Activities on BCM1F crates during last Technical Stop

BCM1F crate

We were mainly debugging the TDCs<->scalers problem.

The problems we observe are....

- Since the removal of VETO module and the introduction of veto of hits in the LUT, despite there are still spikes in the scalers rates during TDCs readout errors, the level of rates return to normal after the spikes.
- Interference also observed in the BCM1F scalers used on the BSC crate side.
- New errors appearing lately related to wrong number of return bytes after a BLT readout, these errors seem to produce the spikes (Roberval knows the details).

Hardware problem? Answer from CAEN support:

- The noise in scalers maybe due to faulty cables.
- Place scalers as far as possible from the TDCs and the VME bridge

Software problem?

The high rate of TDC block transfers overloads the VME bus and the discriminator levels change? Tests to be done:

- Remove discriminator from the BCM1F crate and place it in the BCM1L crate. To do so, we need to daisy chain the VME optical bridges and use same pci card in ctrl3. We failed to implement the test during TS and we will try to do it in Zeuthen.
- Christoph Schwick (CMS DAQ) suggested to update CAEN firmware and install the same one used in CMS daq, apparently it handles better the VME bus. He suggested it after observing in the ctrl3 logs frequent „RX time out“ messages from the pci vme controller (RX is the receiving line of the optical fiber). Arkady Lokhovitskiy volunteered to do the upgrade in computer in Bdg 186.

- New firmware in LUT that is being checked by Roberval (maybe he can report on it)
- Roberval has also reduced the rate of block transfers of the TDCs.

Gated BCM1F crate:

- Removal of LUT and VETO module to be taken back to Zeuthen setup
- Current setup with scalers and TDCs without vetoing of input signals.

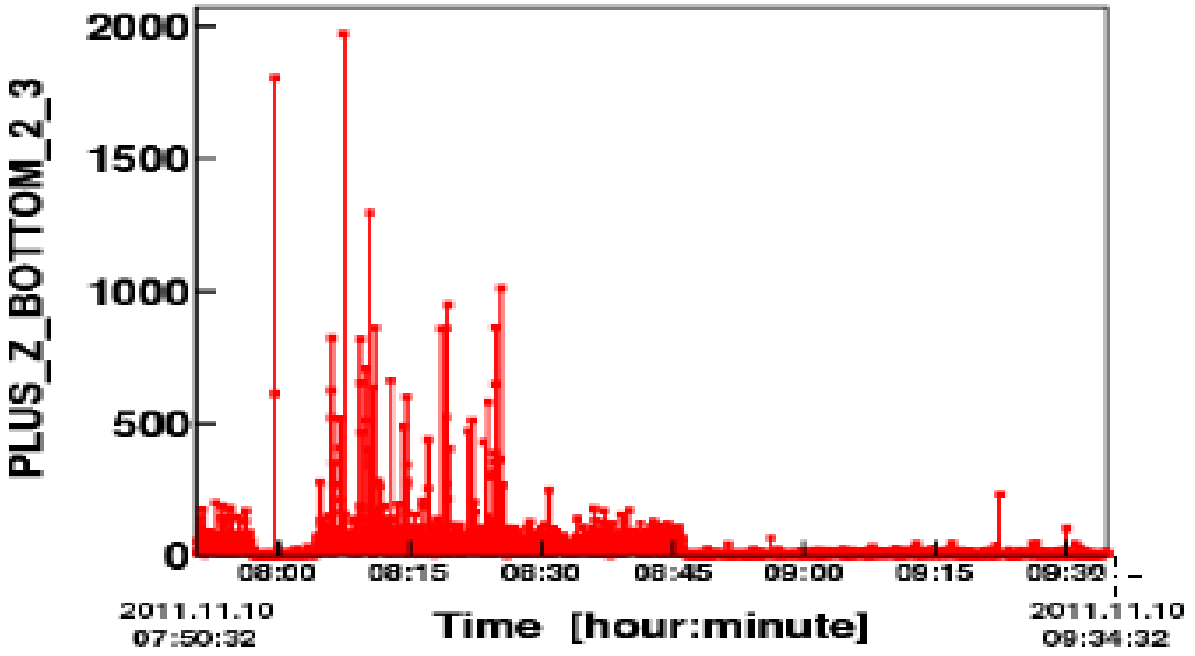
CMS BCM1F Vthr scans without beam

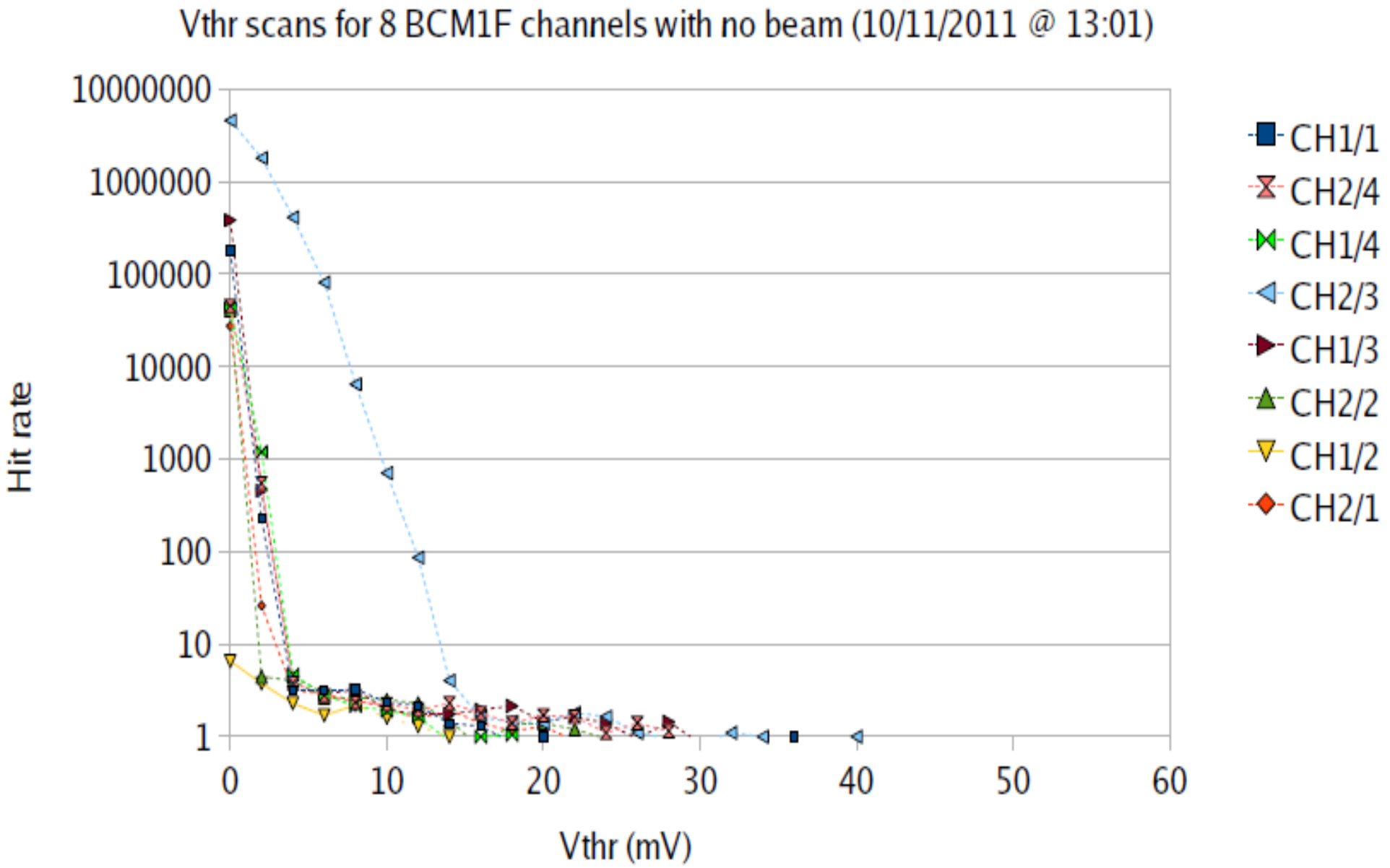
2 Vthr scans were done without beam on 10/11/2011.

The scans show similar results.

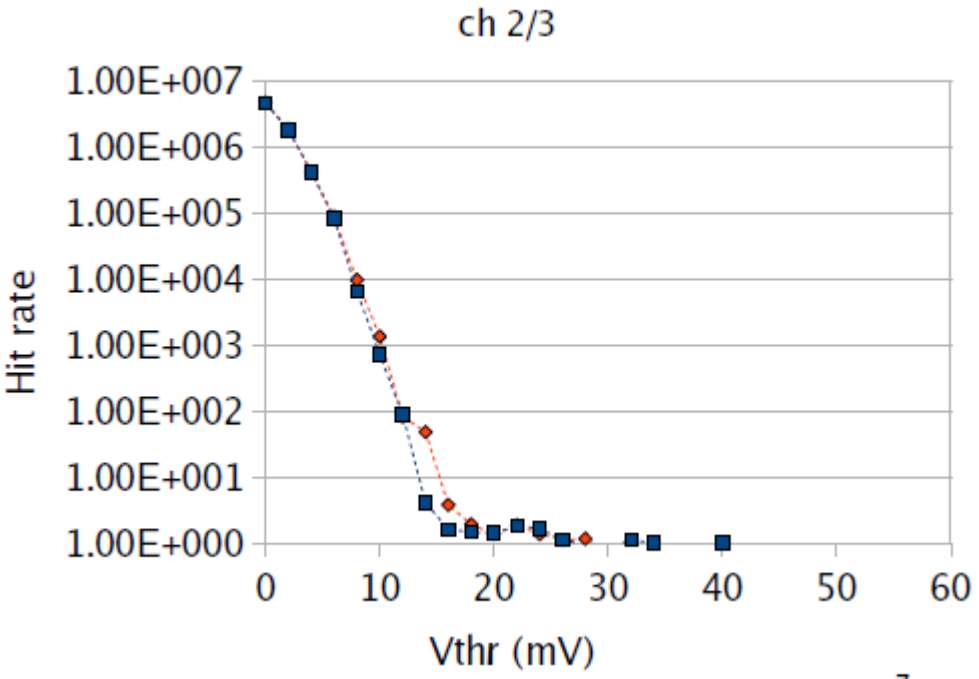
Channel 2/3 has higher noise that the rest of the channels but the noise changes, as it can be seen in figure below so the scans might differ depending on the time.

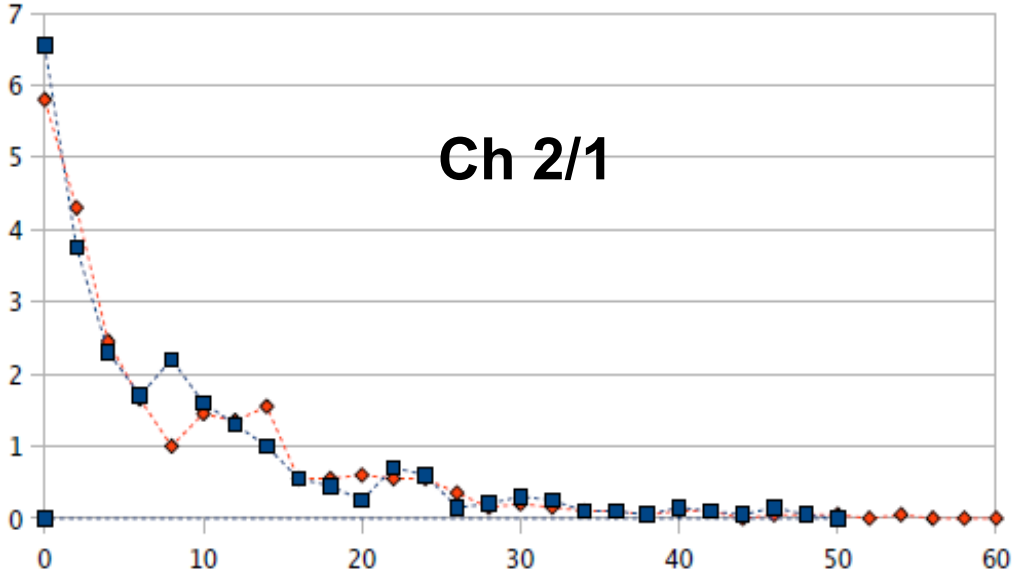
Channel 1/ 2 has less noise at 0mV.




Vthr scans for 8 BCM1F channels with no beam (10/11/2011 @ 13:01)
Hit rate
10000000
1000000
100000
10000
1000
100
10
1
0
10
20
30
40
50
60
Vthr (mV)
CH1/1
CH2/4
CH1/4
CH2/3
CH1/3
CH2/2
CH1/2
CH2/1

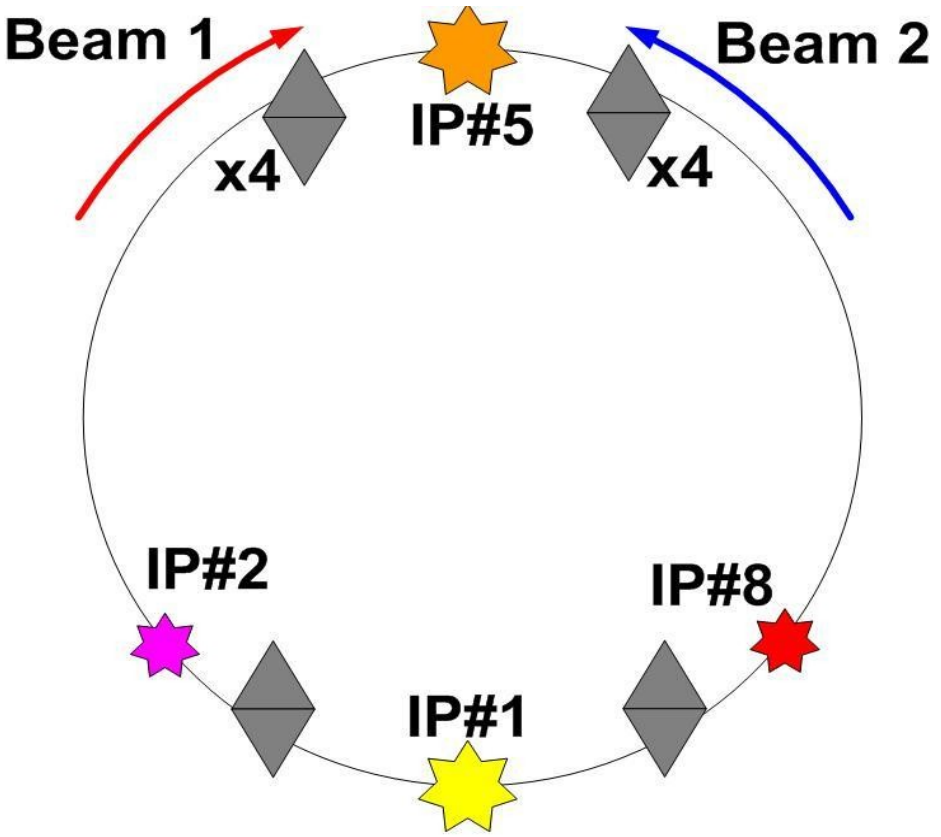
Two Vthr scans of 2 channels at different time on same day





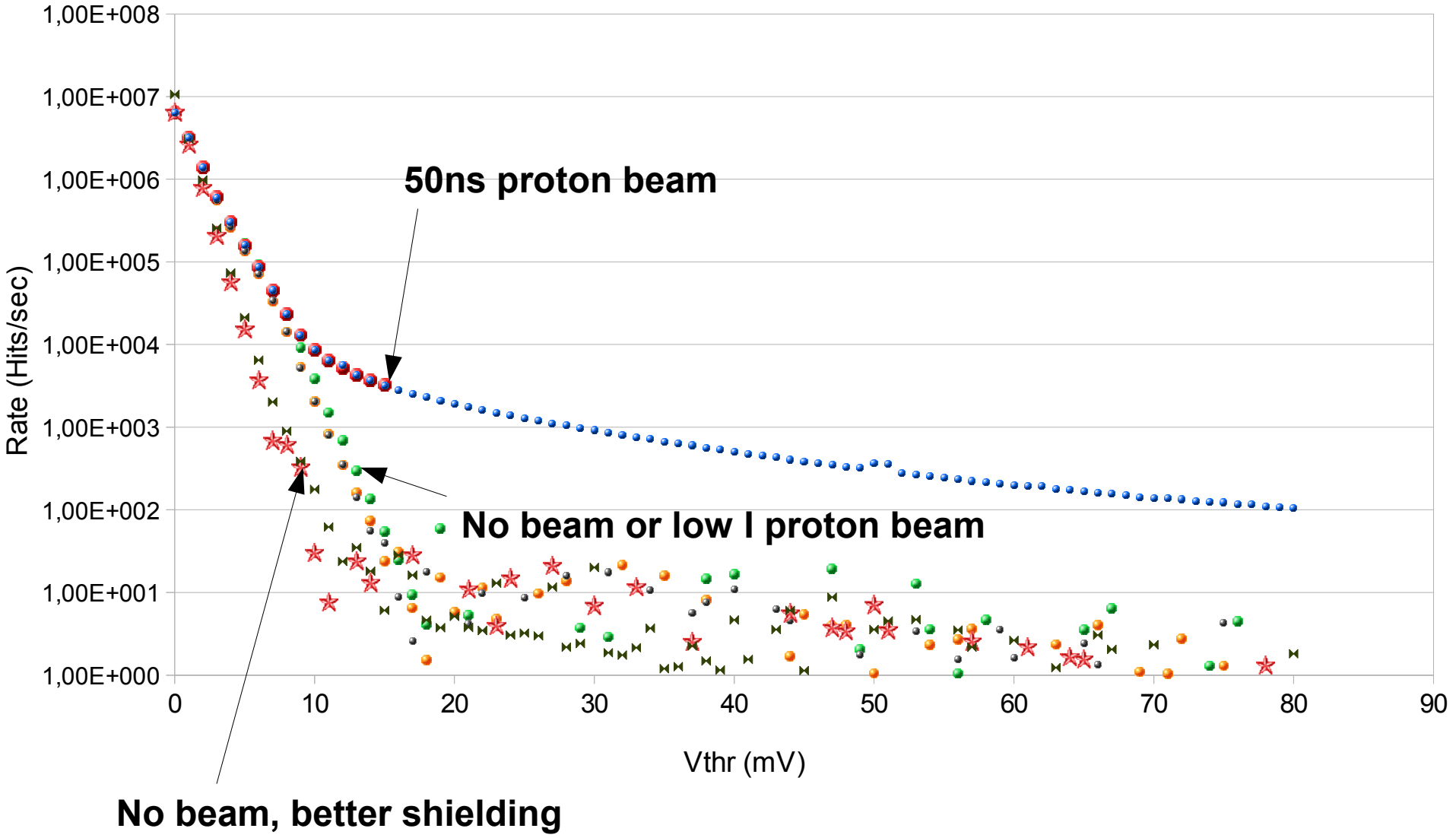
- **BCM1F4LHC**

  An additional diamond was installed in Point 2 (Alice). It needs to be integrated in the daq

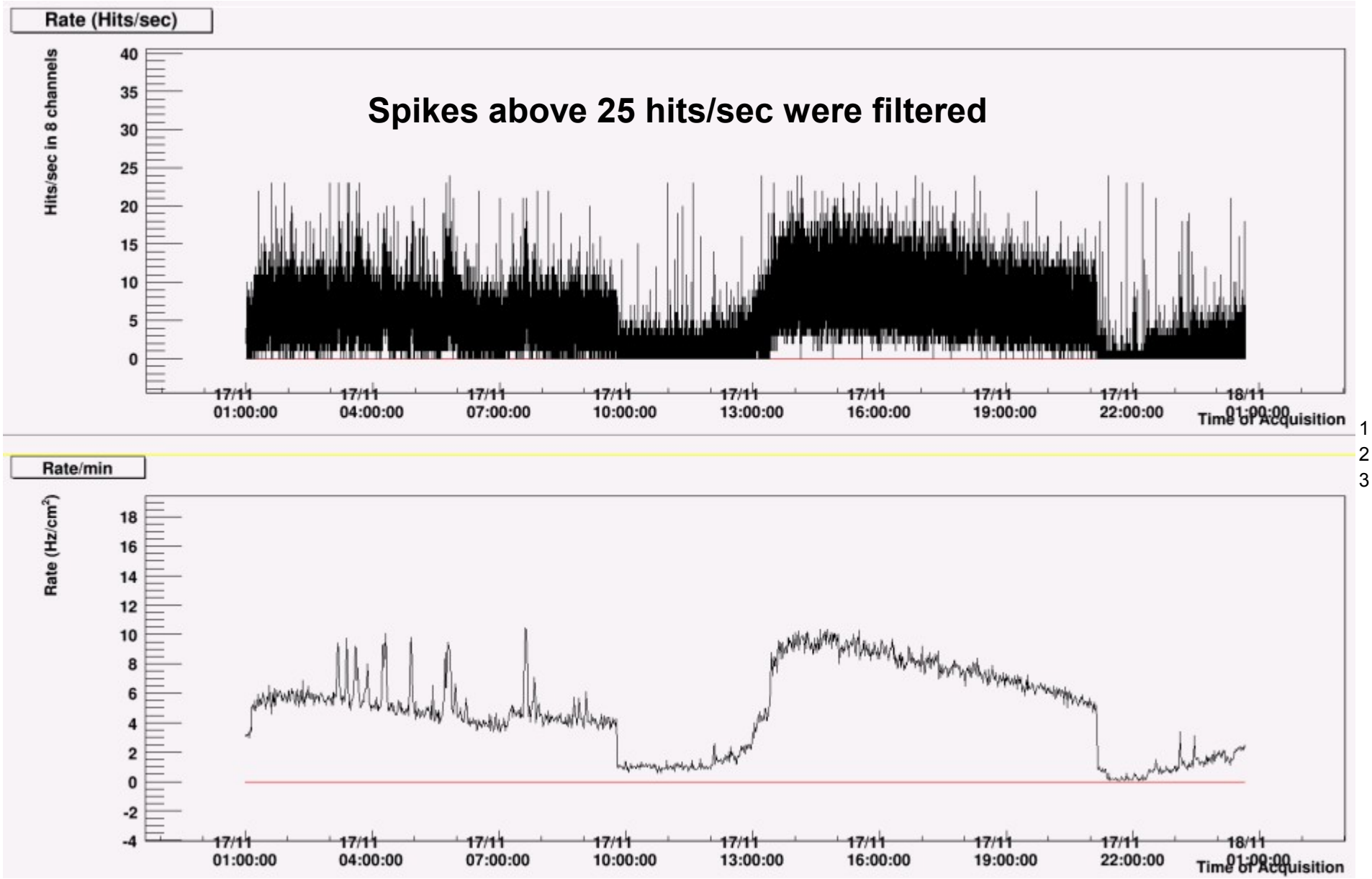


  We need to provide monitors to LHC on scalers rates and to move the data to CASTOR.

Vthr scans


1,00E+008
1,00E+007
1,00E+006
1,00E+005
1,00E+004
1,00E+003
1,00E+002
1,00E+001
1,00E+000
Rate (Hits/sec)
0
10
20
30
40
50
60
70
80
90
Vthr (mV)
50ns proton beam
No beam or low I proton beam
No beam, better shielding

HI fills


Rate (Hits/sec)
Hits/sec in 8 channels
Spikes above 25 hits/sec were filtered
Time of Acquisition
Rate/min
Rate (Hz/cm²)
Time of Acquisition

To Do

- Install in lab 2 VME crates
  - One with the whole BCM1F daq
  - A second one for the daisy chain test
- dsfs
- Plots for upcoming conferences:
  - GSI and DIDANET in Hamburg