8/14 Digital-Control-analysis

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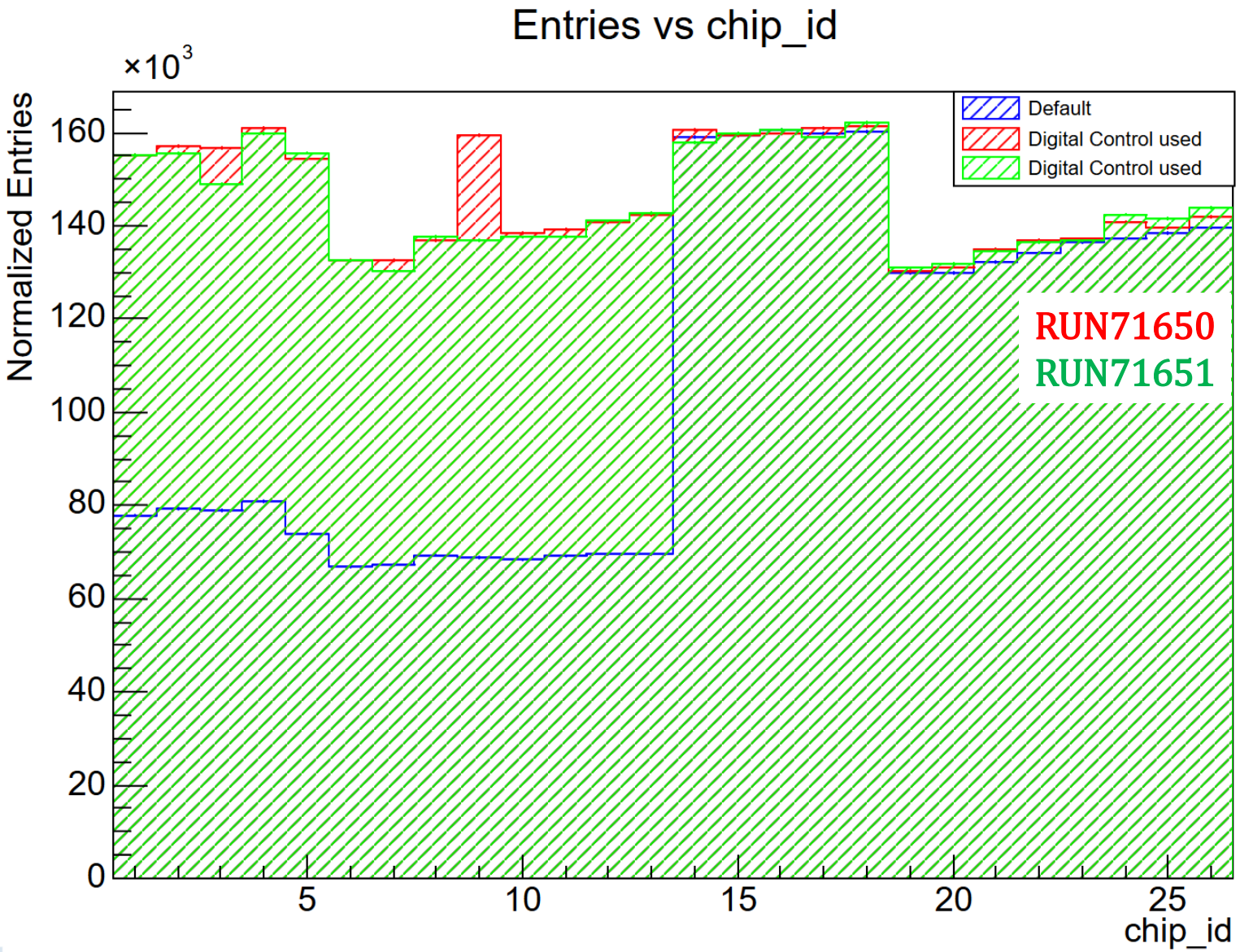
Status report

- I reported this digital-control-analysis for half-entry issue at today's SCM.

- After that, I modified the digital control parameters for half of INTT7&&module0, as well as for the other half-entry-chips.

For preliminary

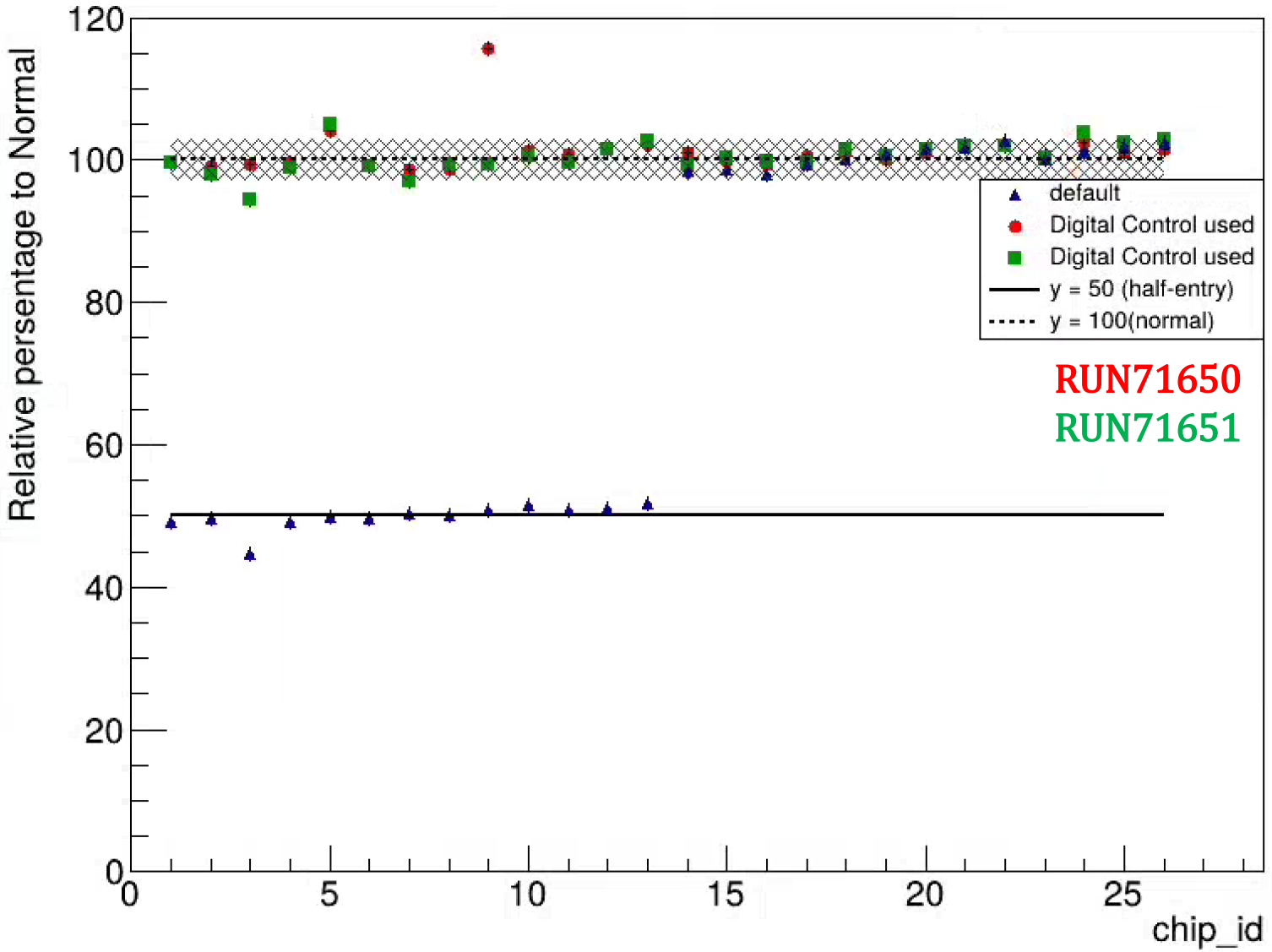


I used 100k event per each runs.
And calculate the number of hits.
So, an appropriate label for the vertical axis is “the number of hits per 100k event”?

What would be an appropriate label for the vertical axis?
And, also Is counterexample sound natural in this context?

Do you have any good FILLSTYLE of root?
→Do a hatched histogram look tacky?

For preliminary



I calculate the normal entries chip by chip with using 3 runs.
And, The default entries for half-entry chips was normalized to 50%, and the corresponding percentages were calculated. This figure provides a quantitative assessment.

Run number

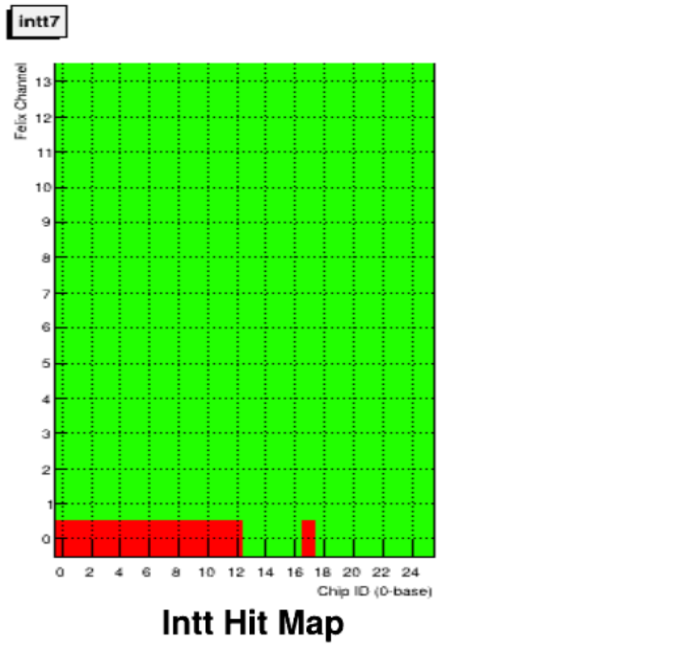
Special run for half-entry-issue with digital-control in physics

7/31 run71618 modifying digital-control-parameters to all half-entry-chips → All chips in INTT7 && module0 become **Hot**

8/1 run71649 default data

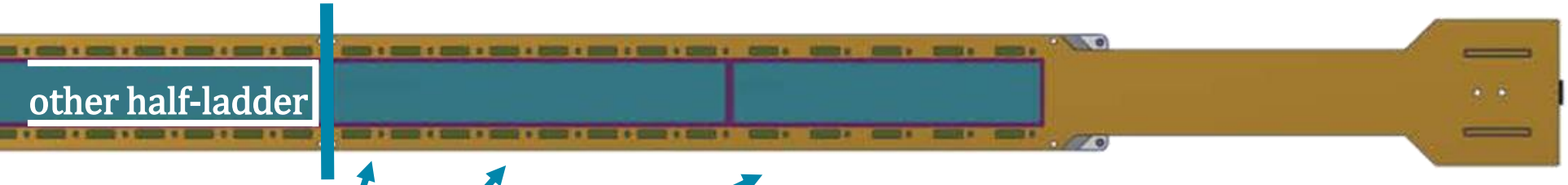
↙

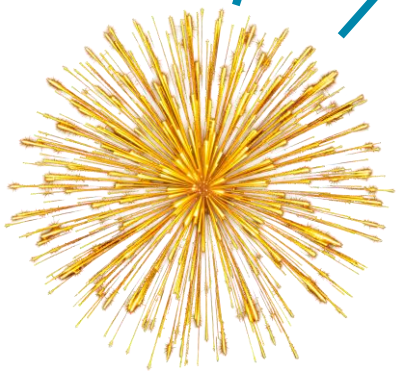
8/1 run71650 modifying digital-control-parameters
8/1 run71651 modifying digital-control-parameters
} Grouping the chips included Intt7 && module0



about INTT7 && module0

INTT7 && module0



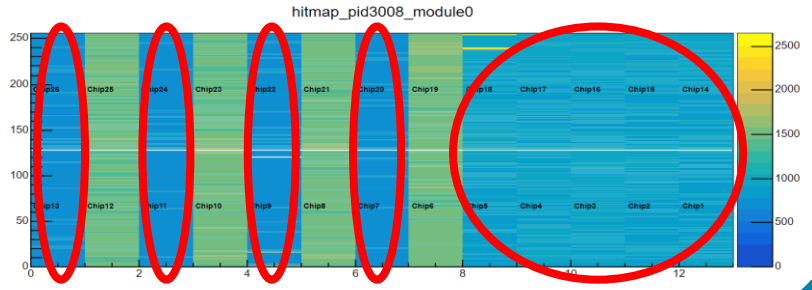


collision point

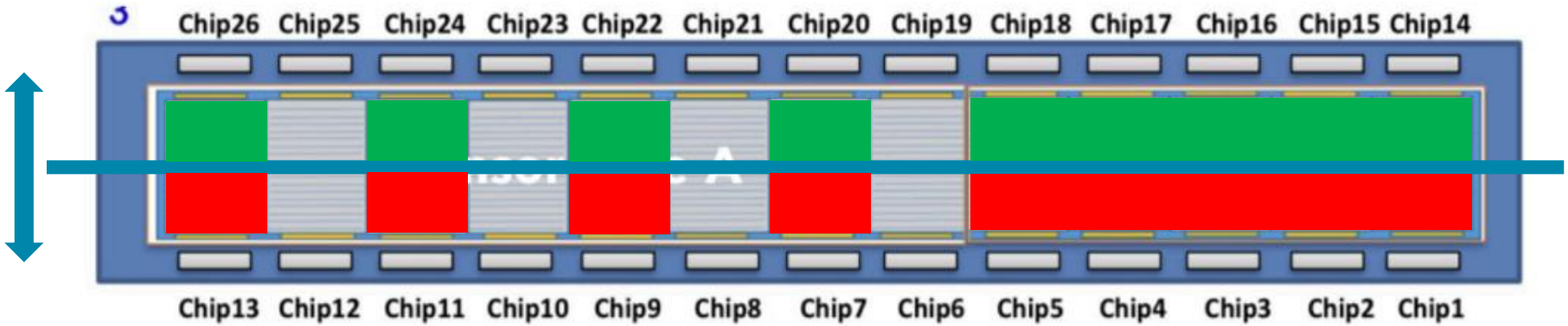
・When we modify the digital-control parameter of all chips included intt7&&module0, most chips become to be hot.

・If grouped as below(purple and yellow), both sides were successfully be able to recover the number of entries.

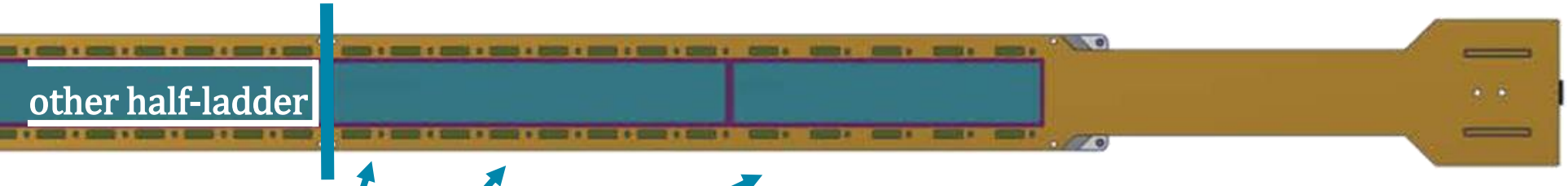
Half-entry-chips on HITMAP (default data)

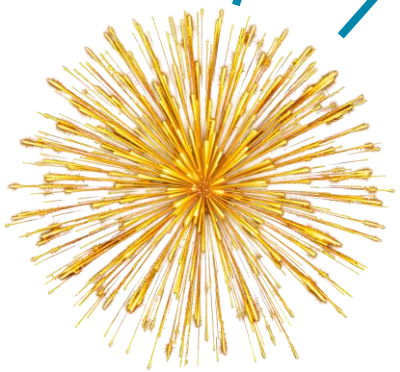


Both succeeded



INTT7 && module0



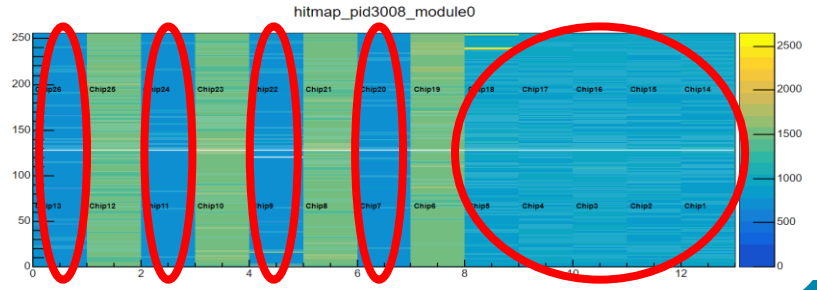


collision point

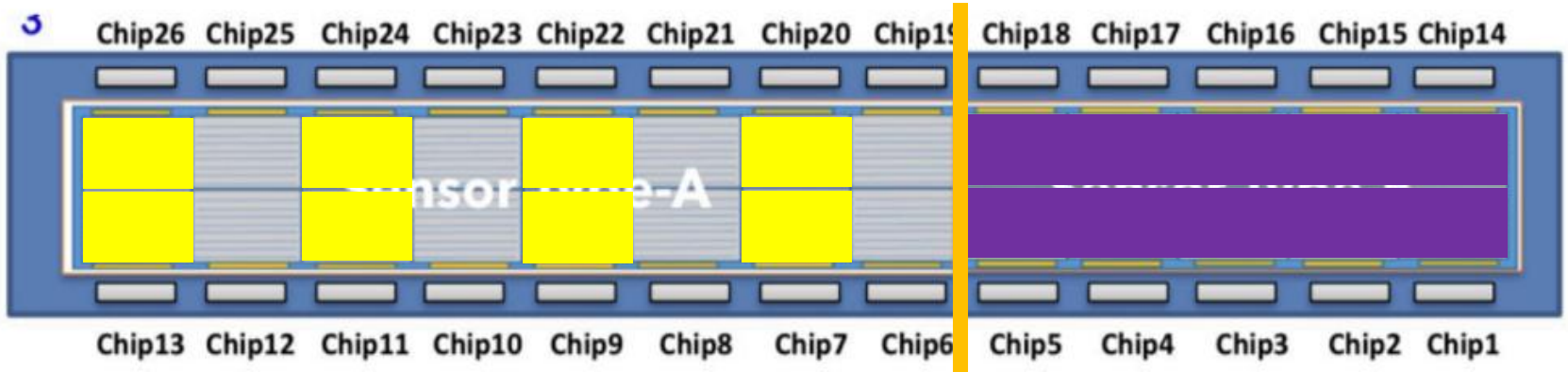
・About these chips, I'd like to make other groupings like below (with cosmic?)

・Is there a limit to the number of chips that can use a digital-control?
Or some other reason?

Half-entry-chips on HITMAP (default data)

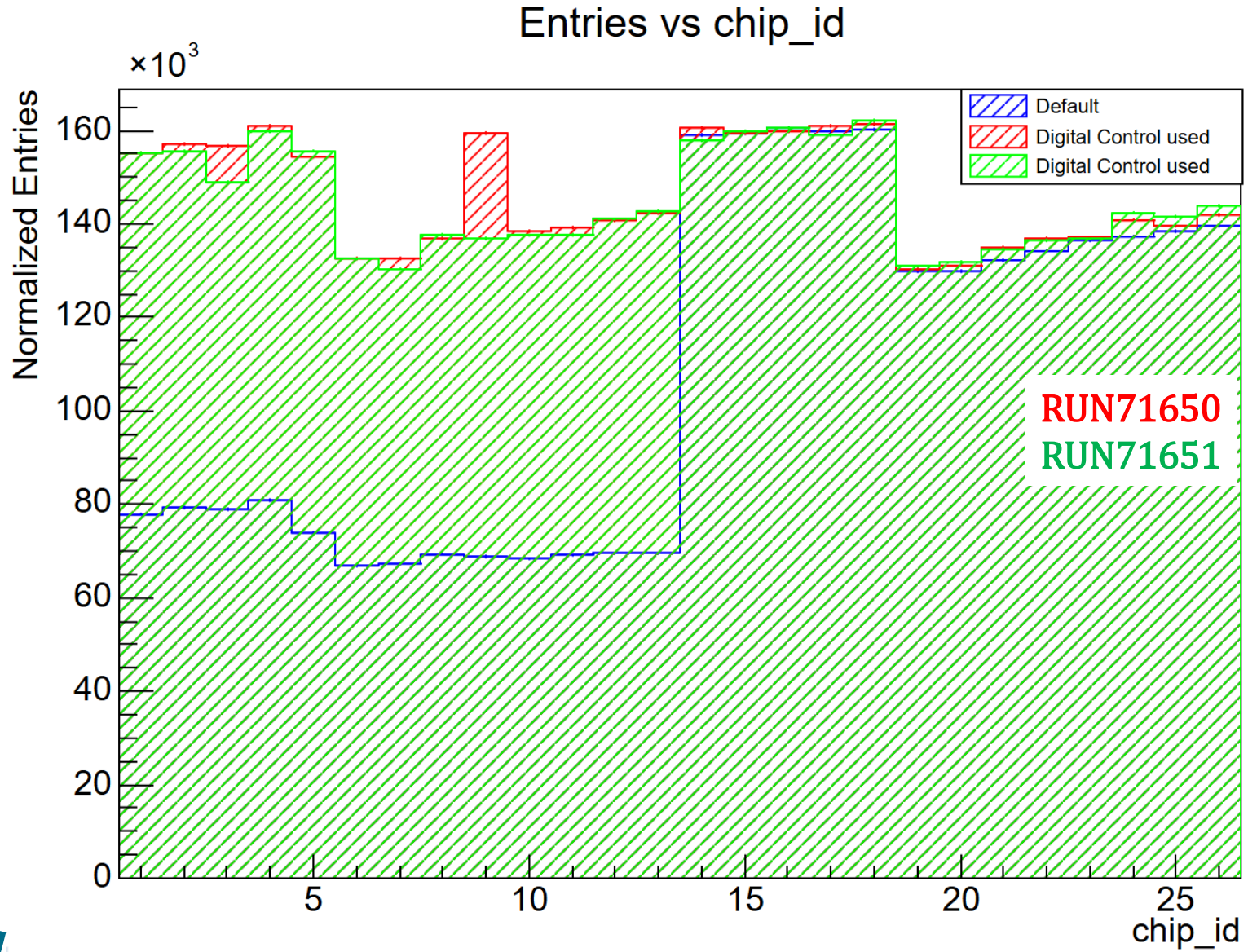


Haven't tried it before



Viewing half-entry-chips Run71650, 71651

Felix Server	0
pid	3001
module	6
chip id	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13

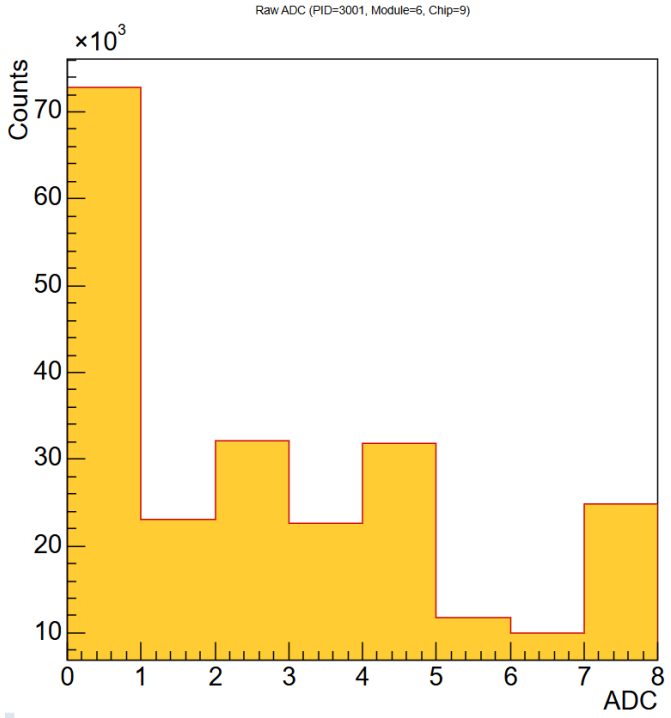


Check the adc distribution

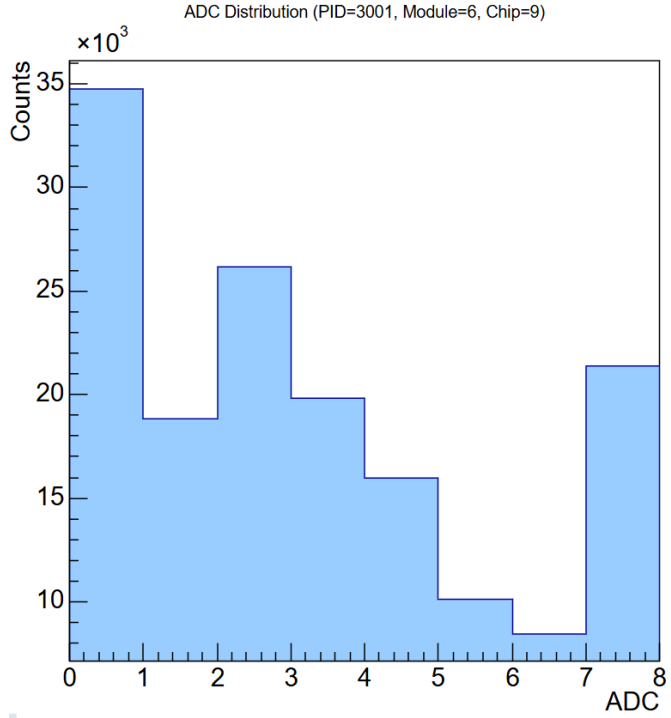
chips included INTT0&&module6 in Run71650, 71651

Felix Server	0
pid	3001
module	6
chip id	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13

RUN71650

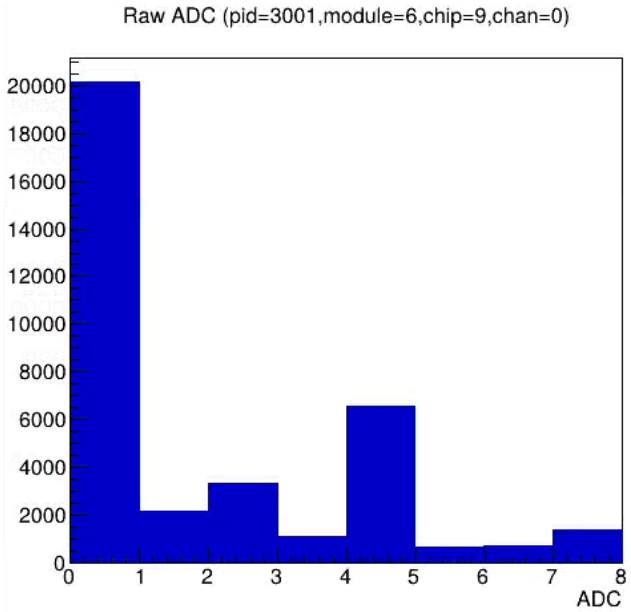


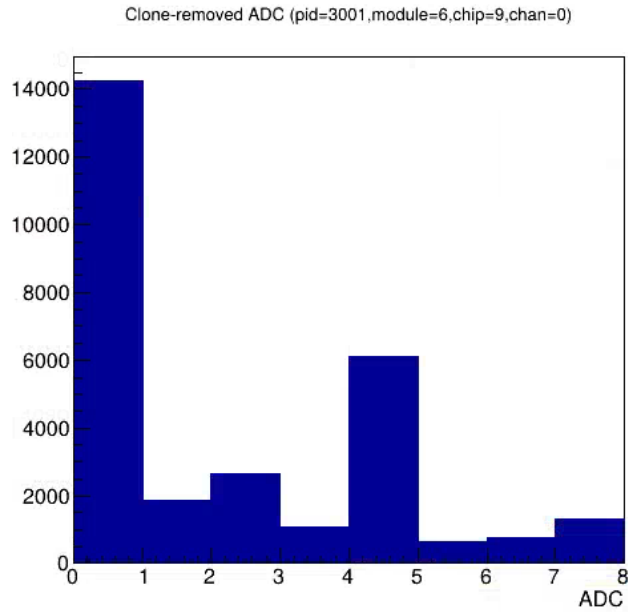
chan0, 127,
clone-hit cut

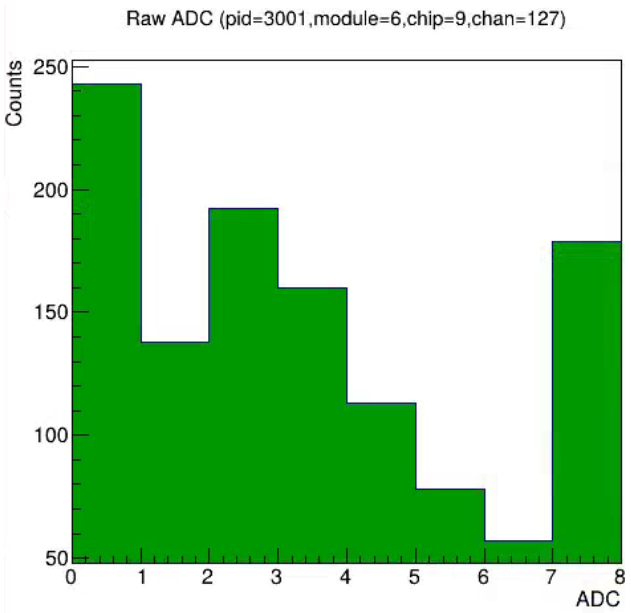


For more details

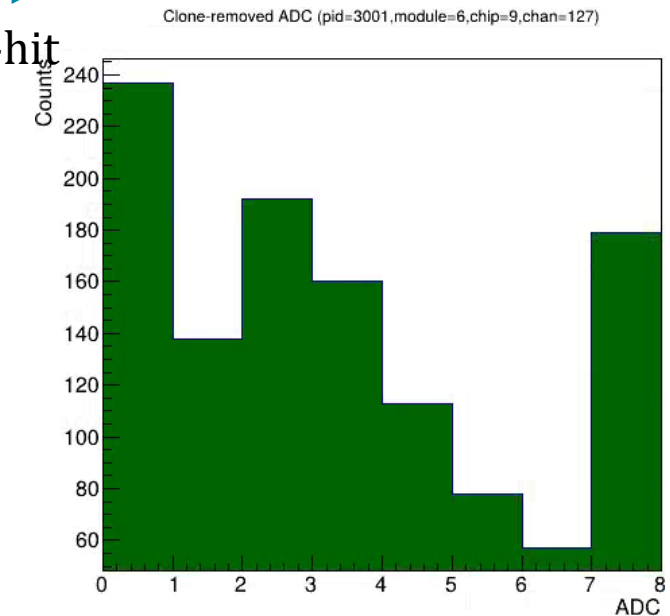
chips included INTT0&&module6 in Run71650, 71651







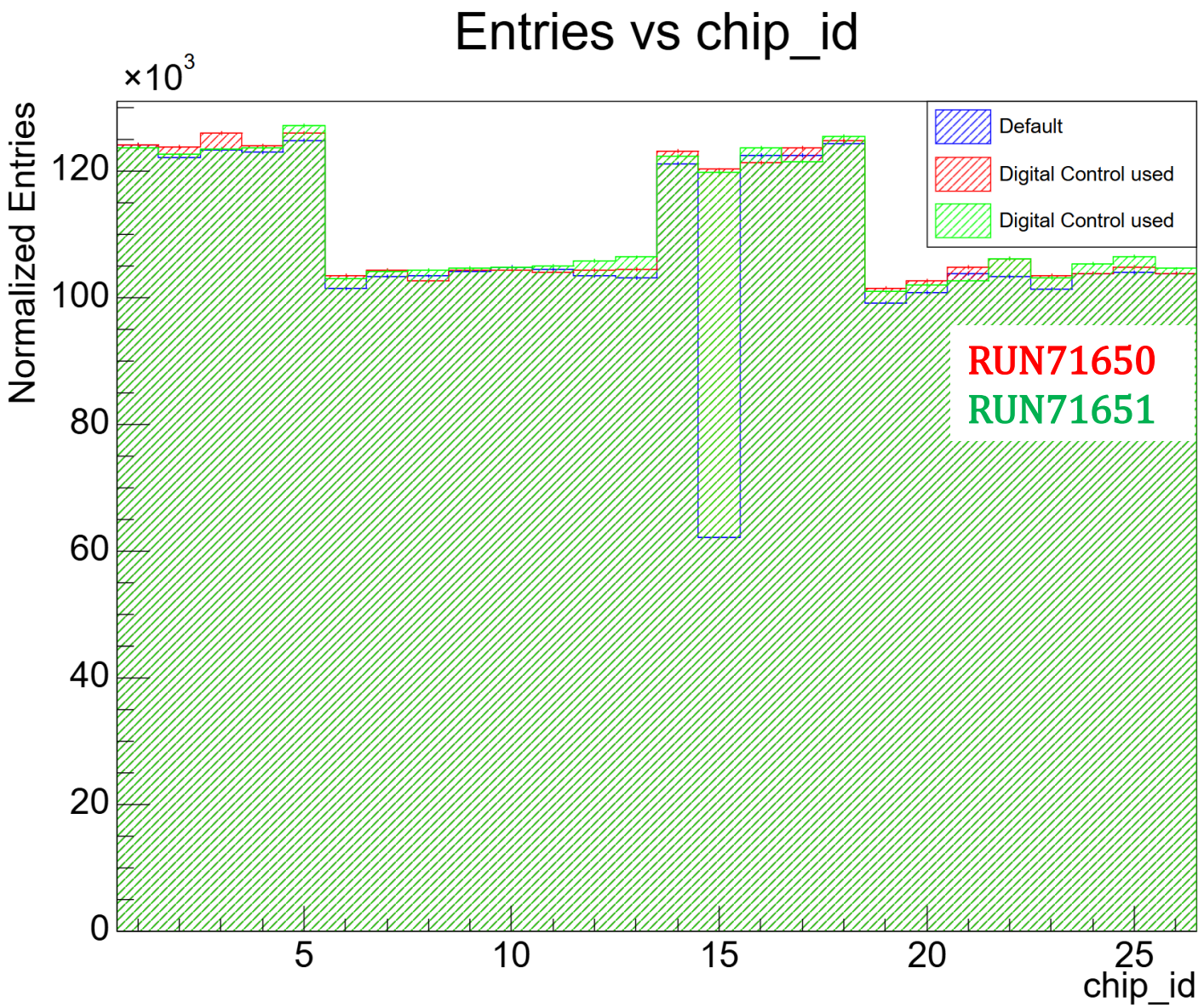
Removed clone-hit



The cause of noisy is not the clone-hit, but channel0

Viewing half-entry-chips Run71650, 71651

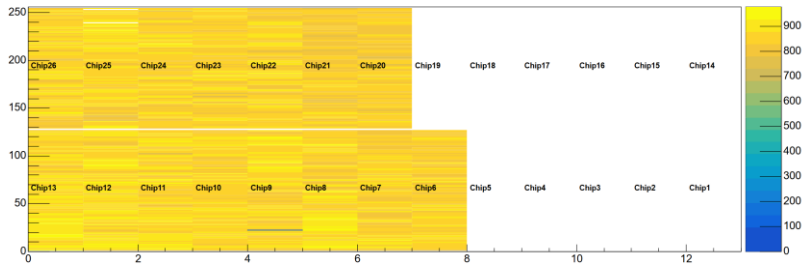
Felix Server	0
pid	3001
module	7
chip id	15



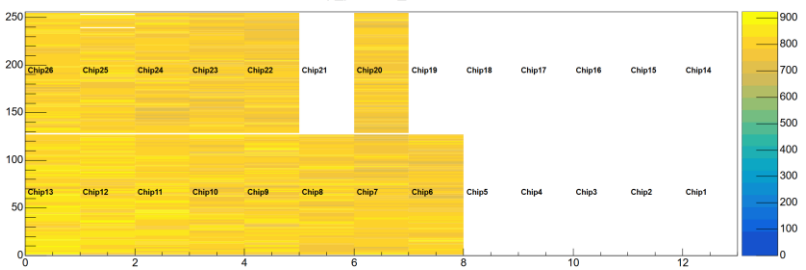
Viewing half-entry-chips Run71650, 71651

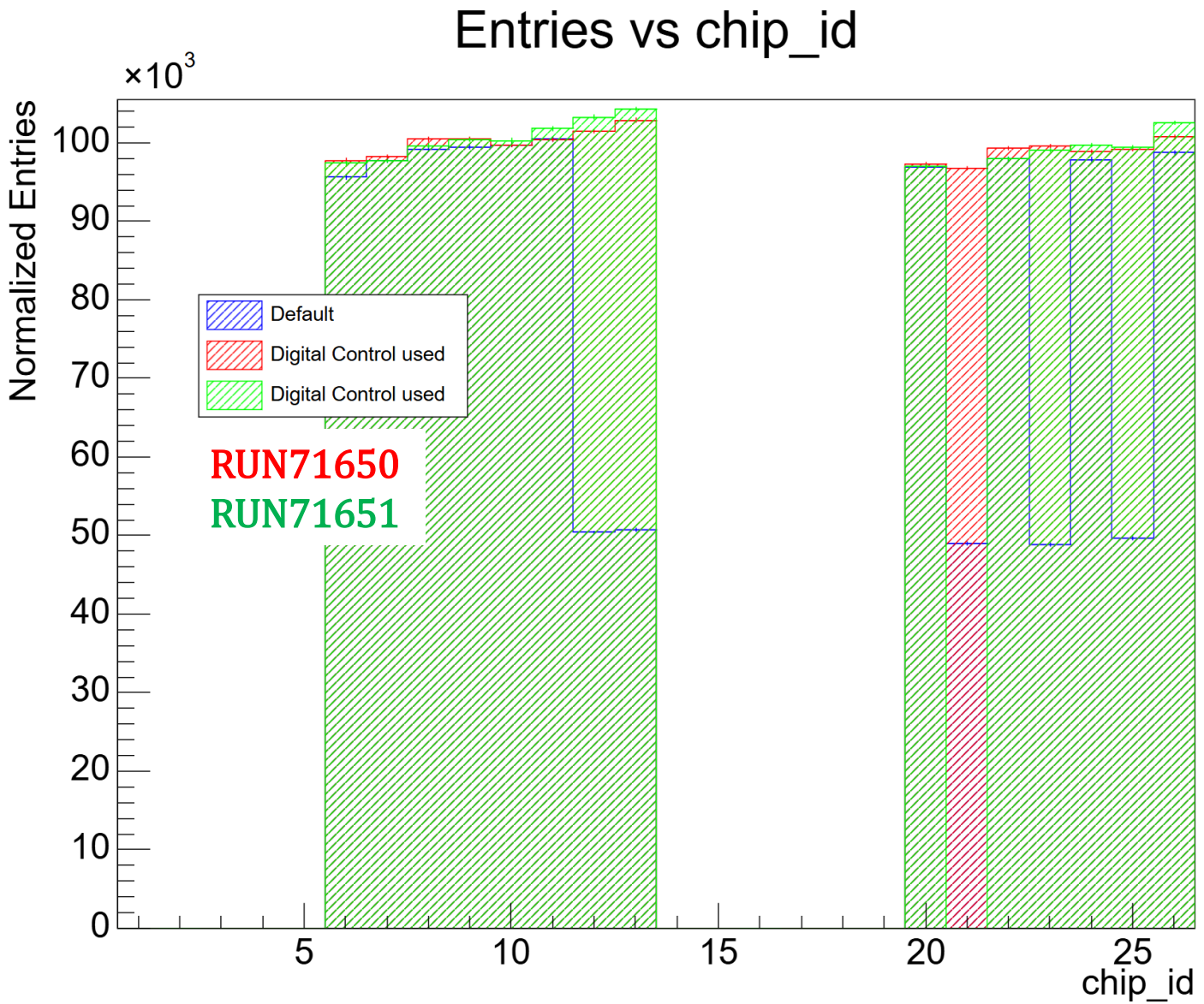
Felix Server	3
pid	3004
module	13
chip id	21, 23, 25

RUN71650

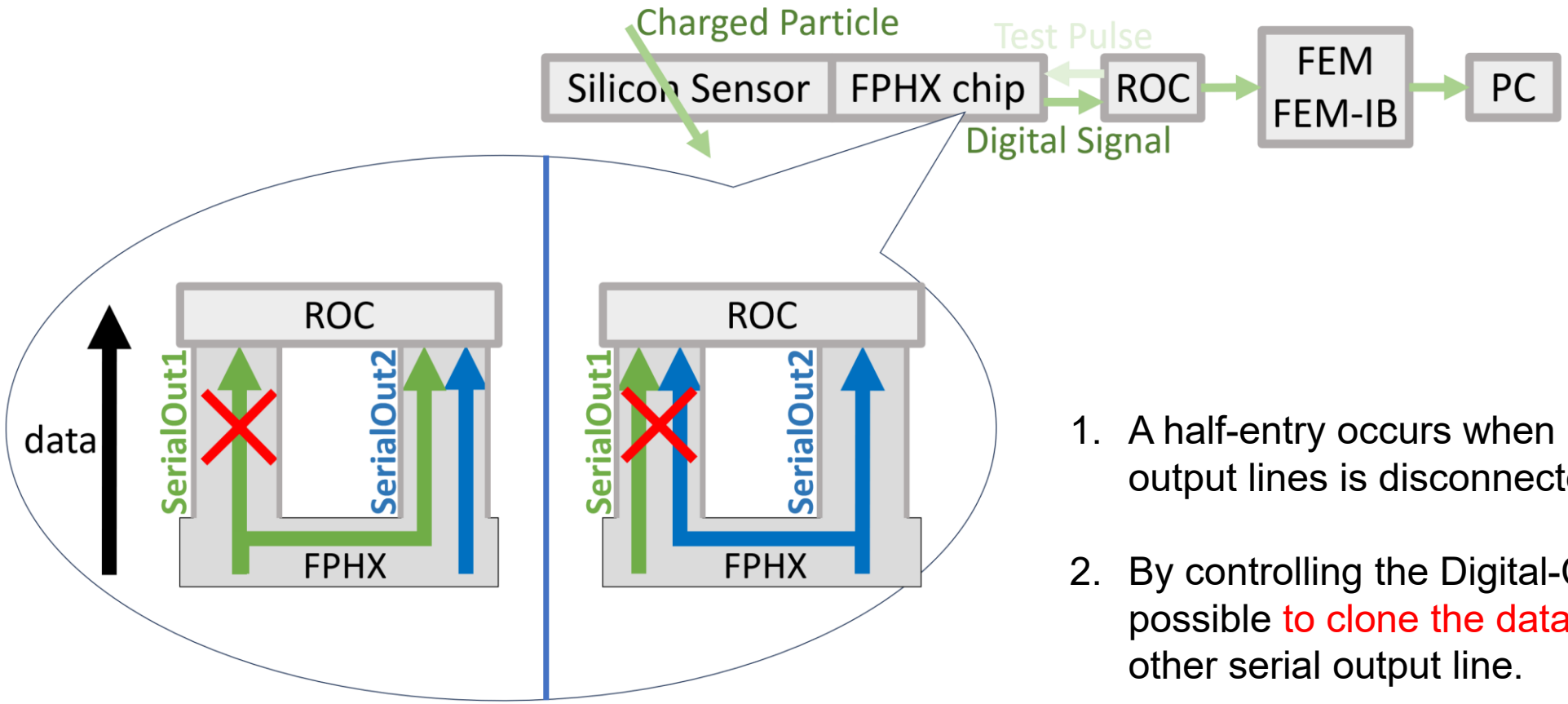


RUN71651





About unstable chips in INTT3&&module13



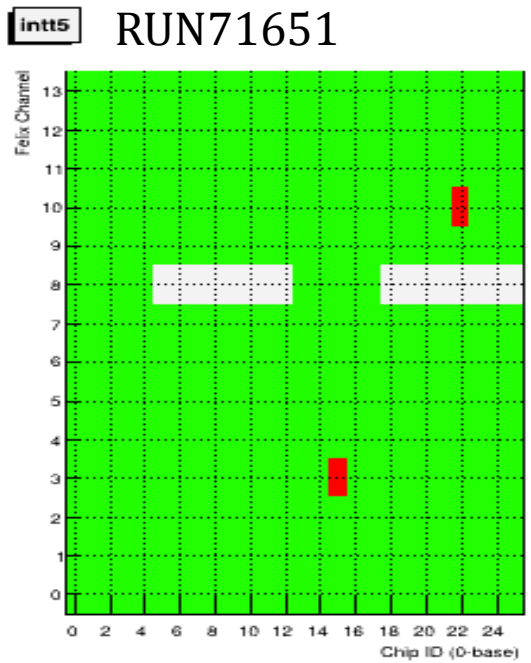
1. A half-entry occurs when one of the two serial output lines is disconnected from FPHX to ROC.

2. By controlling the Digital-Control parameters, it is possible to clone the data and send it through the other serial output line.

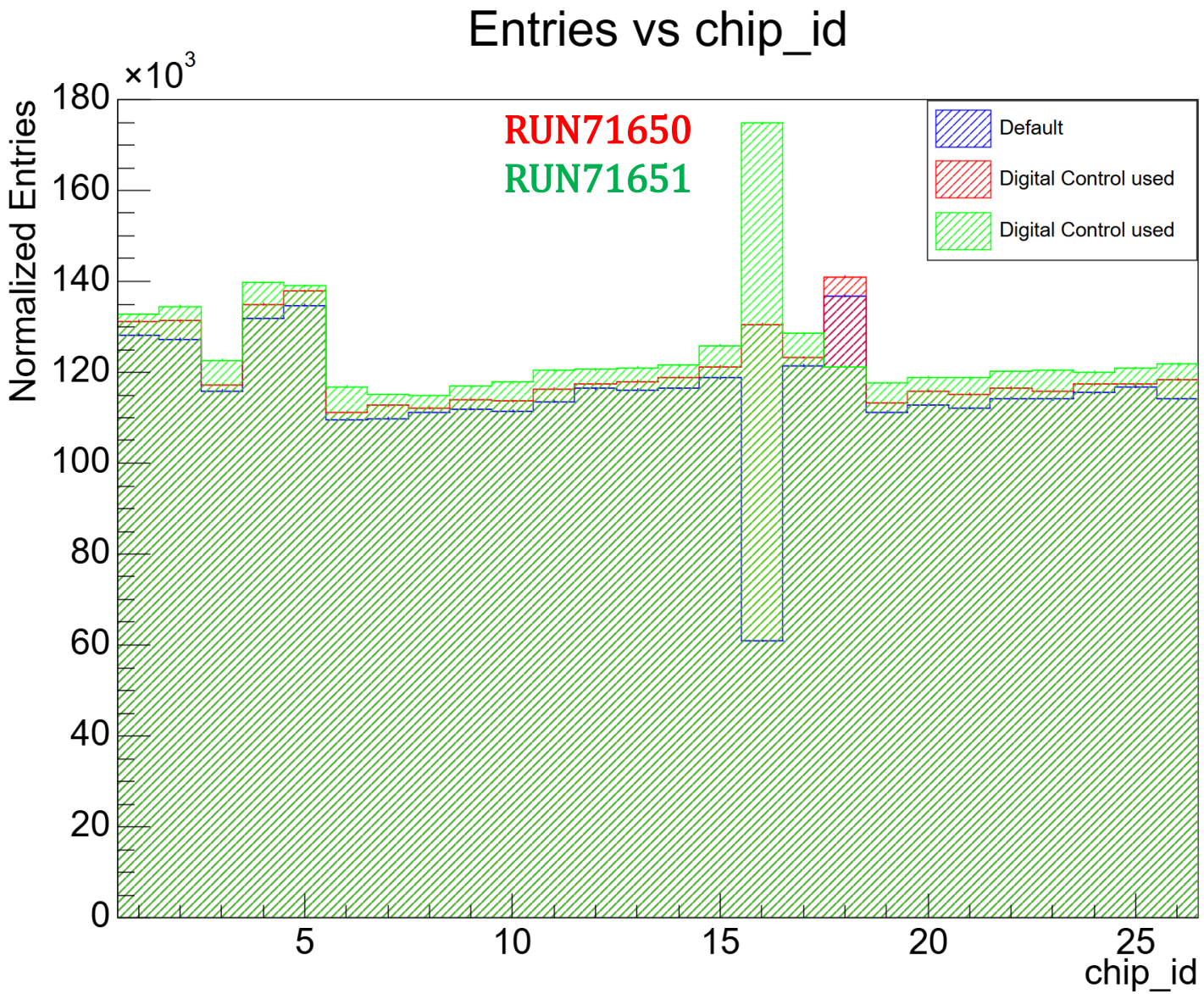
3. If the disconnected line and the cloned direction match, the number of entries is expected to recover to normal. If they do not match, the half-entry condition is expected to remain.

Viewing half-entry-chips Run71650, 71651

Felix Server	5
pid	3006
module	3
chip id	16

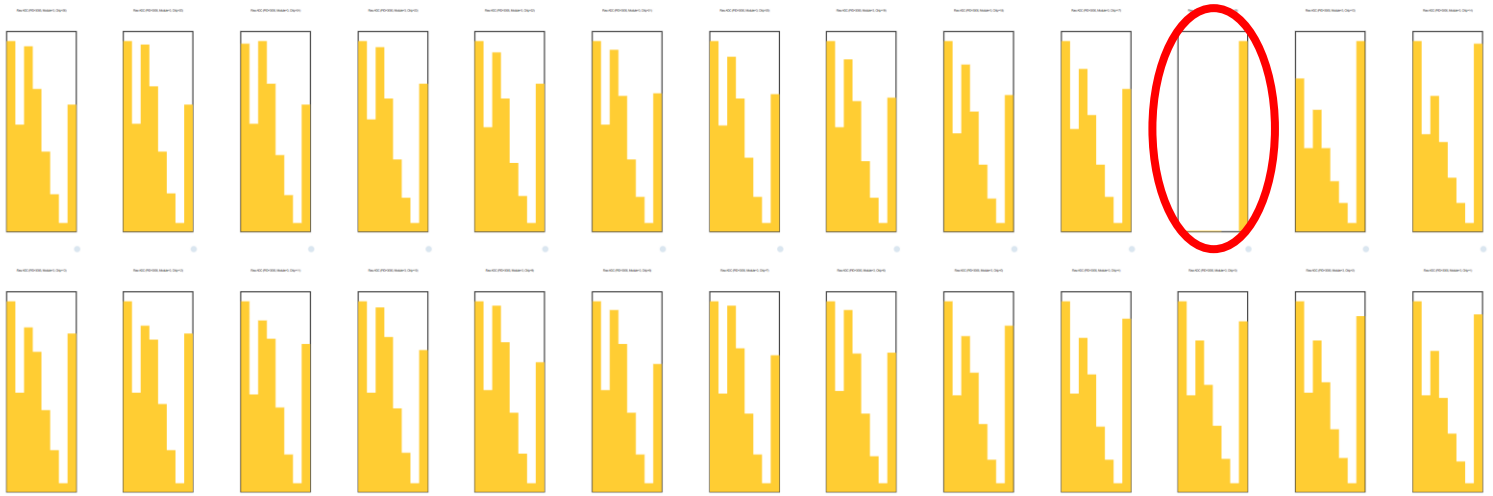


Check the adc distribution

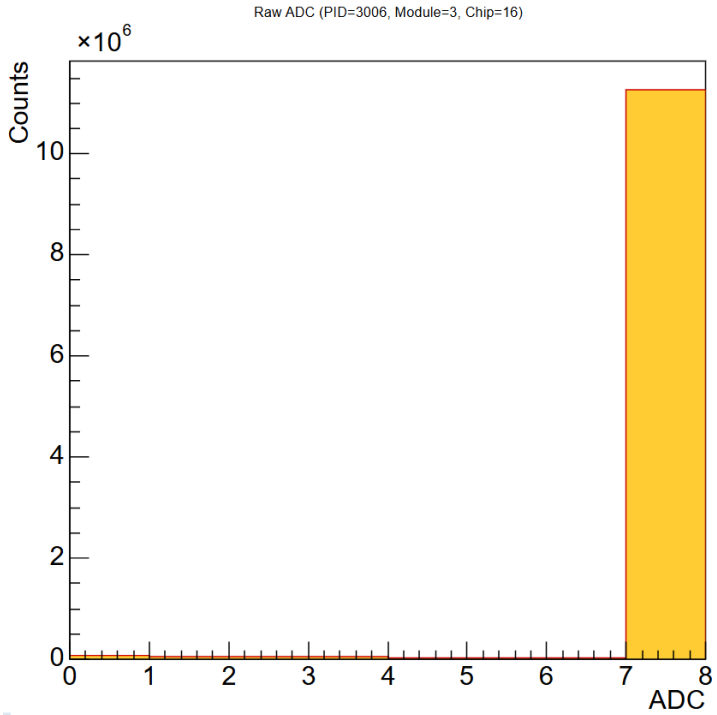


chips included INTT5&&module3 in Run71650, 71651

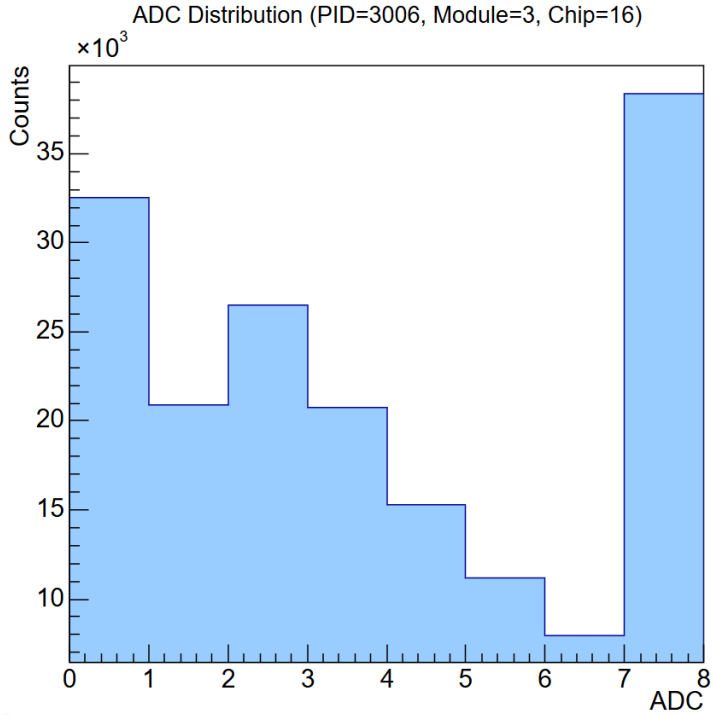
Felix Server	5
pid	3006
module	3
chip id	16



RUN71651

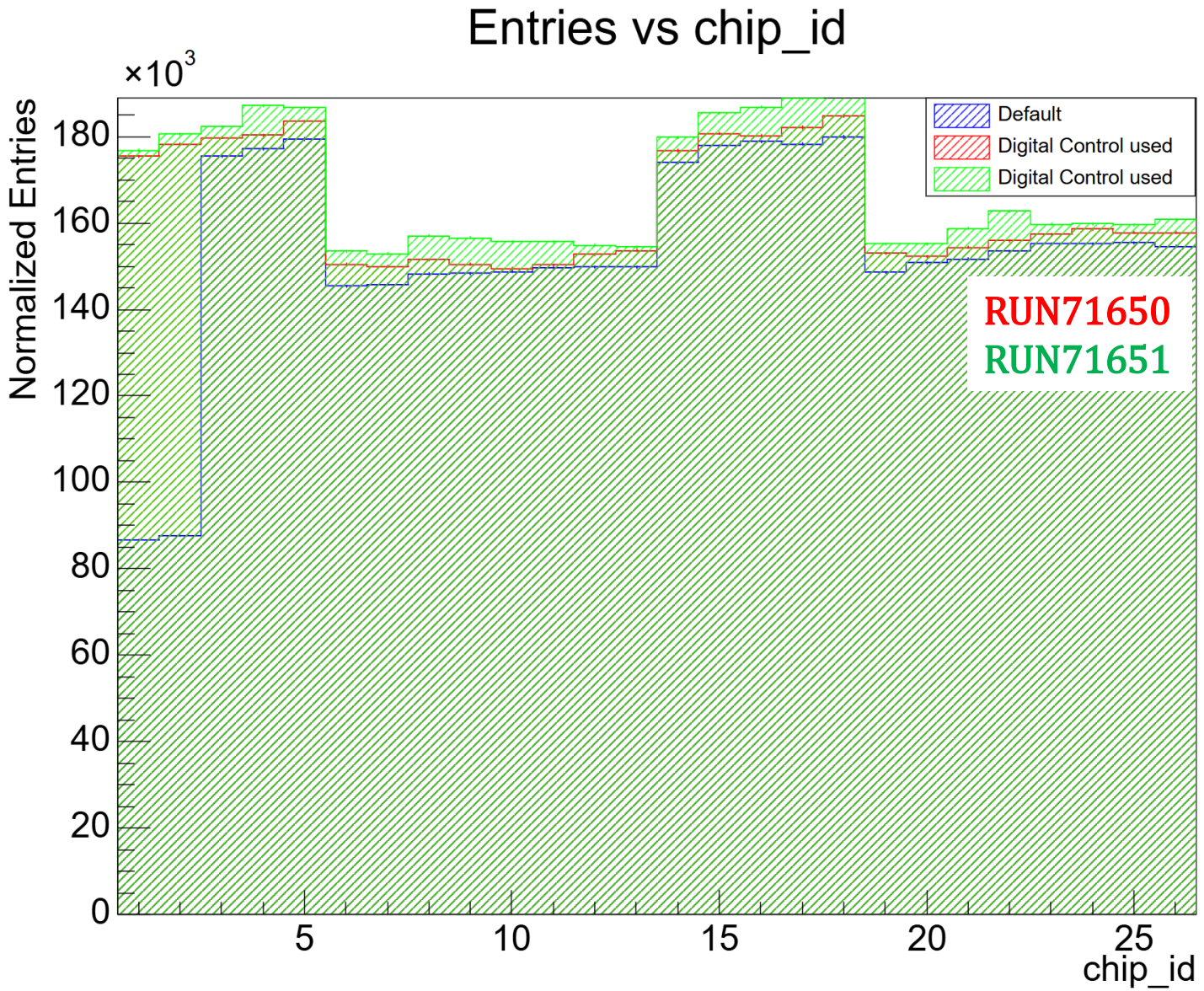


chan0, 127, clone-hit cut



Viewing half-entry-chips Run71650, 71651

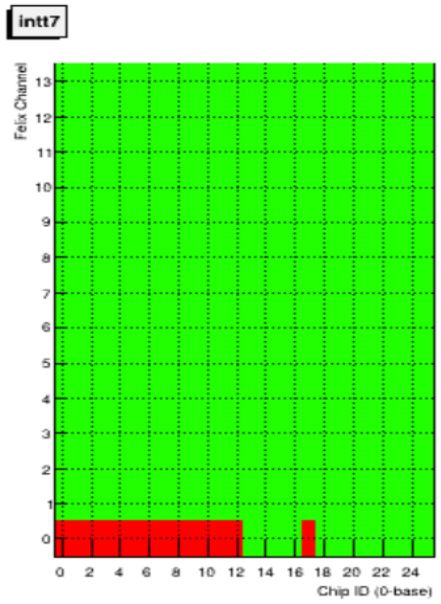
Felix Server	7
pid	3008
module	1
chip id	1, 2



About INTT7&&module0

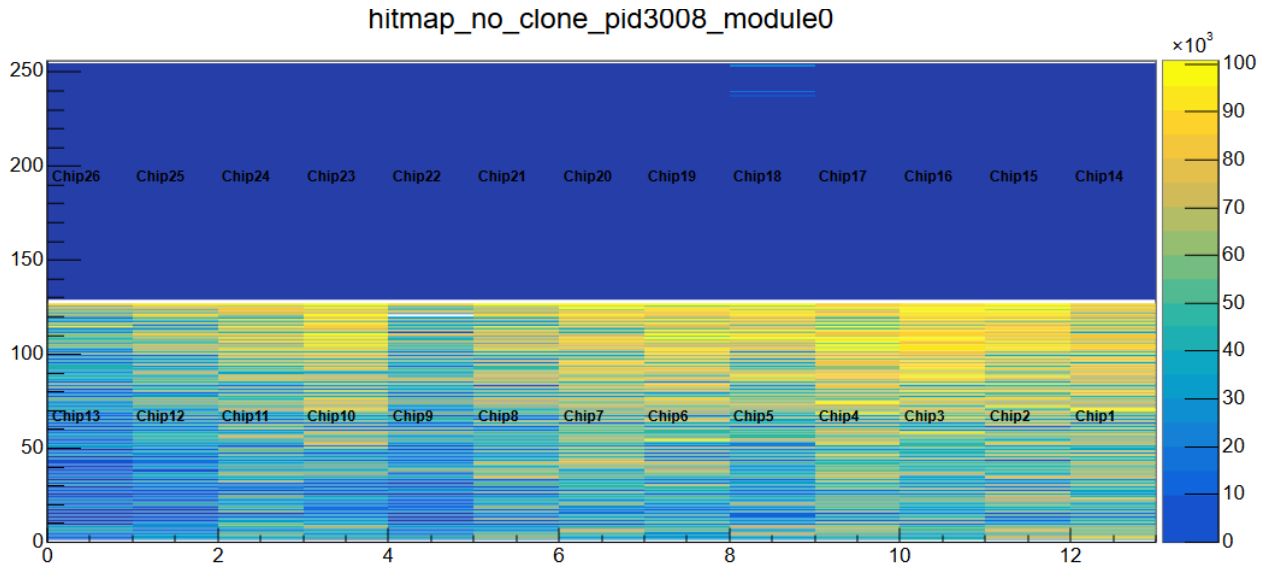
About hot-chips of INTT7

Felix Server	7
pid	3008
module	0
chip id	1, 2, 3, 4, 5, 7, 9, 11, 13, 14, 15, 16, 17, 18, 20, 22, 24, 26

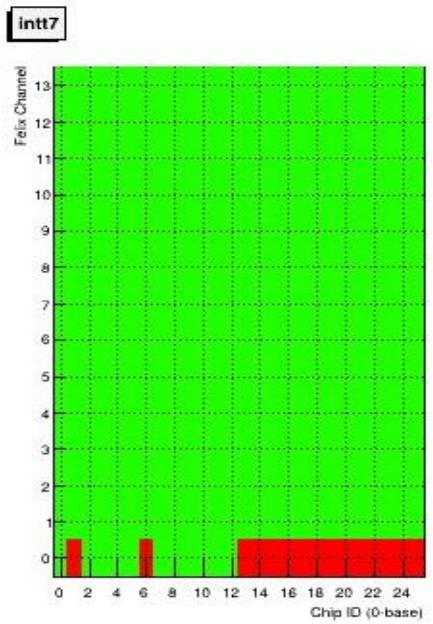


Intt Hit Map

Run 71618, Events: 37632386, Thu Jul 31 21:10:40 2025

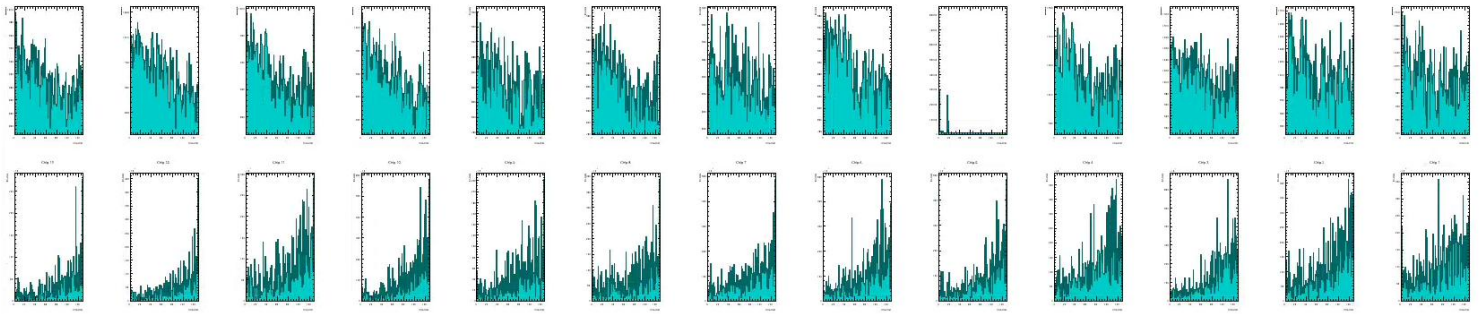


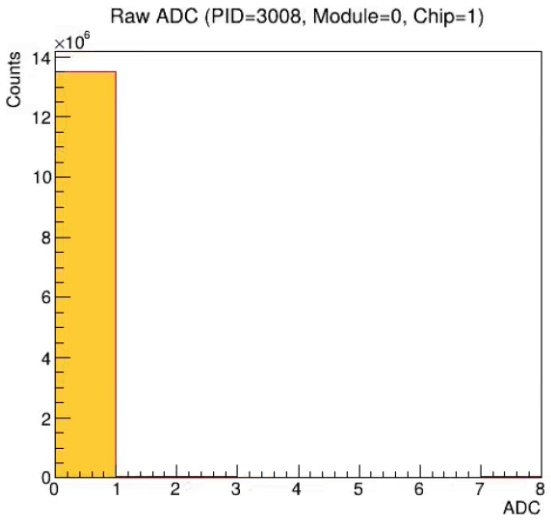
About hot-chips of INTT7



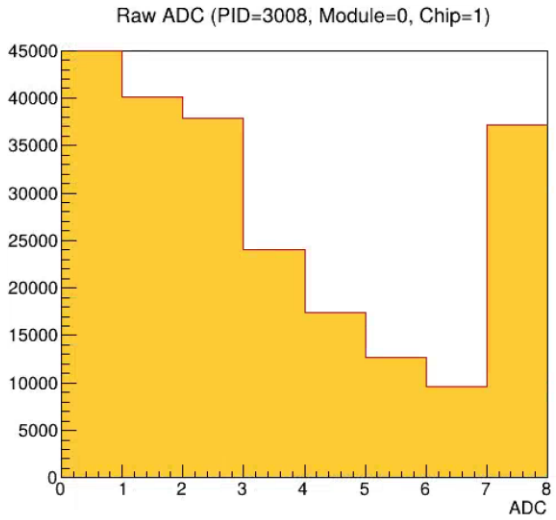
ADC distribution

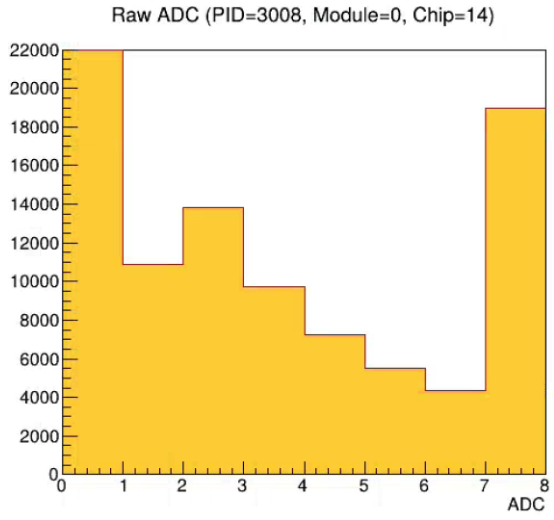
Entries per chan





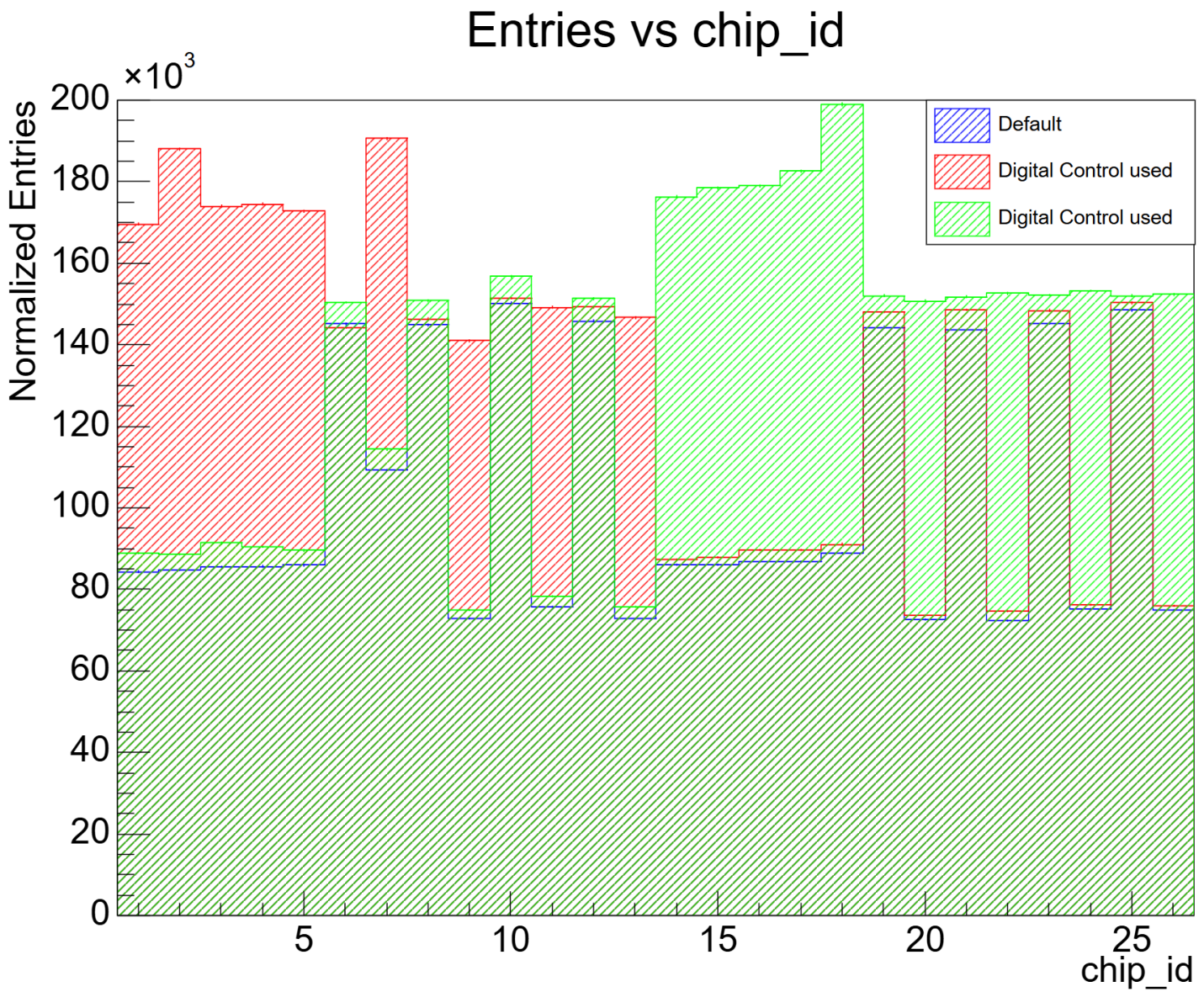
zoom





If grouped the chips in INTT7&&module0

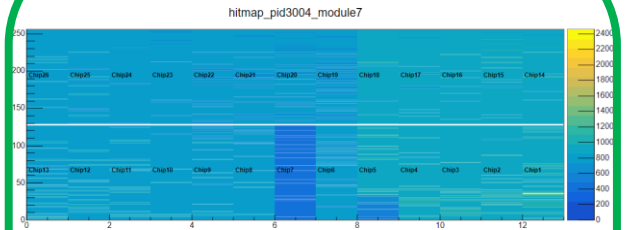
Felix Server	7
pid	3008
module	0
chip id	1, 2, 3, 4, 5, 7, 9, 11, 13, 14, 15, 16, 17, 18, 20, 22, 24, 26

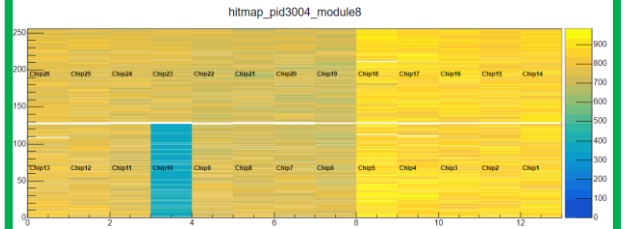


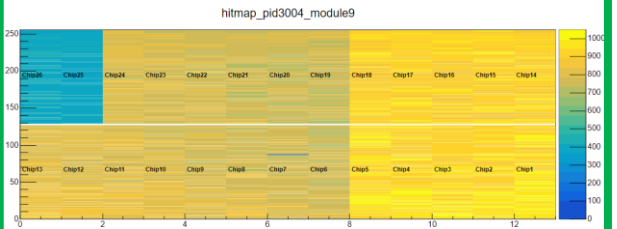
Unstable half-entry

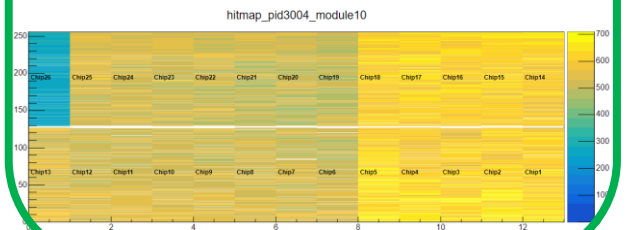
New half-entry-chips

RUN69260

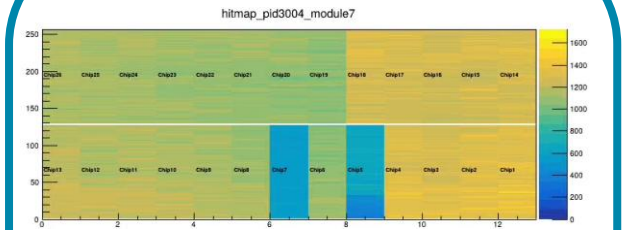


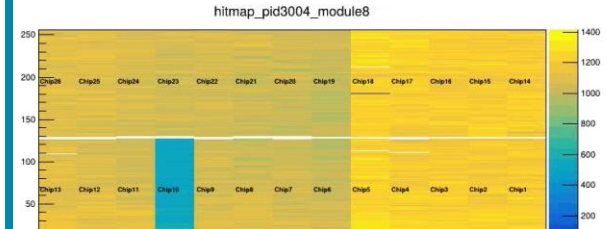


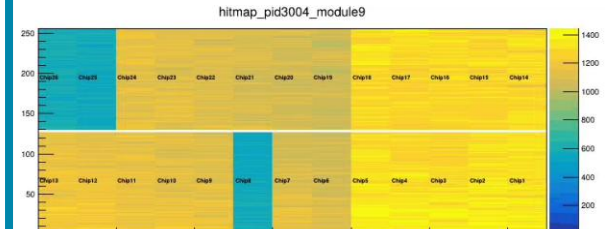


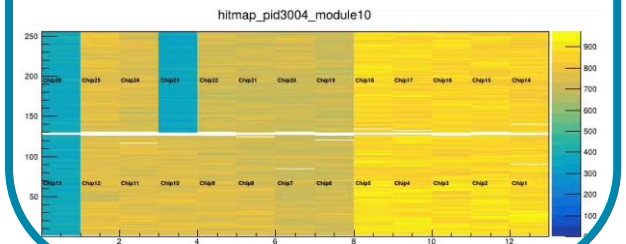


RUN69268

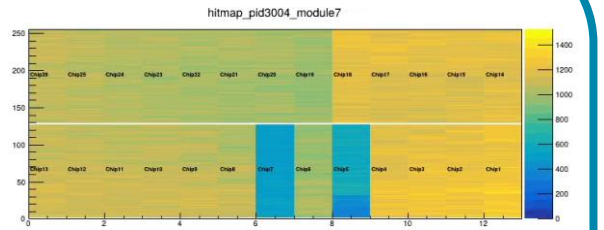


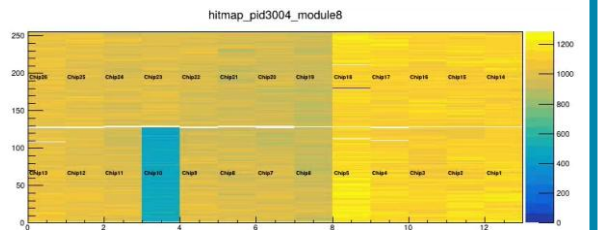


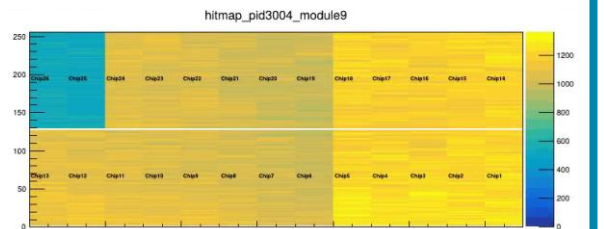


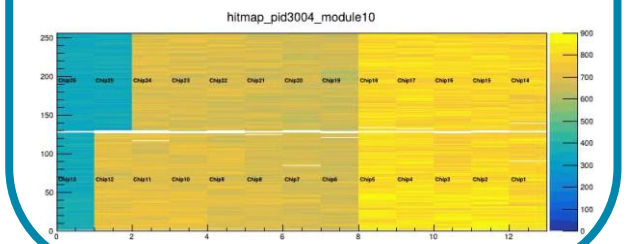


RUN69268

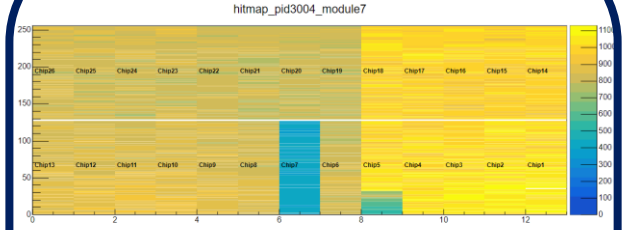


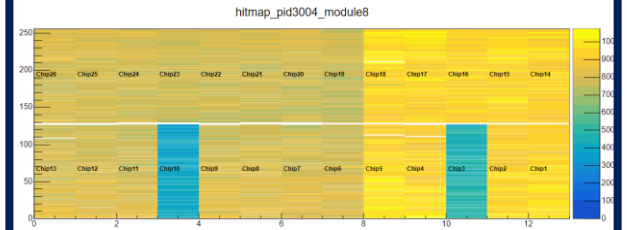


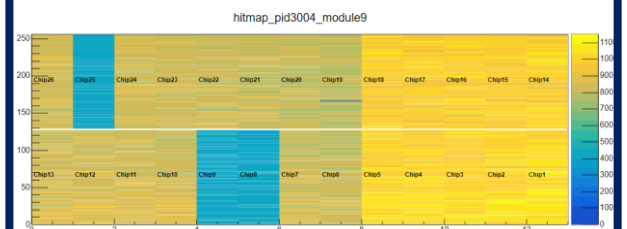


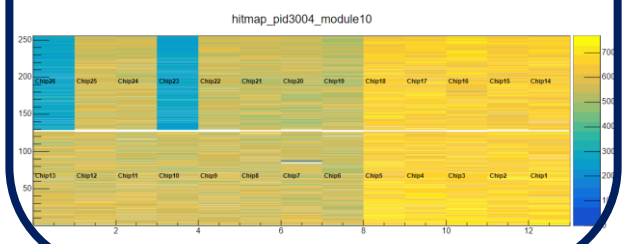


RUN69281



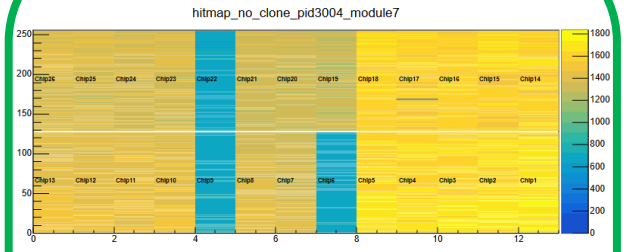


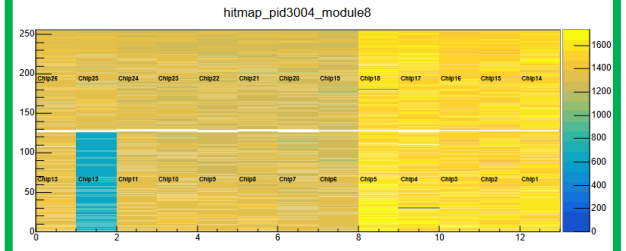


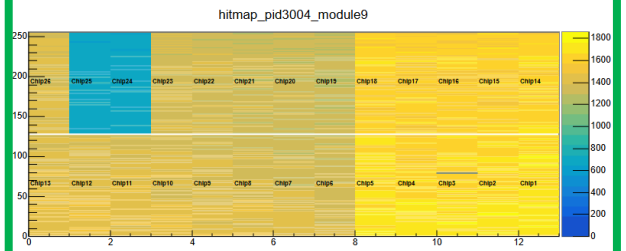


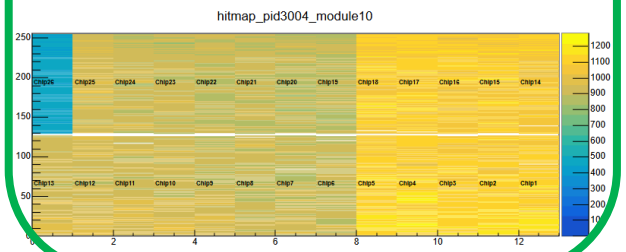
New half-entry-chips

RUN71618

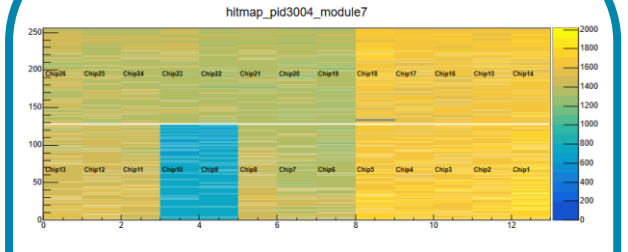


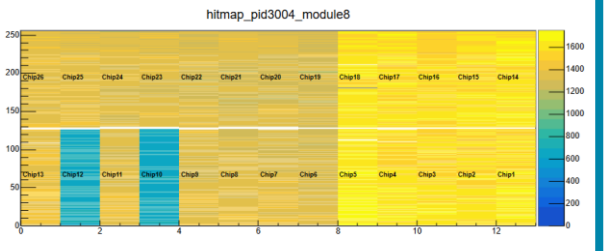


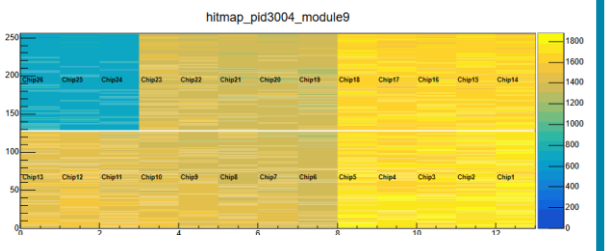


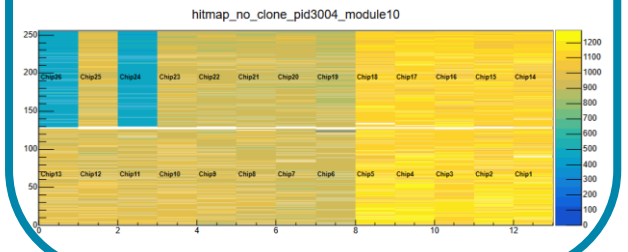


RUN71649

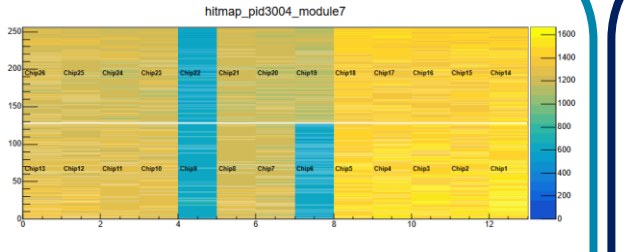


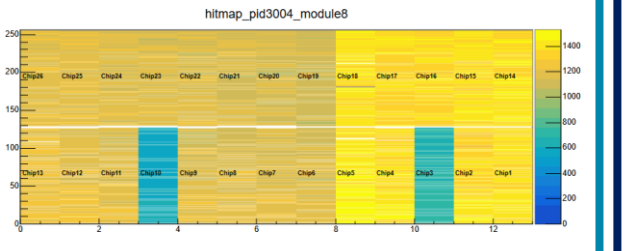


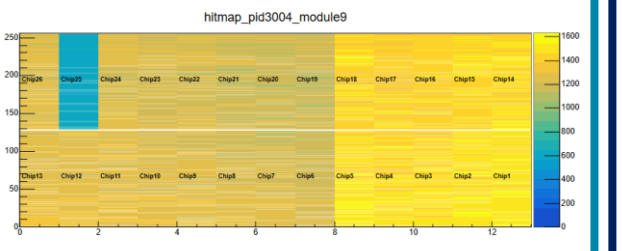


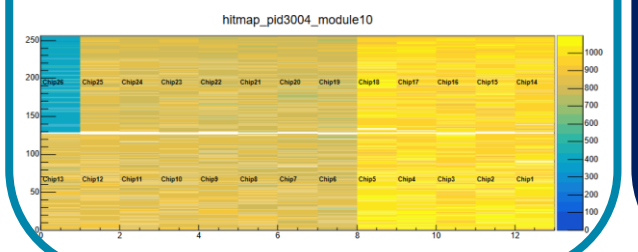


RUN71650

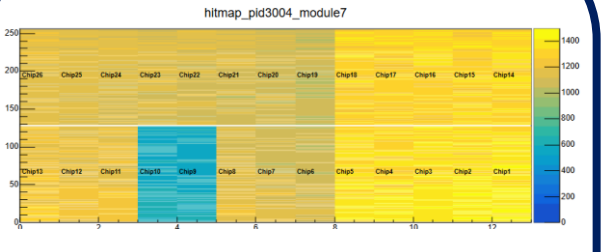


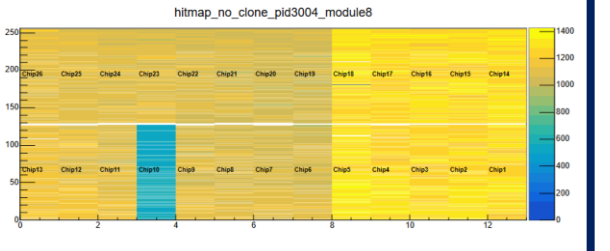


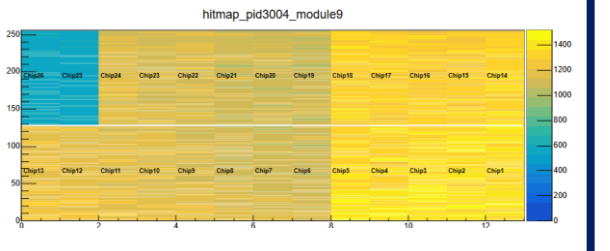


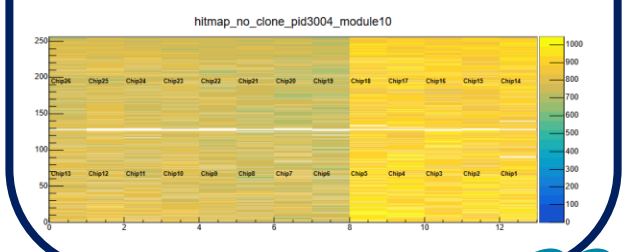


RUN71651









New half-entry-chips

・New half-entry-chips were recently identified.

・Even data not using digital-control can be viewed. And, also it is unstable half-entry with no reproducibility.

・It viewed in INTT3(packet_id=3004) && module 7～10.

Summary

Half-entry-chips chart(38 half-entry-chips)

Felix Server	0	0	3	5	7	7
pid	3001	3001	3004	3006	3008	3008
module	6	7	13	3	0	1
chip id	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	15	21, 23, 25	16	1, 2, 3, 4, 5, 7, 9, 11, 13, 14, 15, 16, 17, 18, 20, 22, 24, 26	1, 2

・20 chips / 38 chips are perfectly recovered with digital-control
(Seems to be less, but problematic only the half-ladder at intt7&module0)

・When we used digital-control, Hot chips are appeared in intt7.
→ if divided it into 2 groups, both sides were successfully recovered.

・There are unstable half-entry-chips in intt3 these days from RUN68***.