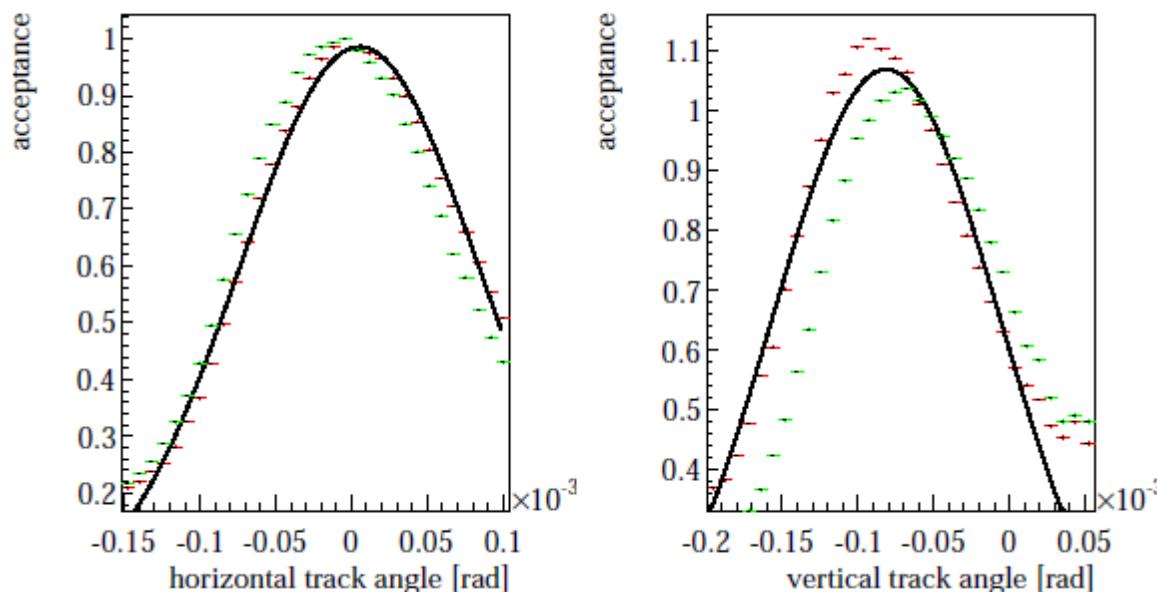
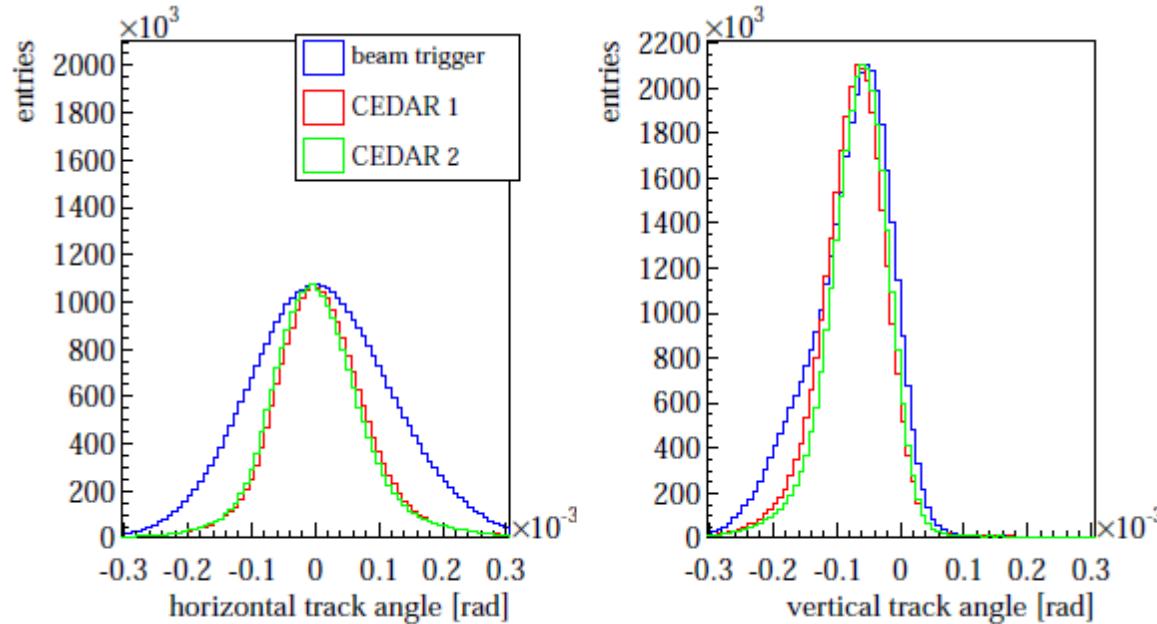
Effect of CEDAR heat shielding



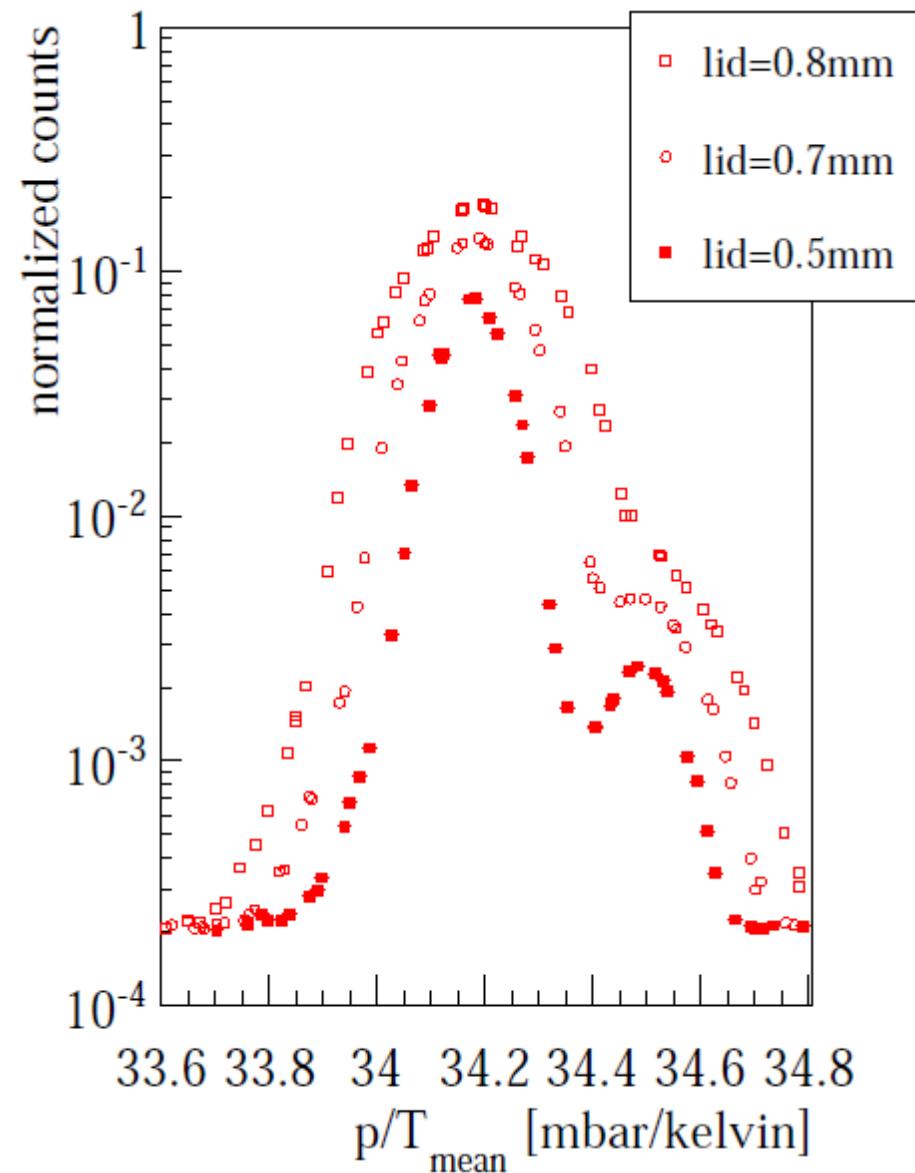
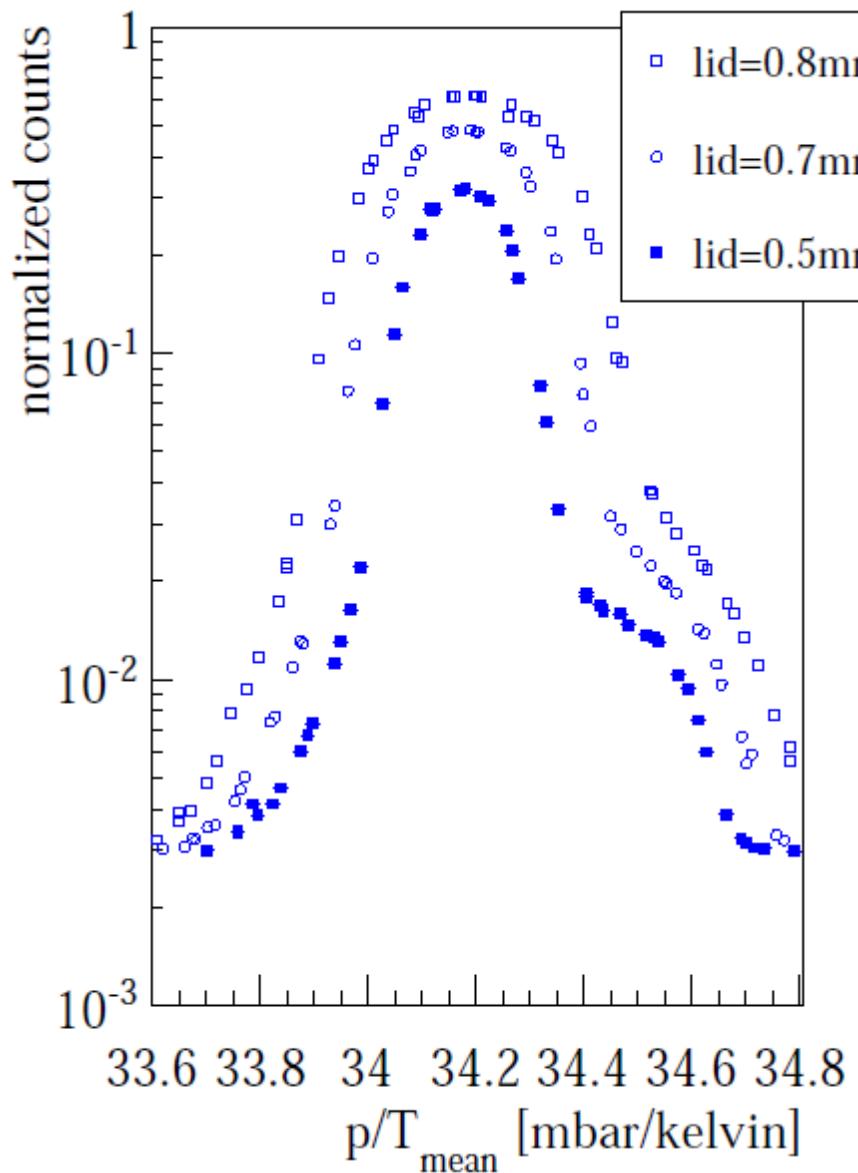
Temperature uniformity in 2009



Issue: track acceptance

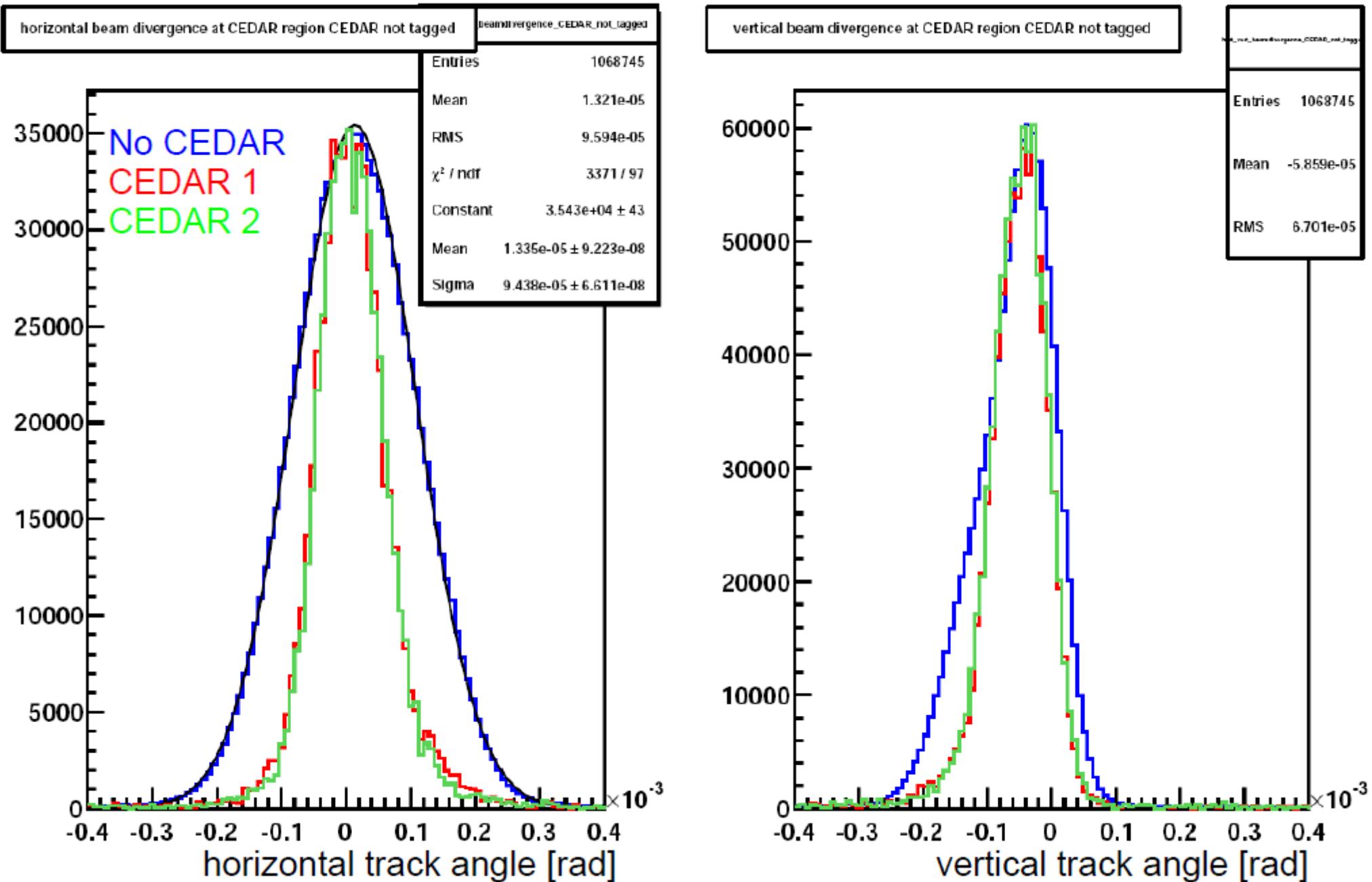


Solution: opening the lid? NO!



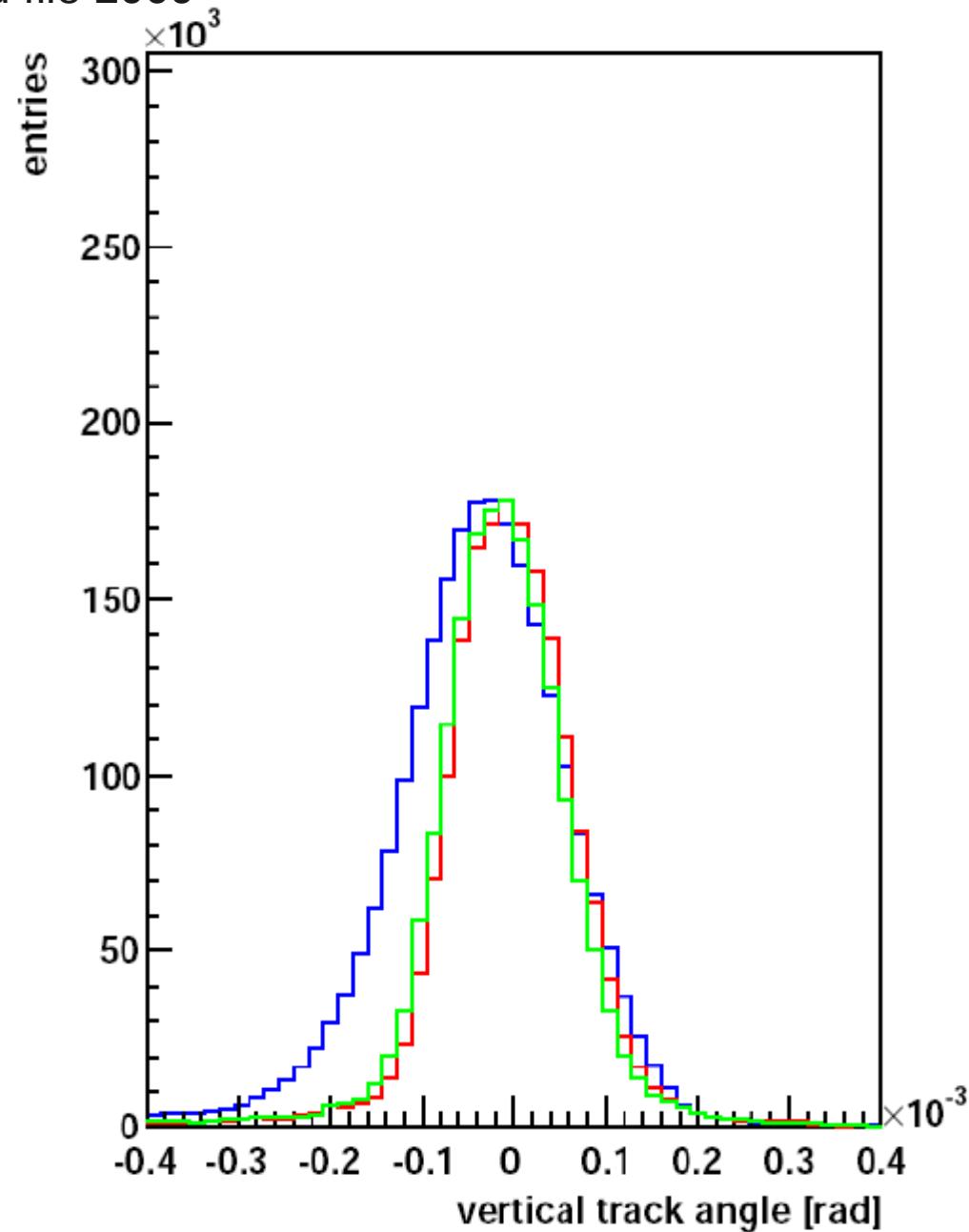
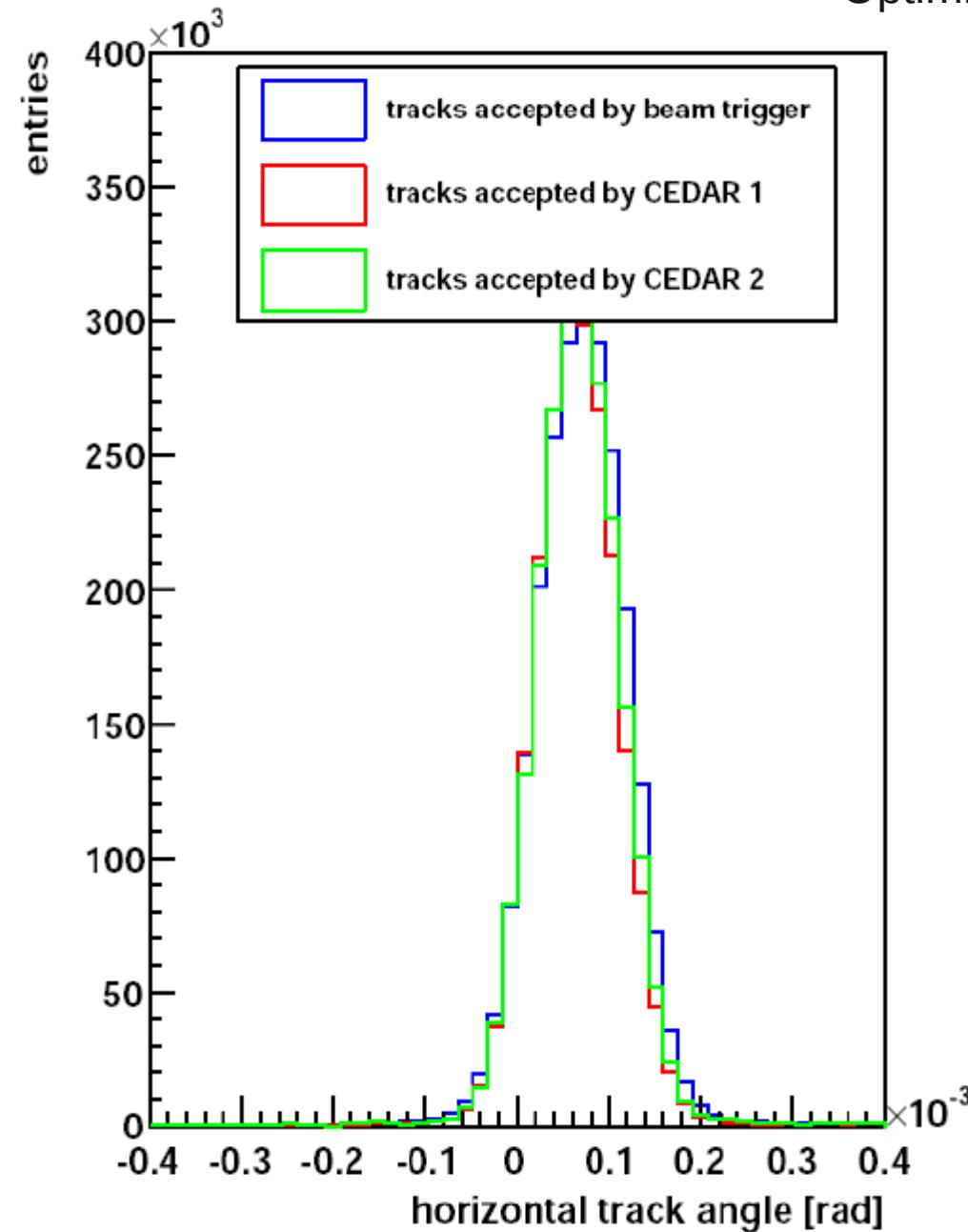
Solution: Improve the beam divergence

Old 2008 file

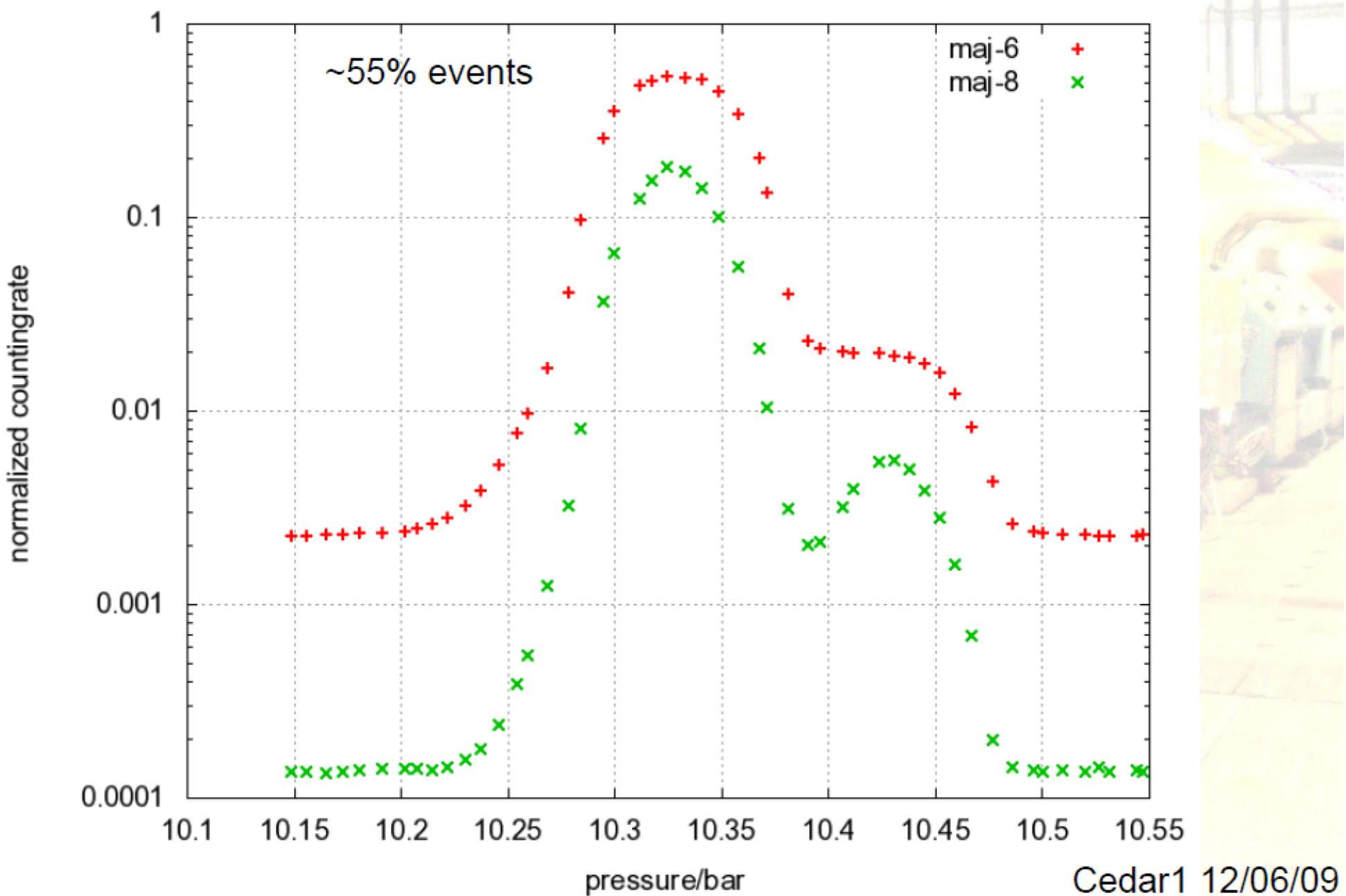


Solution: Improve the beam divergence

Optimized file 2009

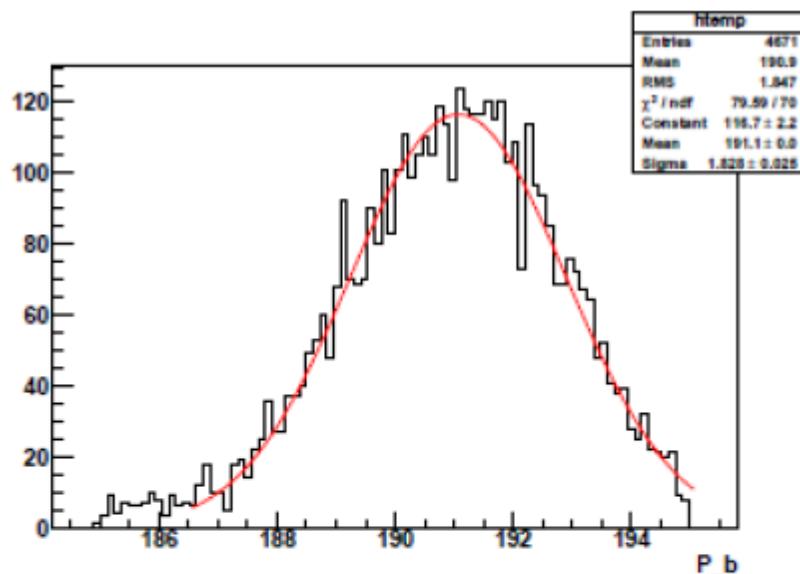


Pressure scan with optimized beam file

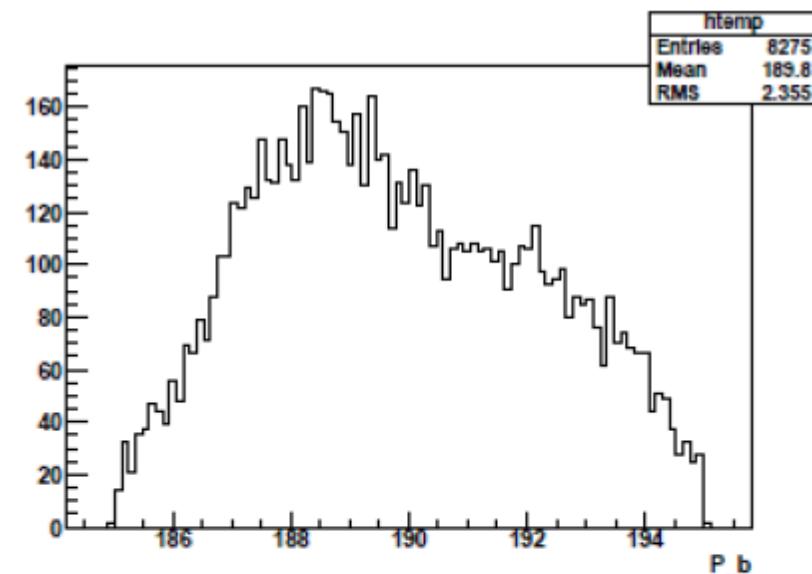


55% of count rate / 69% of acceptance = $\sim 80\%$ of efficiency

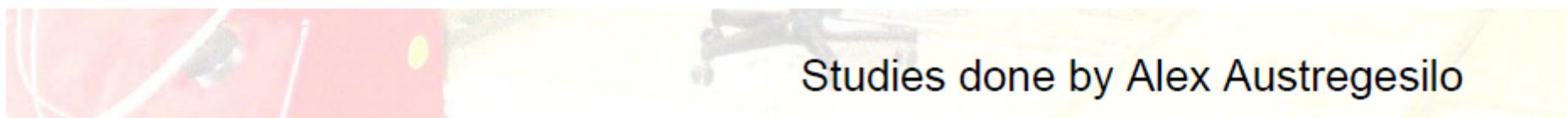
New issue: exclusivity peak (elastic scattering)



M2A.011
RMS = 1.8 GeV

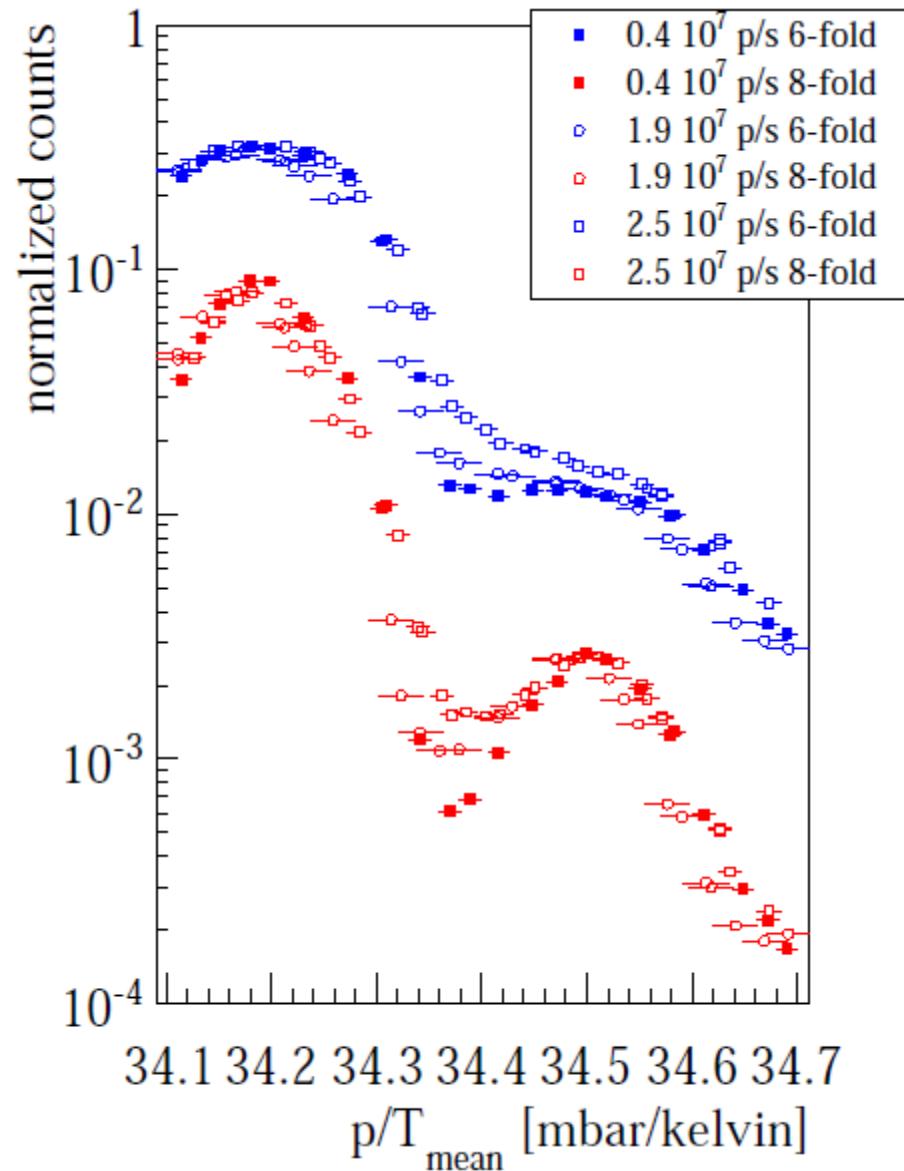


M2A.006
RMS = 2.4 GeV



Studies done by Alex Austregesilo

An other issue: pileup



Summary

A lot of issues.

Some of them were more or less under control.
Things can always be improved!