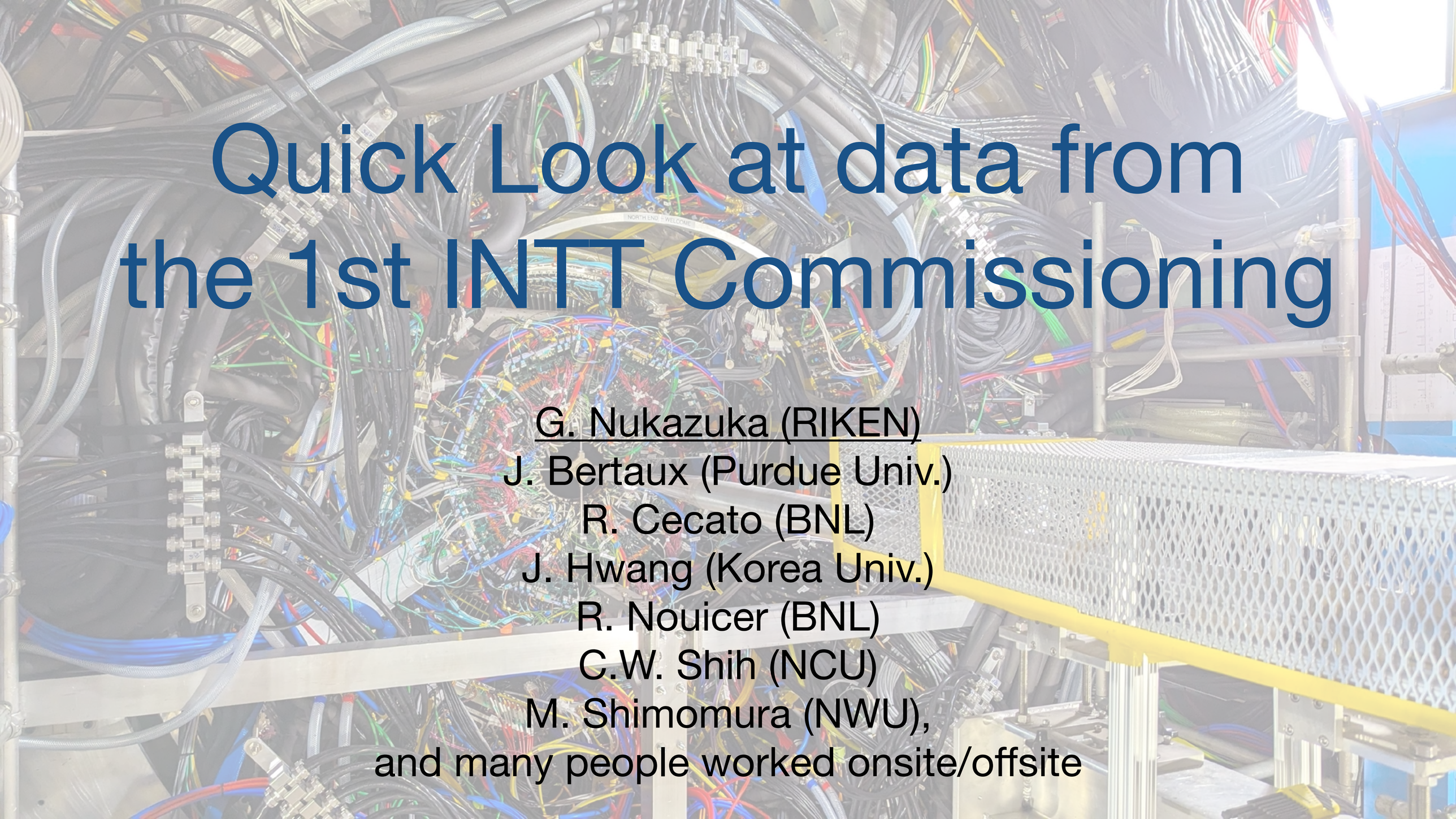

Quick Look at data from the 1st INTT Commissioning

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J. Bertaux (Purdue Univ.)
R. Cecato (BNL)
J. Hwang (Korea Univ.)
R. Nouicer (BNL)
C.W. Shih (NCU)
M. Shimomura (NWU),
and many people worked onsite/offsite

Commissioning

- Installation of the INTT barrel was finished in Mar/1.
- Calibration measurements of all ladders were started:
  - with **a temporary ladder cooling** (not sufficient for the ladders physically located on the upper half due to insufficient pumping power)
  - with **a temporary ROC cooling** (for 4 or 8 ROCs)
  - with **the 2nd Felix server (called inttdaq)**, which was located in the silicon lab
  - for **1 or 2 ROCs (i.e. up to 14 ladders at once)** with a single Felix board
  - from the south side for MVTX installation

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  - from the south side for MVTX installation
- Softwares for the commissioning were:
  - Felix (Raul) : the developments were not completed, but it works well for the 1st commissioning.
  - LV GUI for ROC power (Mai, Maya) : It worked well though some improvements are needed.
  - LV GUI for FPHX chips power (WC, Maya) : It worked well though some improvements are needed.
  - HV GUI for bias (Joseph) : It worked well. The mapping issues and strange behaviors due to hardware are always involved and confused us.
  - Felix DAQ GUI (Genki) : It worked well. Some more features are needed.
  - Calibration database (CW) : It worked well if CW's hard care.
  - Map generator (CW) : It worked well.

Calibration data

- All data were stored in
  inttdev@inttdaq:~/data/IR or
  inttdev@inttdaq:~/sphenix_inttpy/data ← Raul's working place
- Good datasets were stored in inttdev@inttdaq:~/data/IR/commissioning/202303_1st:
  - RC-0N
  - RC-1N
  - RC-2N
  - RC-3N
  - RC-4N
  - RC-5N
  - RC-6N
  - RC-7N
  - RC-0S
  - RC-1S
  - RC-2S
  - RC-3S
  - RC-4S
  - RC-5S
  - RC-6S
  - RC-7S
  - all_ladders_ver2.root

New int branches in ROOT files:

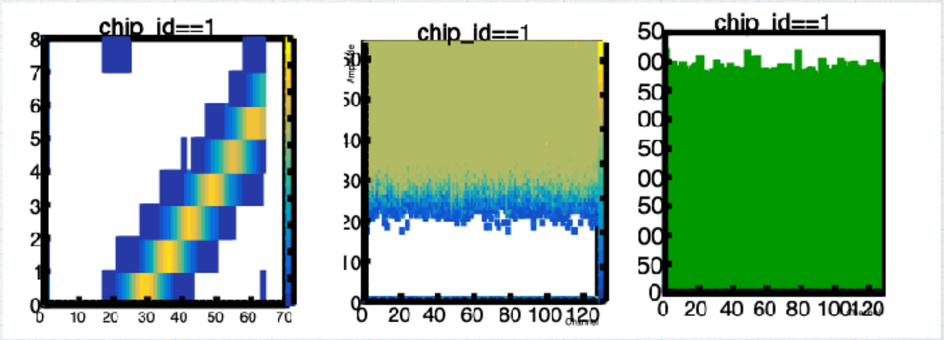
- barrel: for the barrel ID
- layer: for the layer ID
- ladder: for the ladder ID
- direction: for north(0)/south(1)

- To access the data:
  1. Log in to cssh01.sdcc.bnl.gov (e.g. `ssh genki@cssh01.sdcc.bnl.gov`)
  2. Log in to opc0.sphenix.bnl.gov with phnxrc account (e.g. `ssh phnxrc@opc0.sphenix.bnl.gov`)
  3. Log in to inttdaq (10.20.33.210) with inttdev account (e.g. `ssh inttdev@inttdaq`)

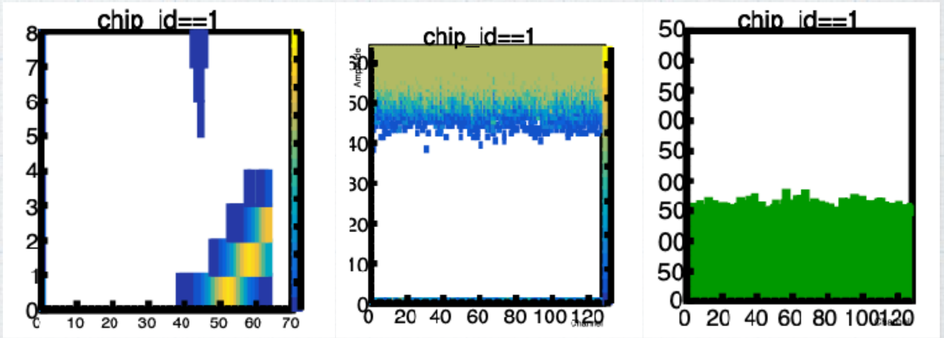
Calibration condition

- Since the Felix DAQ takes all his while the FEM DAQ does strong filtering for calibration, Felix's data tends to be large.
- When all ladders worked well, it was not a problem at all.
- Sometimes due to some reasons, Felix got a too large amount of data, and the DAQ was stacked during data taking. It happens often.
- To proceed testing all ladders in limited time, we increased DAC settings to suppress noise (it doesn't mean the noise comes from the silicon sensors):

DAC0: 30	DAC4: 46
DAC1: 34	DAC5: 50
DAC2: 38	DAC6: 54
DAC3: 42	DAC7: 58



RC-3S
calib_packv5_032223_2141.npy

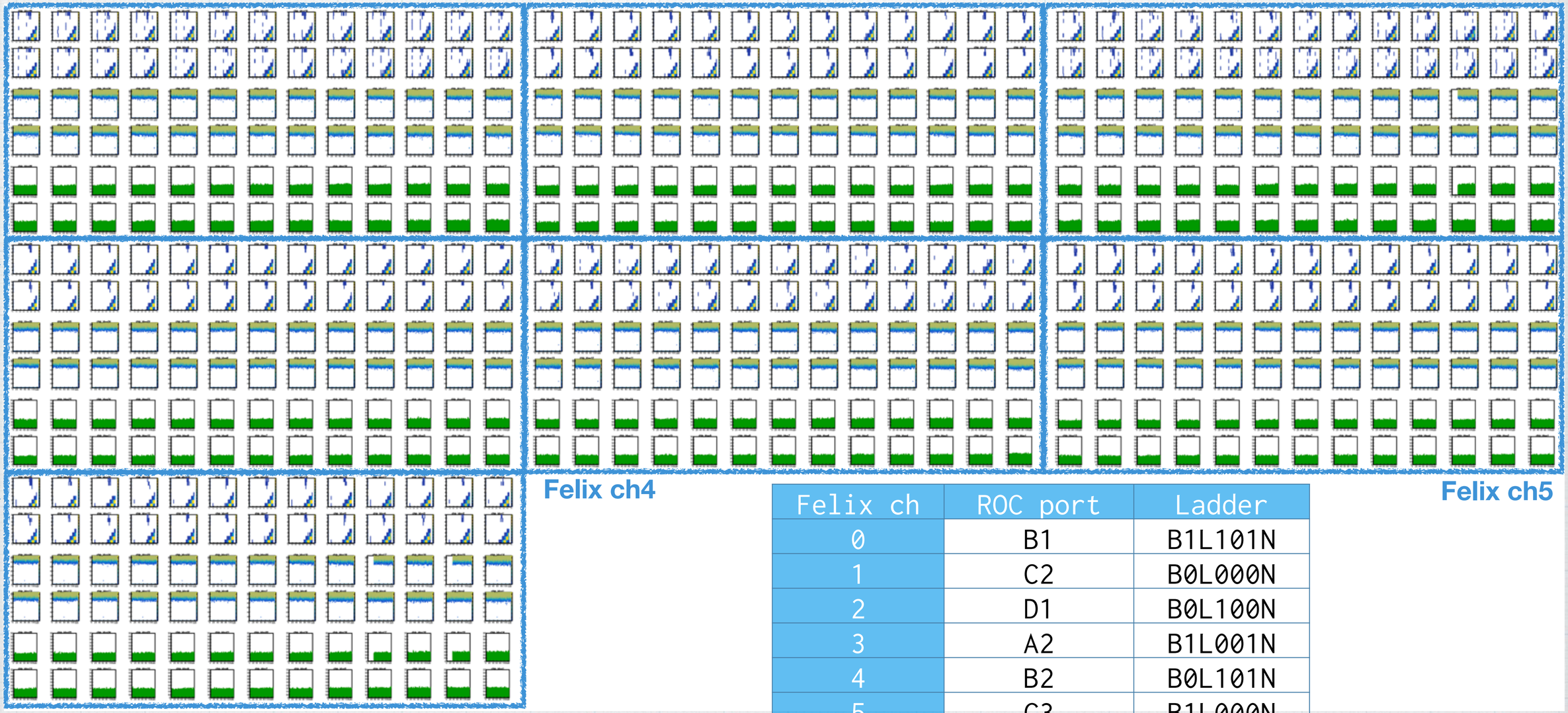


RC-7N
calib_packv5_032723_2256.npy

Calibration results: example of the good samples

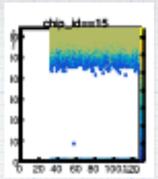
ROC: RC-0N

Data: calib_packv5_032723_1847.npy

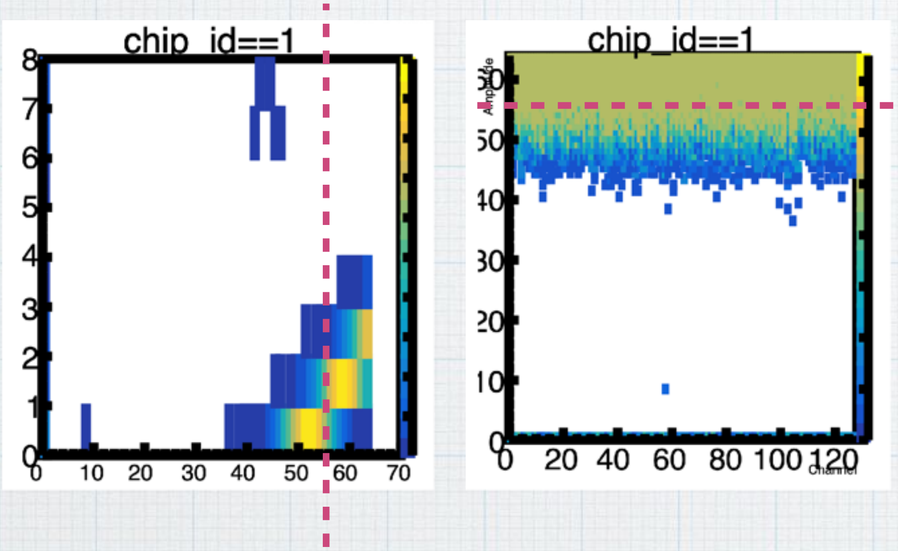


Felix ch	ROC port	Ladder
0	B1	B1L101N
1	C2	B0L000N
2	D1	B0L100N
3	A2	B1L001N
4	B2	B0L101N
5	C3	B1L000N
6	D2	B1L100N

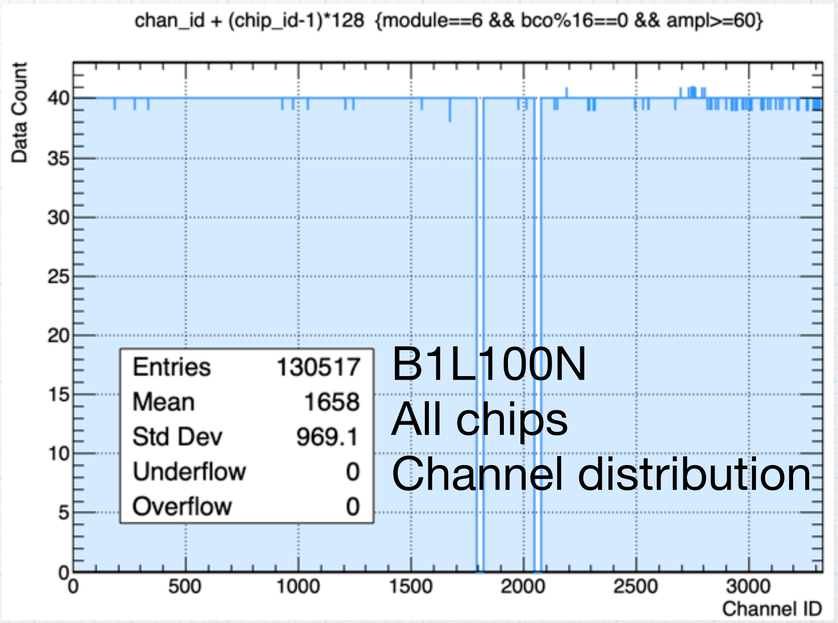
Calibration results: Analysis

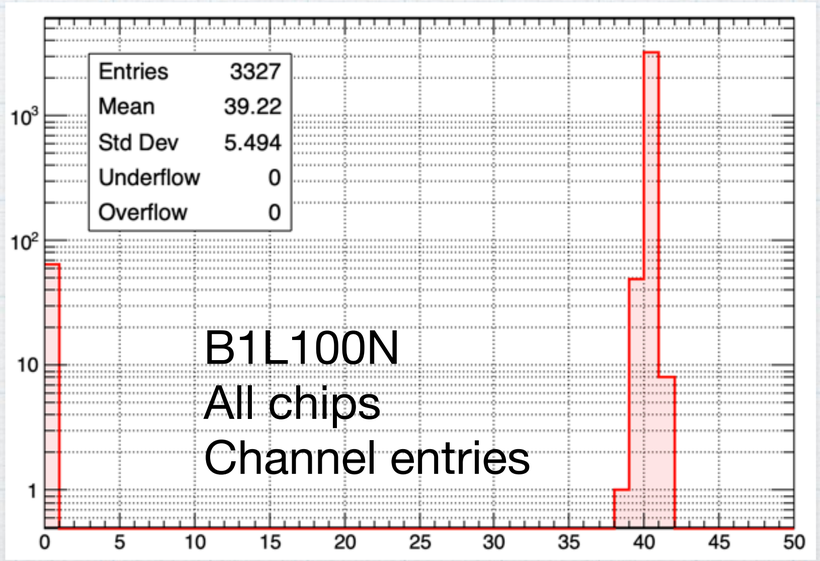


ROC: RC-0N
Data: calib_packv5_032723_1847.npy
Ladder: B1L100N (ch6, D2)



A selection of high-amplitude regions gives stable conditions in the channel distribution. For the region with ampl ≧ 54, each channel should have
10 (attempts) × 4 (amplitude settings, 60-64) = 40 events.





Calibration results: Analysis, Data

RC-0S
- calib_packv5_032323_2213.root
- calib_packv5_032323_2225.root

RC-1S
- calib_packv5_032123_0259.root

RC-2S
- calib_packv5_032423_0056.root
- calib_packv5_033023_1843.root

RC-3S
- calib_packv5_032223_2141.root

RC-4S
- calib_packv5_032323_0050.root
- calib_packv5_032323_0114.root

RC-5S
- calib_packv5_032323_0050.root

RC-6S
- calib_packv5_032323_0505.root
- calib_packv5_032323_0602.root

RC-7S
- calib_packv5_032323_0518.root

RC-0N
- calib_packv5_032723_1847.root

RC-1N
- calib_packv5_032723_2119.root

RC-2N
- calib_packv5_032723_2119.root

RC-3N
- calib_packv5_032923_0116.root

RC-4N
- calib_packv5_032823_1745.root

RC-5N
- calib_packv5_032823_1505.root

RC-6N
- calib_packv5_032723_1719.root

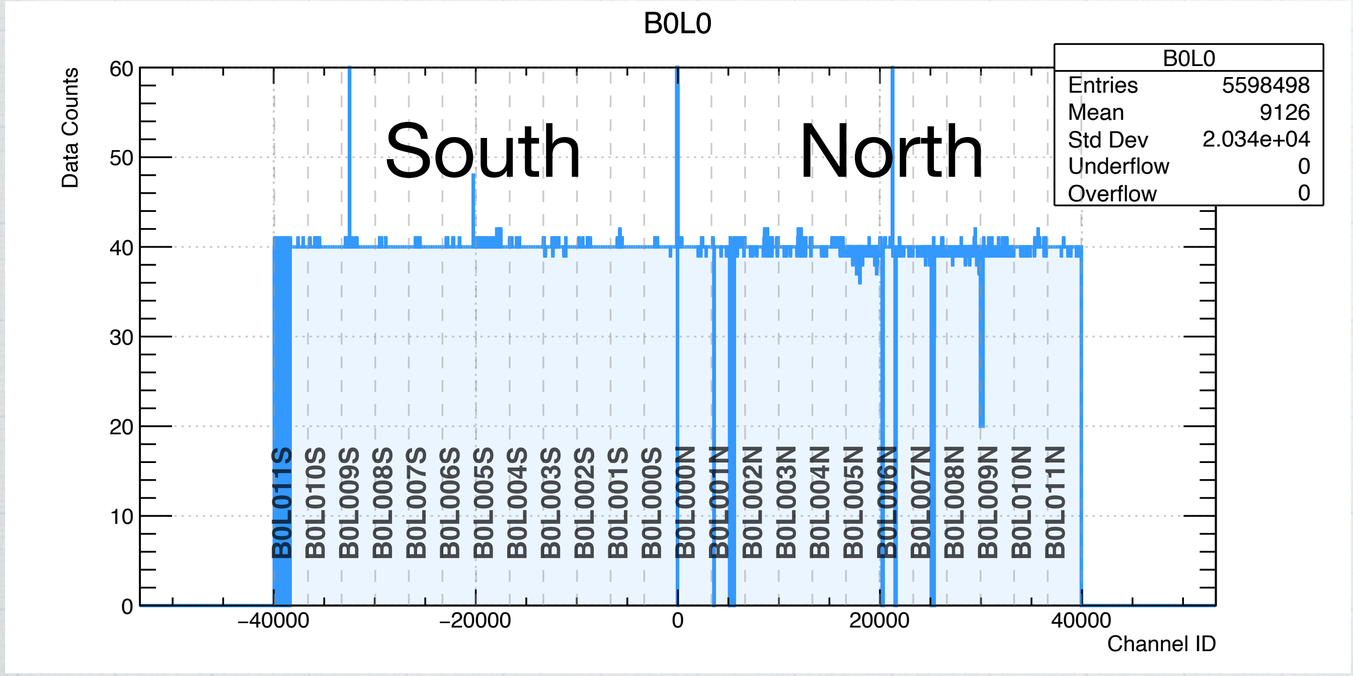
RC-7N
- calib_packv5_032723_2256.root

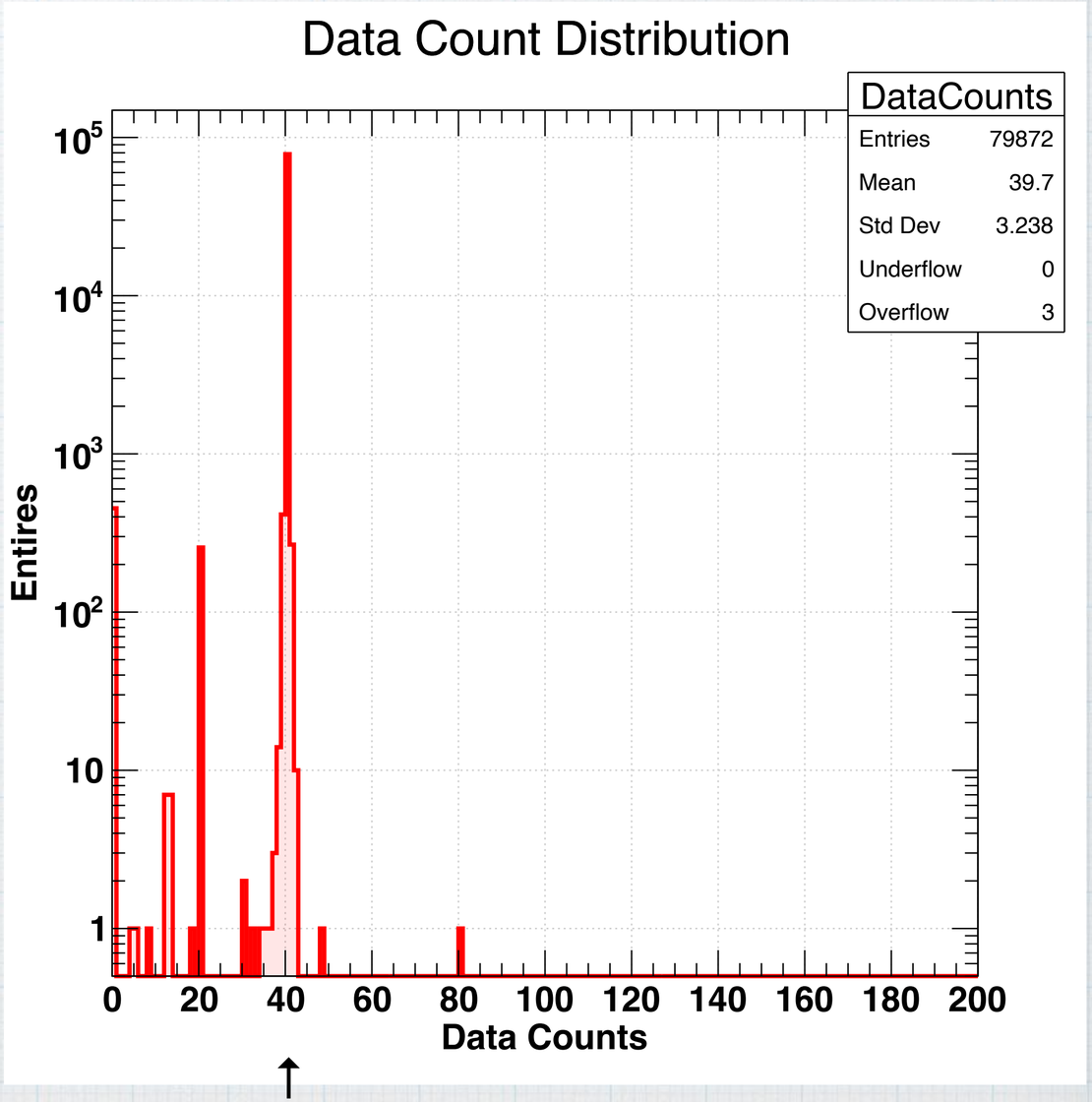
Calibration results: Analysis, B0L0

Cuts:

- bco%16==0
- && ampl>=60
- && barrel == 0
- && layer == 0

#hit distribution of all channels
in the **inner layer** of the **inner barrel** (B0L0).





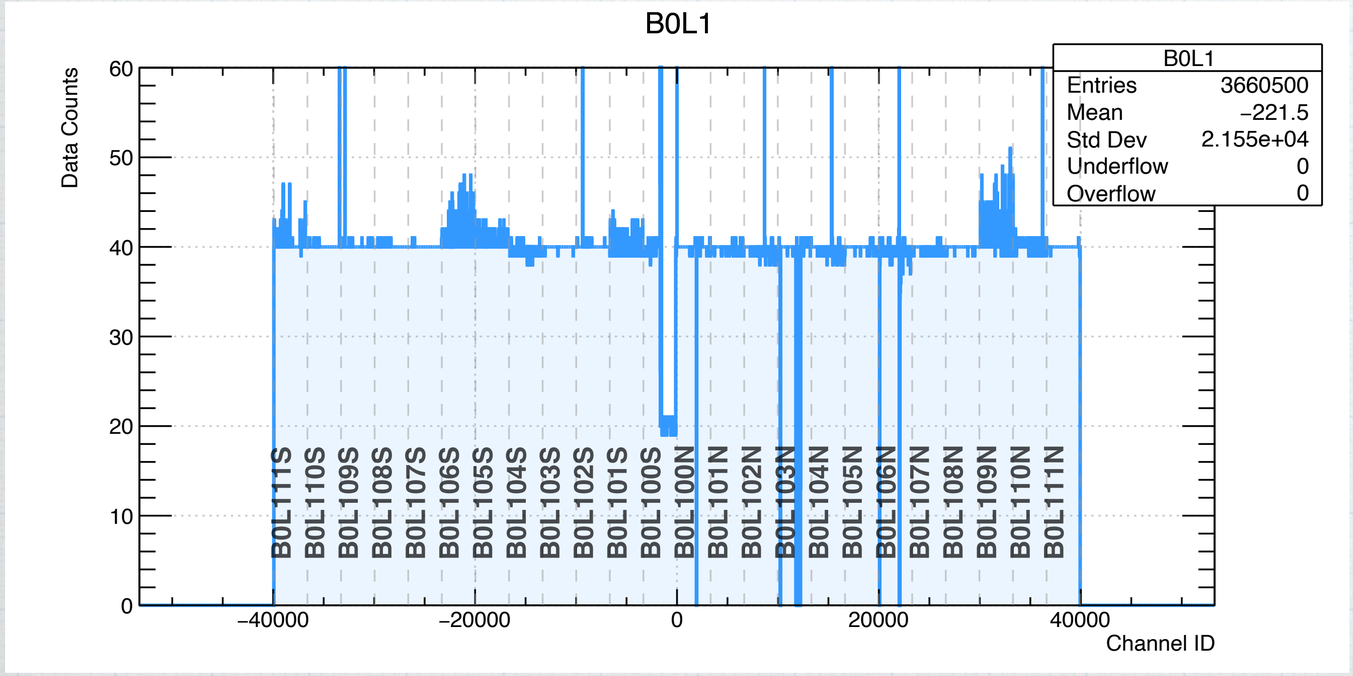
All entries should be at 40

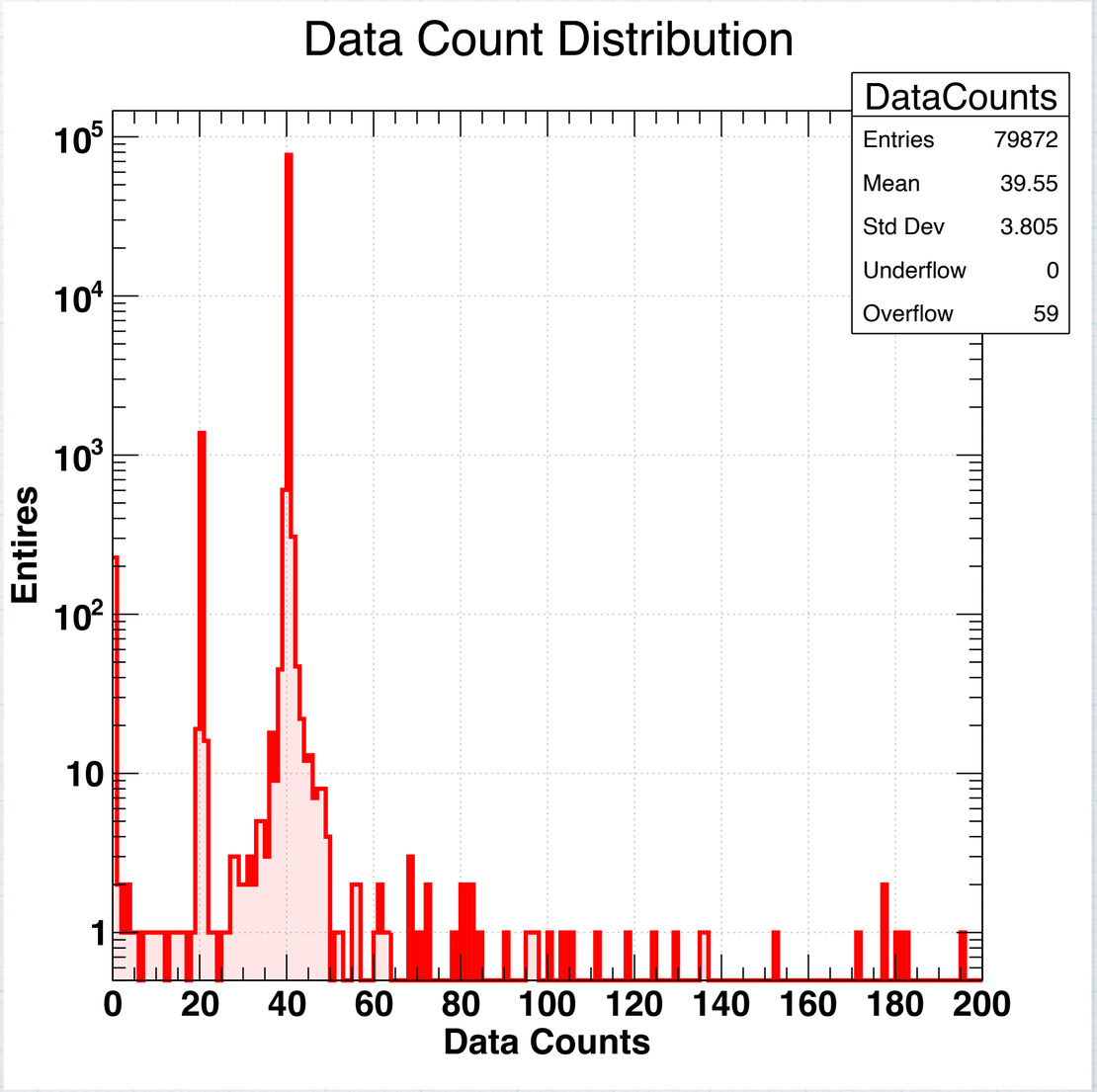
Calibration results: Analysis, B0L1

Cuts:

- bco%16==0
- && ampl>=60
- && barrel == 0
- && layer == 1

#hit distribution of all channels
in the **outer layer** of the **inner barrel** (B0L1).



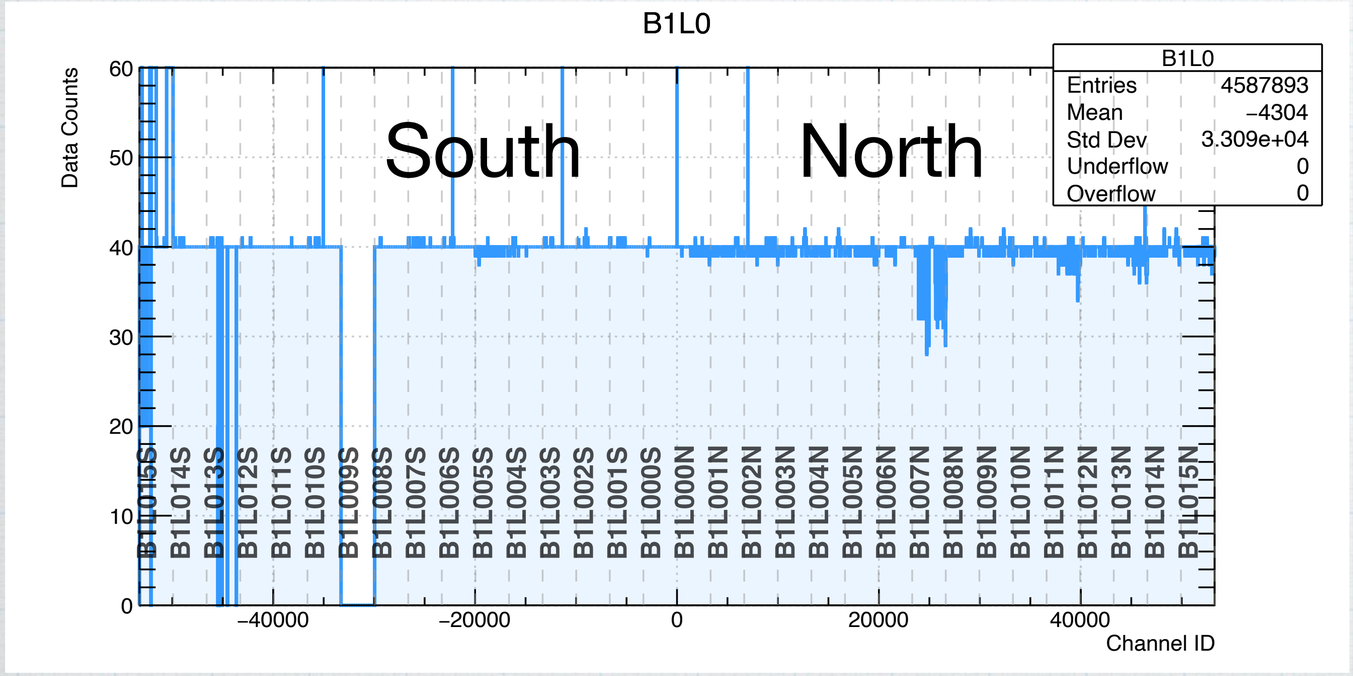


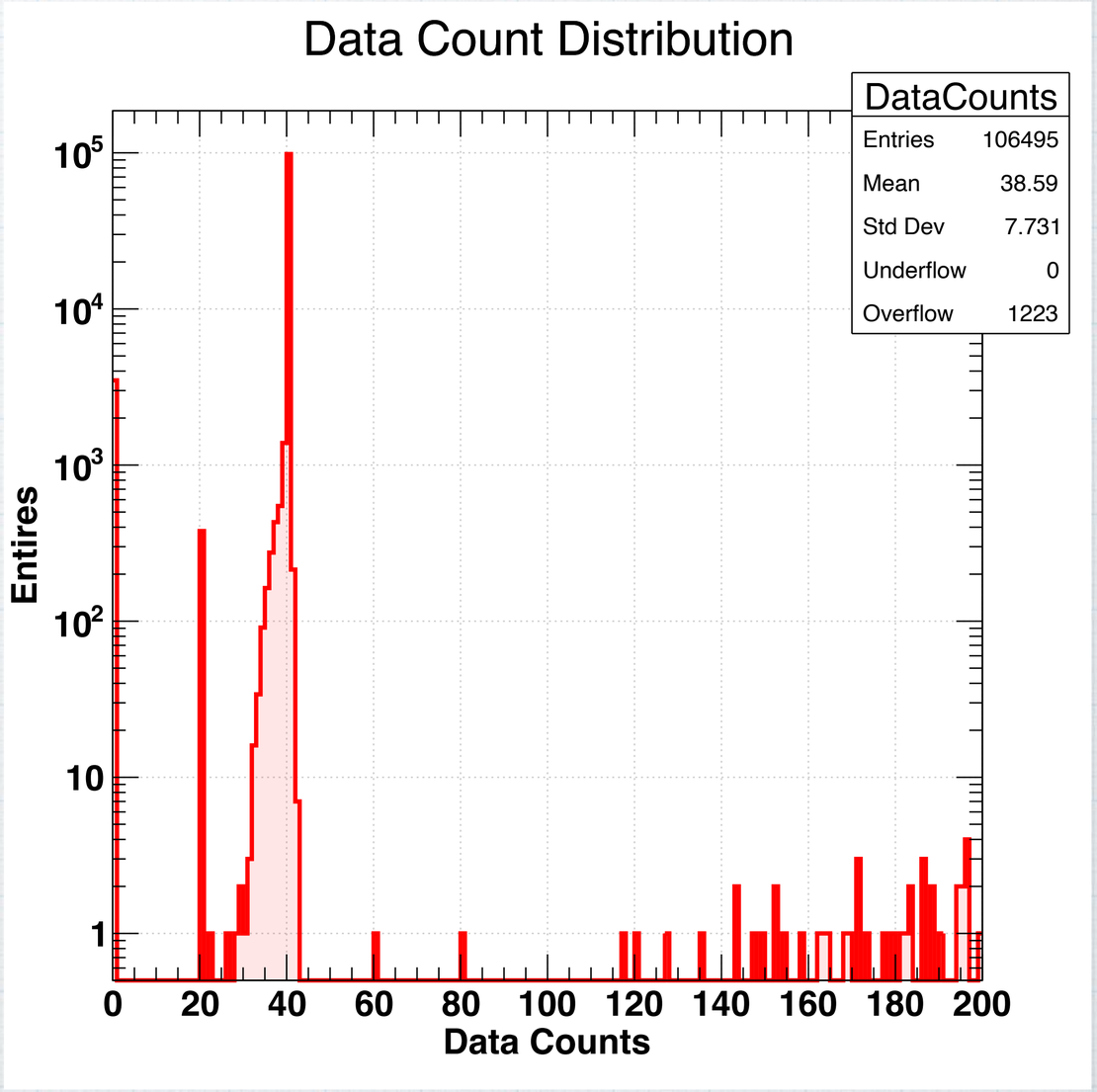
Calibration results: Analysis, B1L0

Cuts:

- bco%16==0
- && ampl>=60
- && barrel == 1
- && layer == 0

#hit distribution of all channels
in the **inner layer** of the **outer barrel** (B1L0).



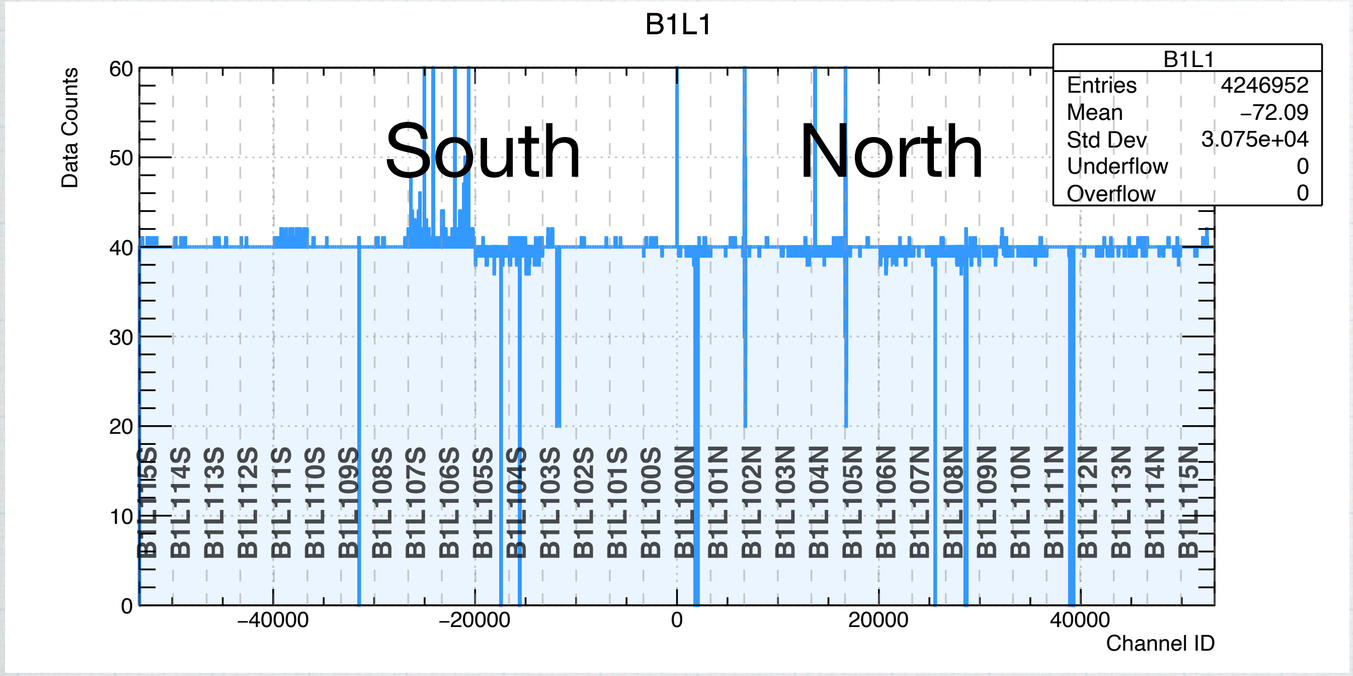


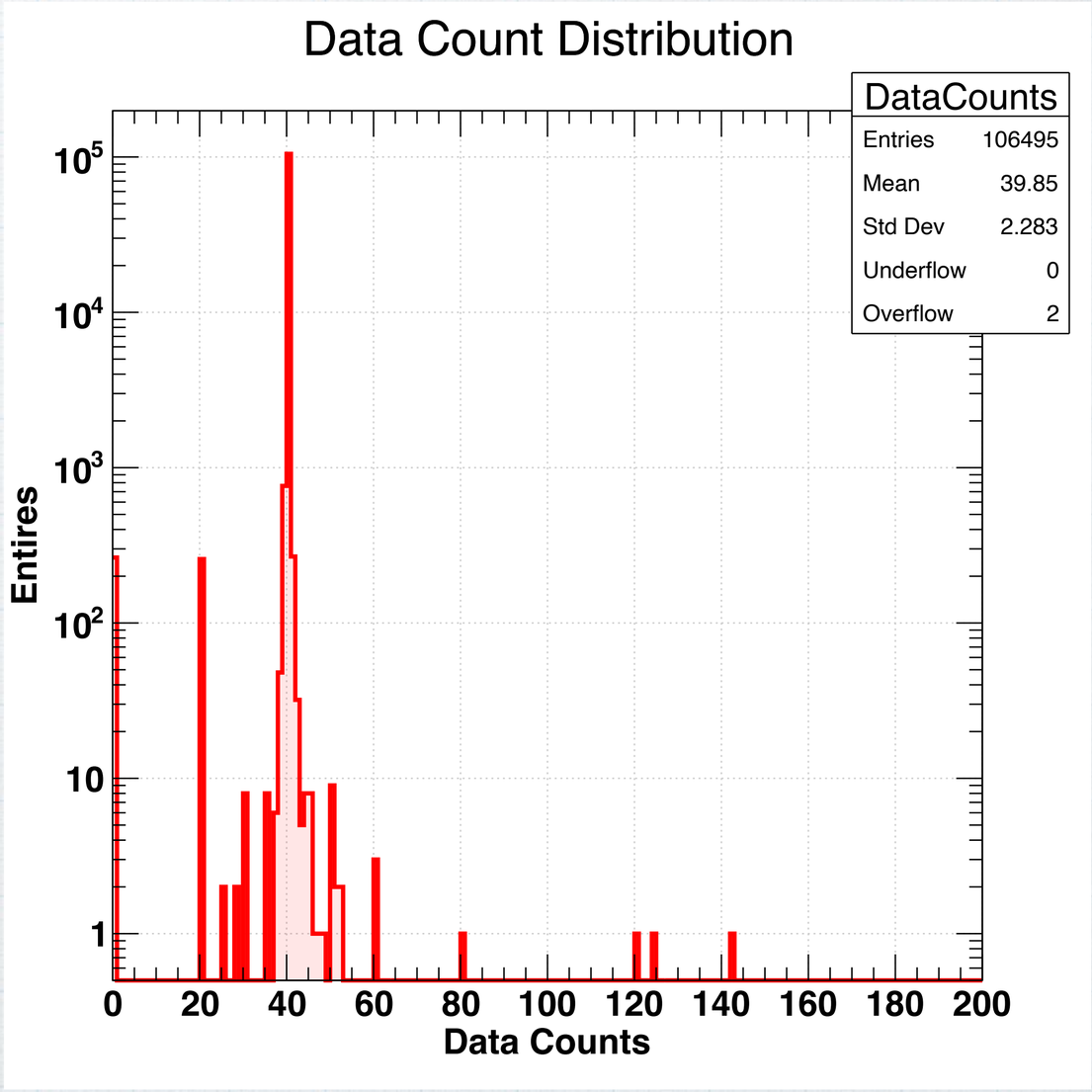
Calibration results: Analysis, B1L1

Cuts:

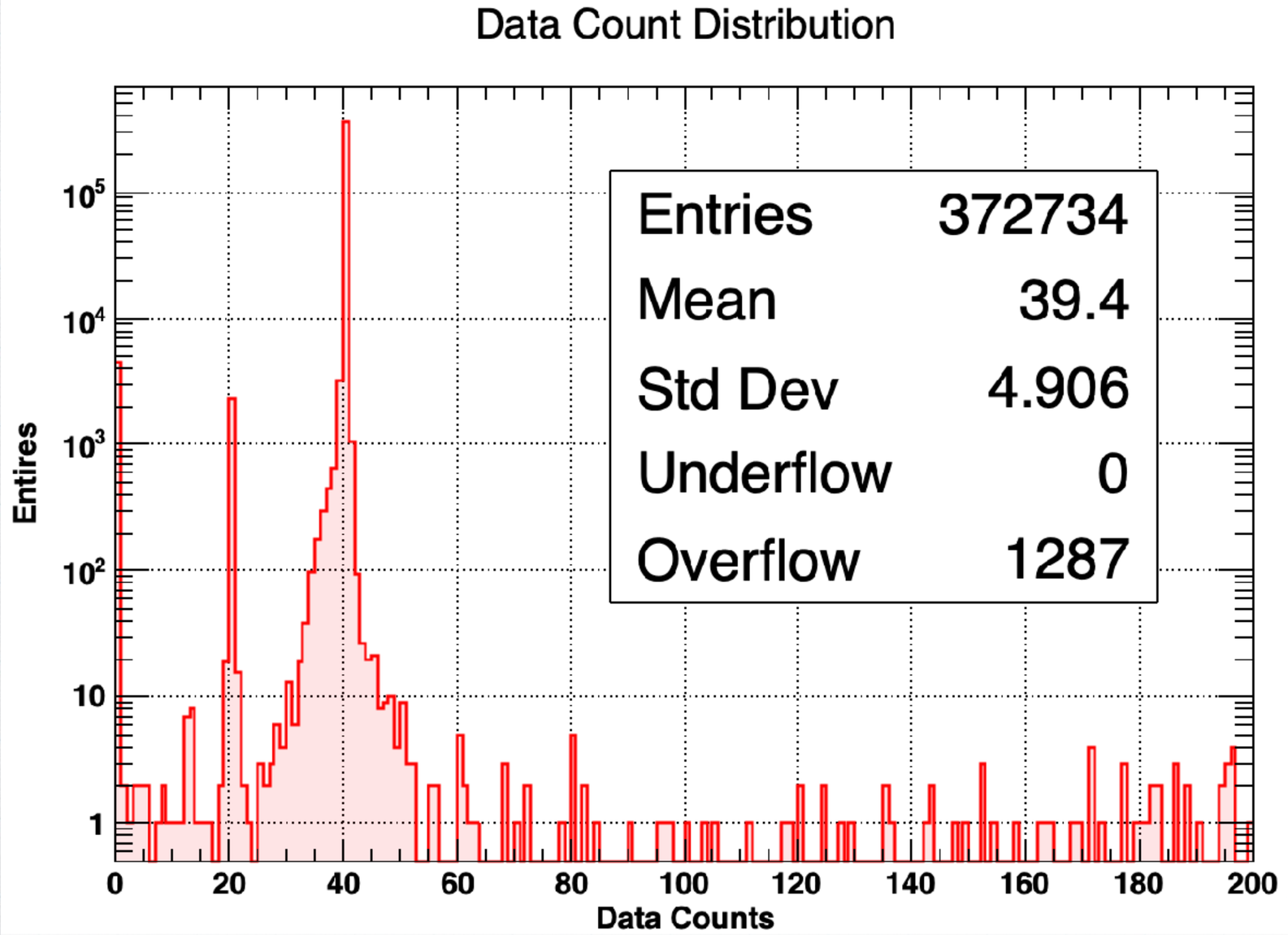
- bco%16==0
- && ampl>=60
- && barrel == 1
- && layer == 1

#hit distribution of all channels
in the **outer layer** of the **outer barrel** (B1L1).





Calibration results: Analysis, All channels



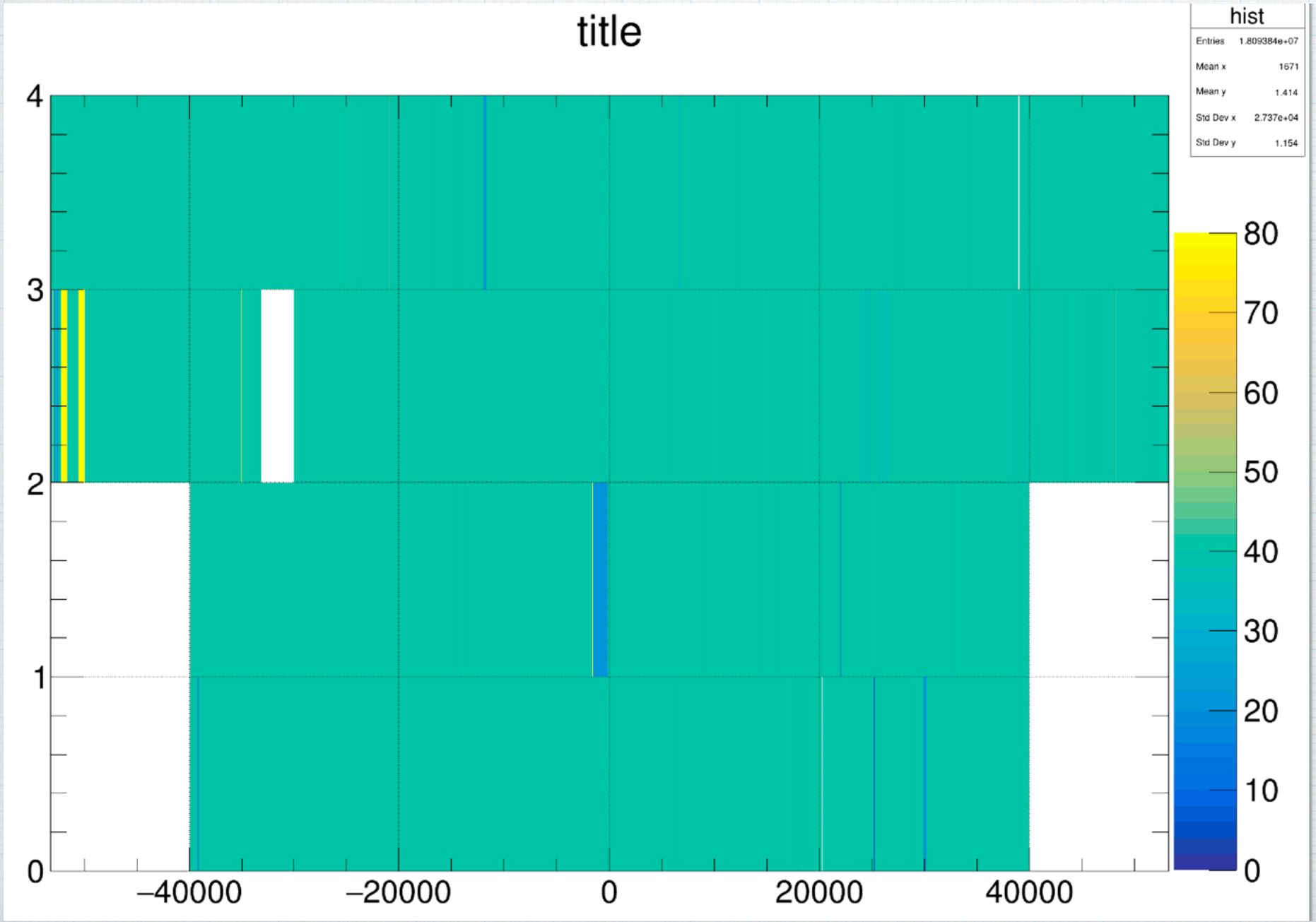
Cuts:

- bco%16==0
- && ampl>=60

If channels without data are ignored,
entry 40 ± 2 covers 99% of all channels.

We confirmed that the INTT barrel is in good condition!

Calibration results: Analysis, Hit Map of All Channels



Cuts:

- bco%16==0
- && module==6
- && ampl>=60

No one can see ch by ch…