

SiPixel Quality Q&A

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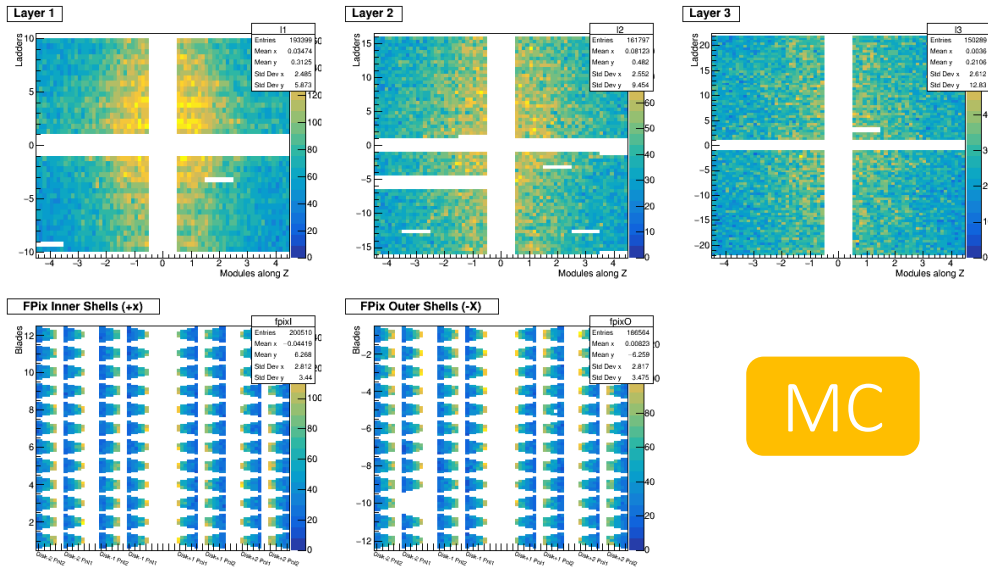
How can we make sure that the payload content is correct?

We are doing internal validation using occupancy plots (MC and data)

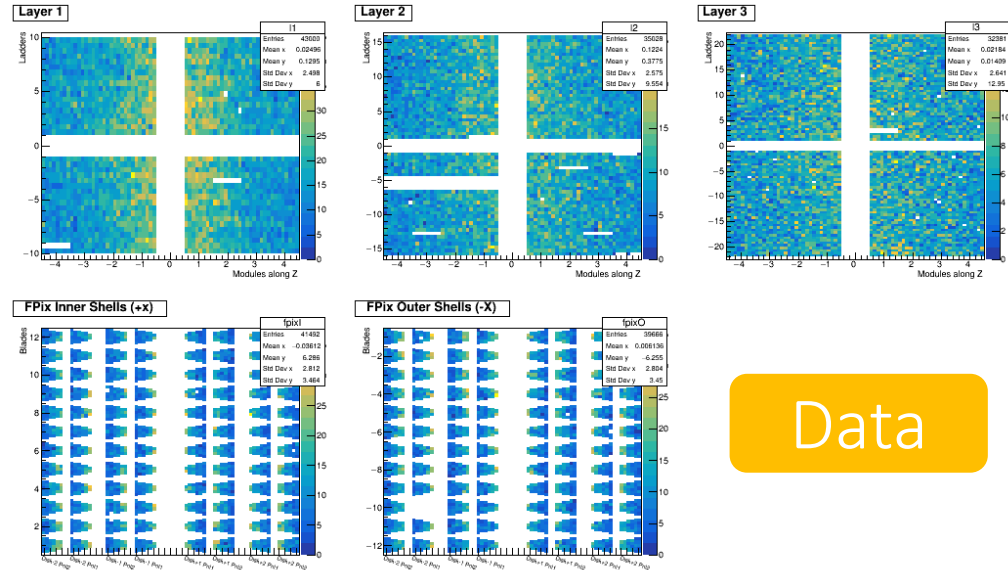
(a) MC plot: a perfect detector is simulated until the RAW step, then in the raw2digi the payload is applied → every hole in the occupancy map is due to the Quality

(b) data plot: plotting the occupancy from data that is in the given period

How can we make sure that the payload content is correct?

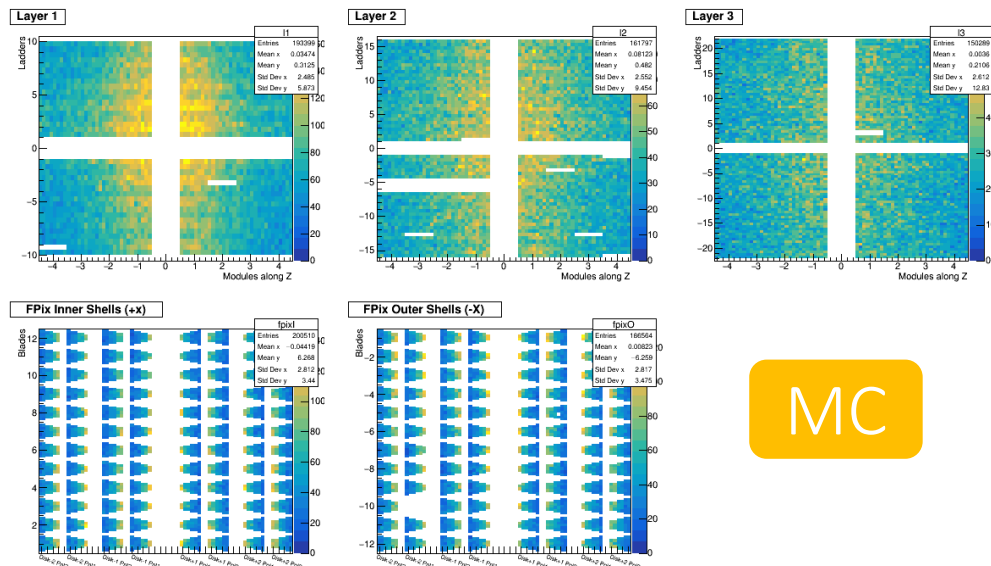


MC

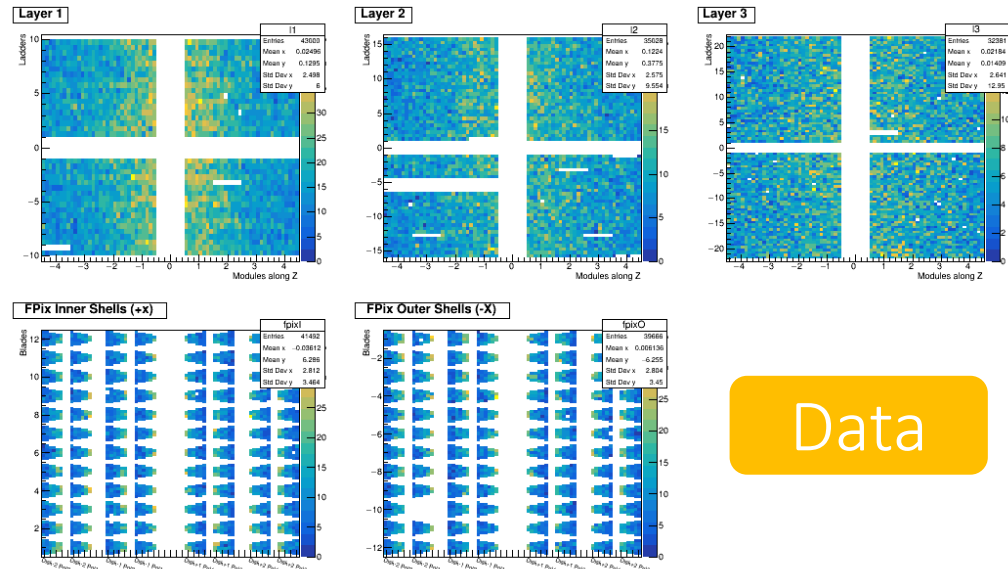


Data

How can we make sure that the payload content is correct?



MC



Data

(b) was not done in case of v36 → cause of the avalanche of questions

Solution: have to be more careful in the future

What is the effect on tracking?

The unit of SiPixelQuality is a ROC.

The Quality reader can differentiate between completely dead and partially dead modules ([link](#) and [link](#))

Thus the code is written like that tracking can use the working part of the module

What is the effect on tracking?

Quality has no effect on seeding

It disables the layer when looking for a valid hit during track finding

So a dead module will not contribute to the missing-hit count

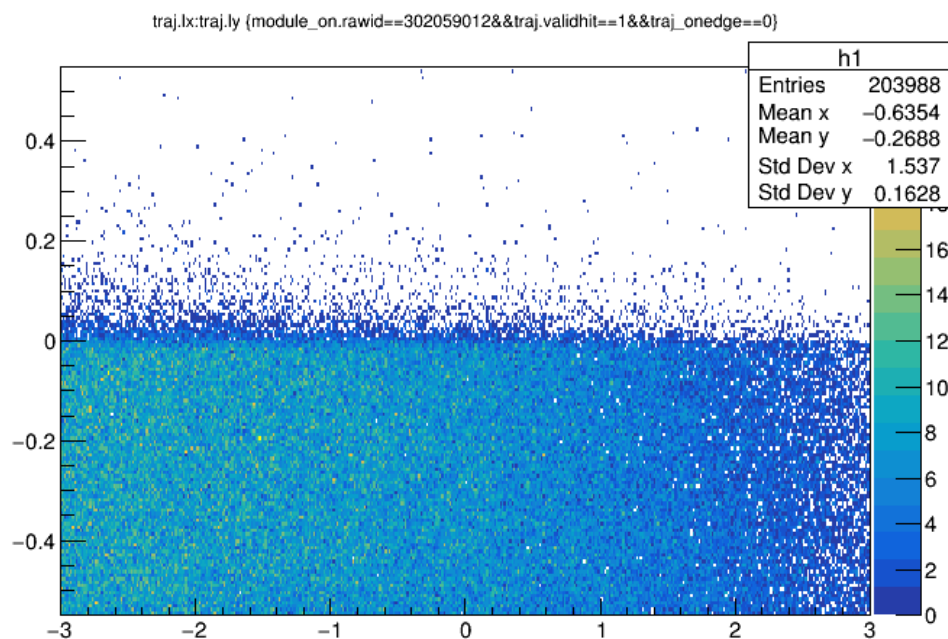
Therefore it will not discard the track if the limit is reached

What is the effect on tracking?

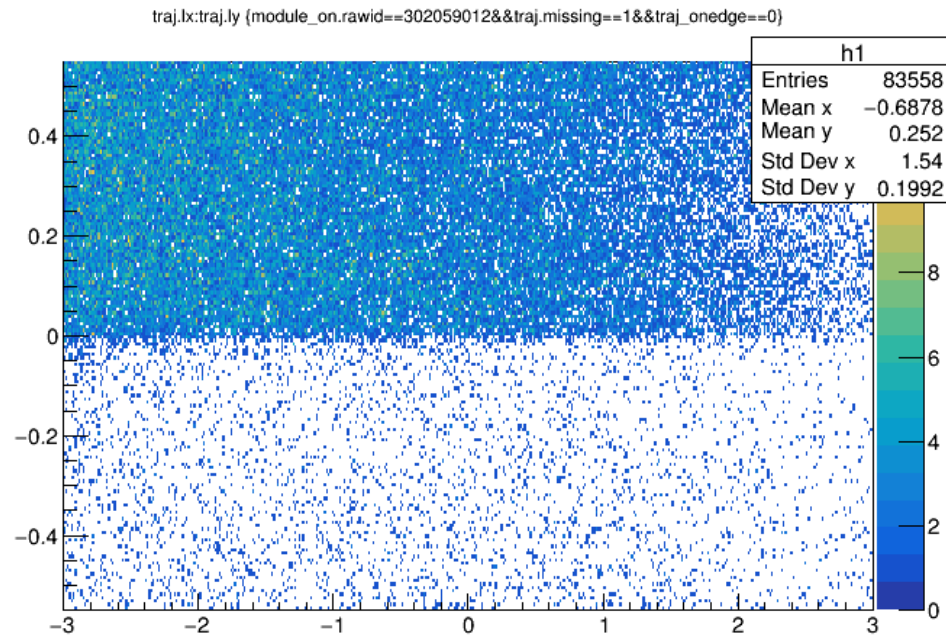
Three scenarios:

- 1) We have a new bad component but it is not included in the DB yet
- 2) We have a bad component and it is included in the DB already
- 3) A module is marked bad although it is working

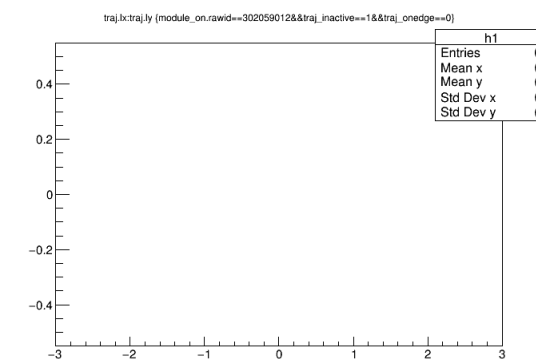
Tracking effect // Scenario 1)



valid hits



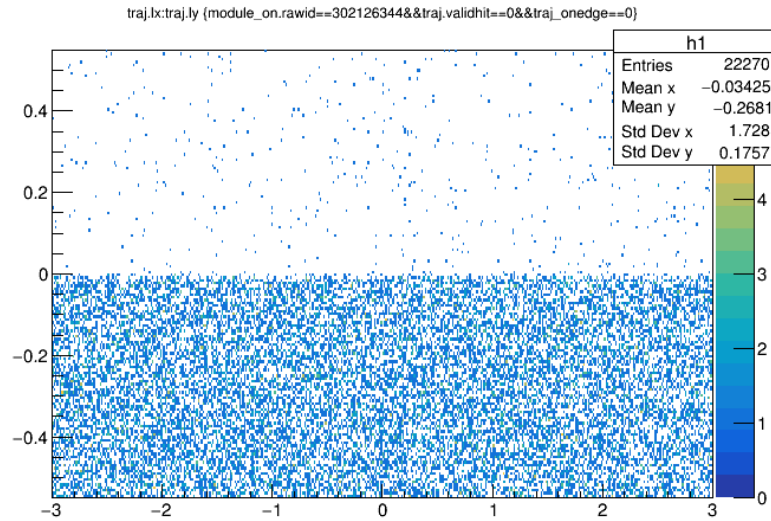
missing hits



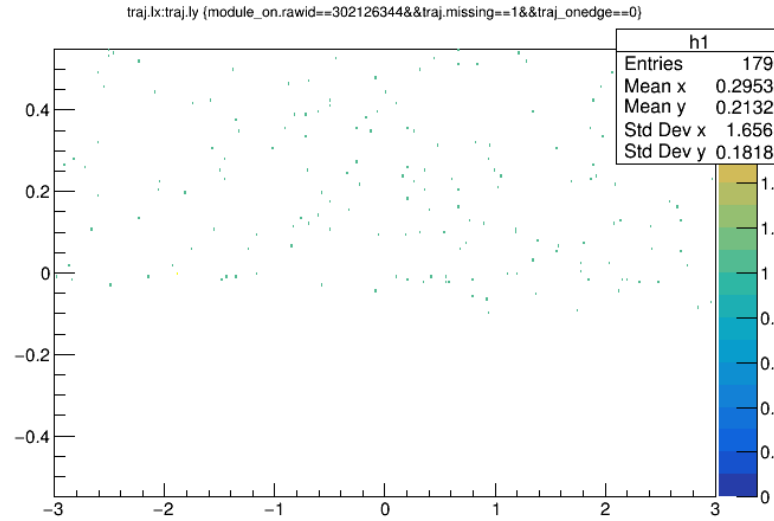
inactive hits

Since the quality is not (yet) applied → we have missing hits

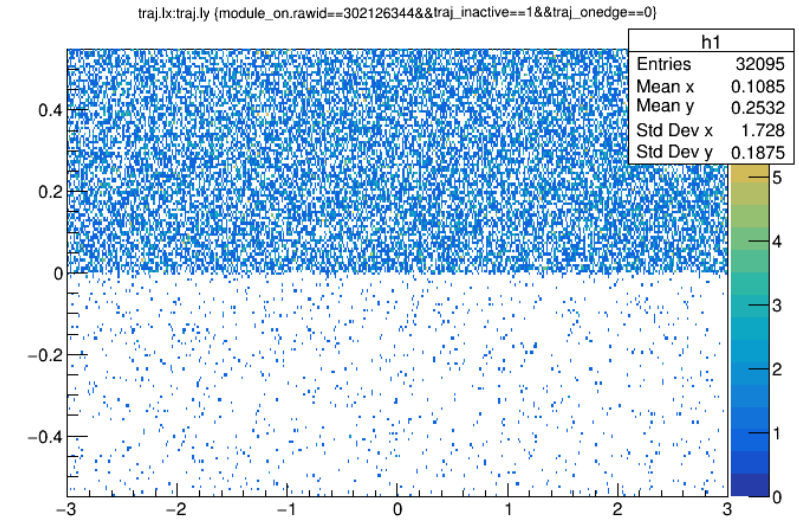
Tracking effect // Scenario 2)



valid hits



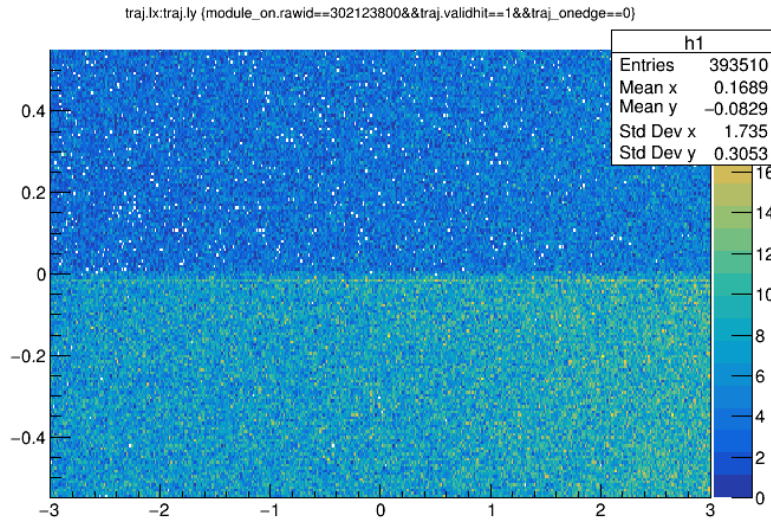
missing hits



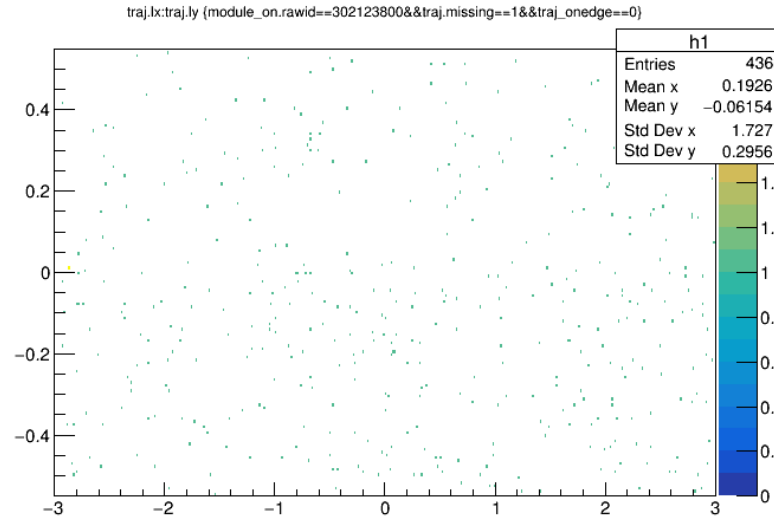
inactive hits

Since the quality is (already) applied → instead of missing hits we have inactive ones

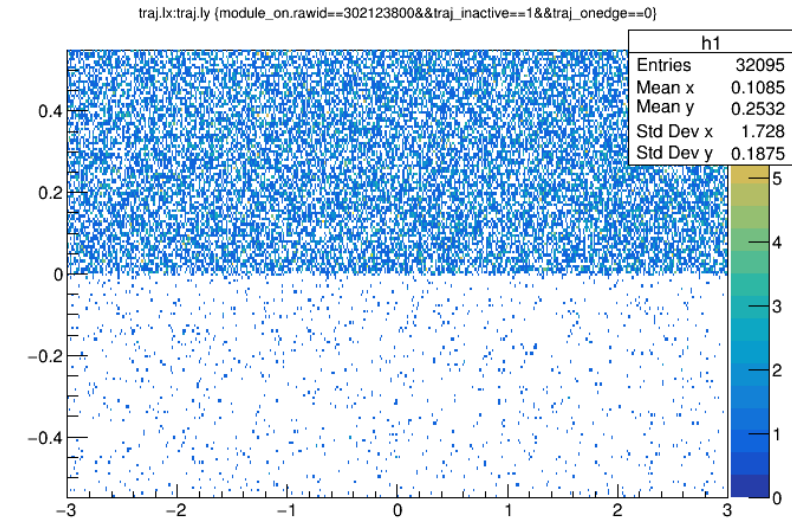
Tracking effect // Scenario 3)



valid hits



missing hits



inactive hits

Missing hits everywhere (only some)

Inactive hits where quality is applied

When should we update?

Is the change permanent?

Yes

- In 2012 and 2015 we even put ROCs
- Maybe the half module threshold is better

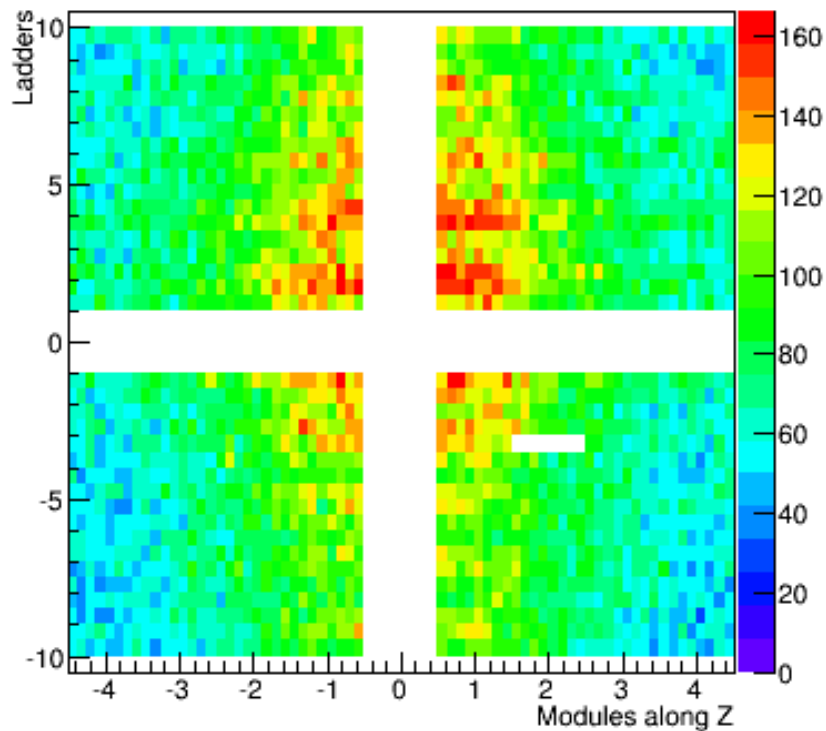
No

- In case if we know that it will be bad for more then a fill
- Threshold should be a whole module

Consistency of MC payload with data?

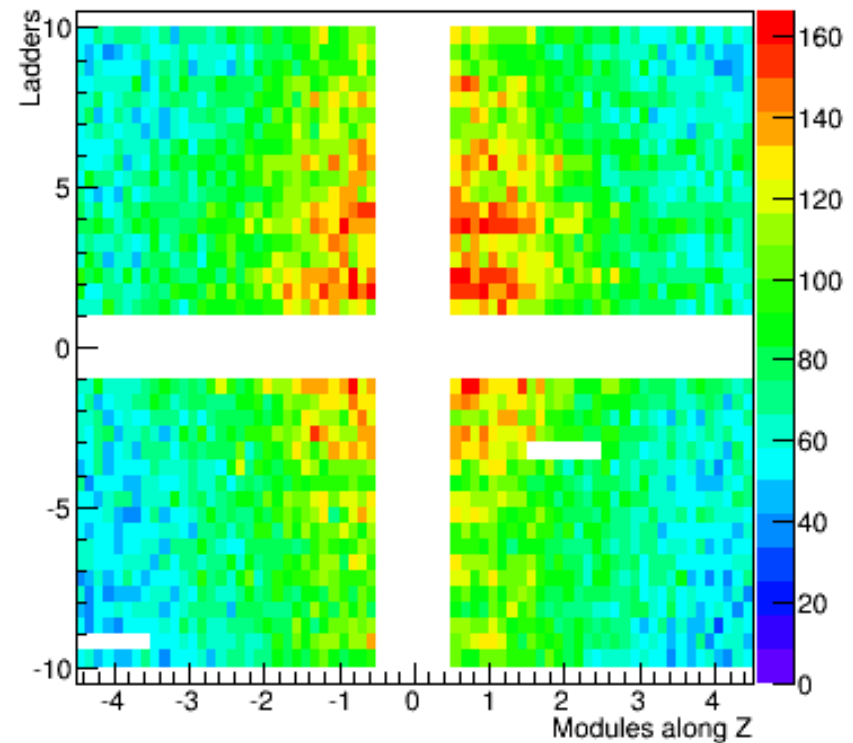
Simulation

Layer 1



Current detector status

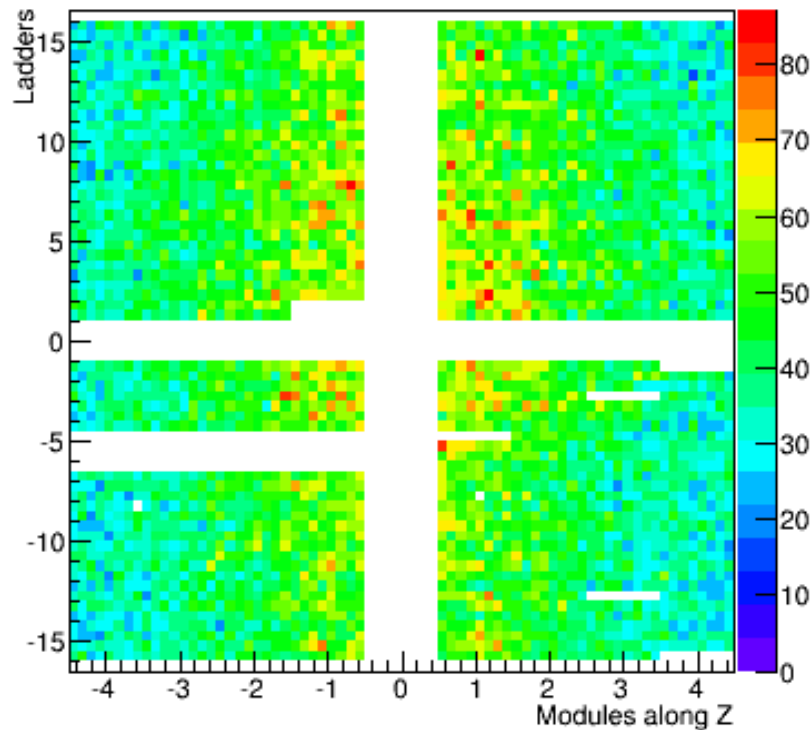
Layer 1



Consistency of MC payload with data?

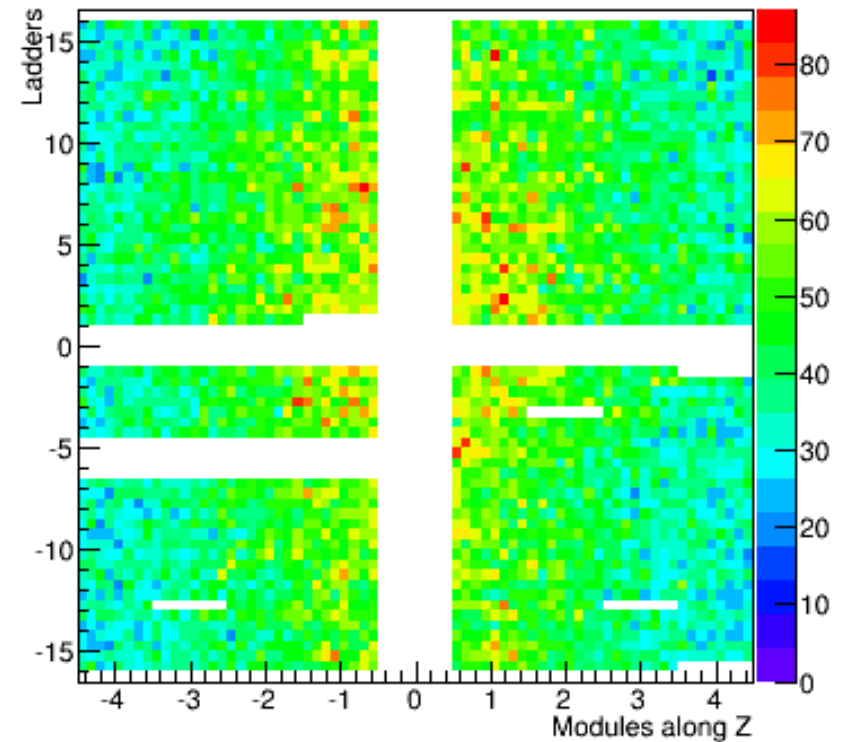
Simulation

Layer 2



Current detector status

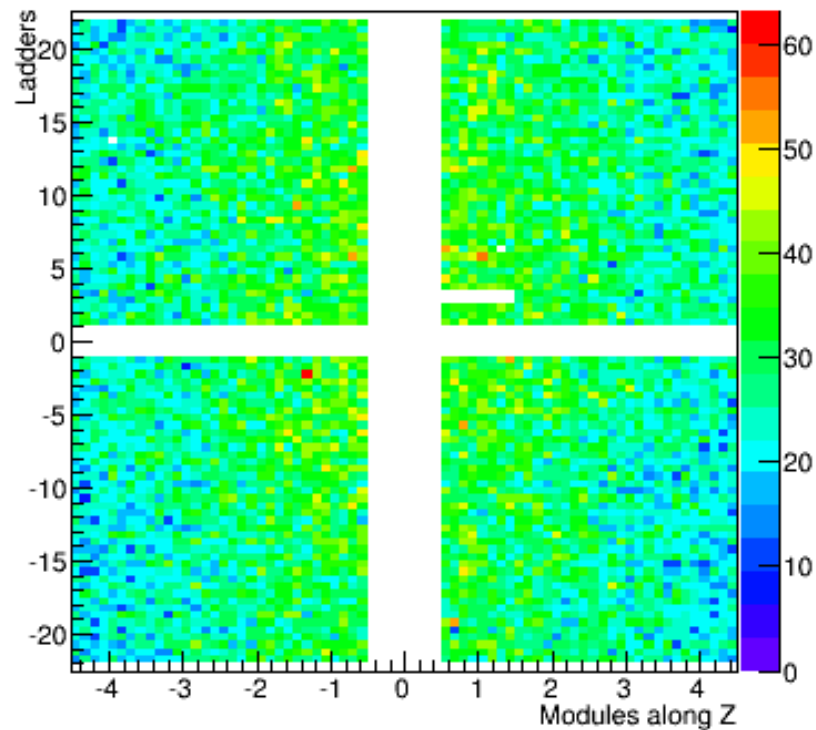
Layer 2



Consistency of MC payload with data?

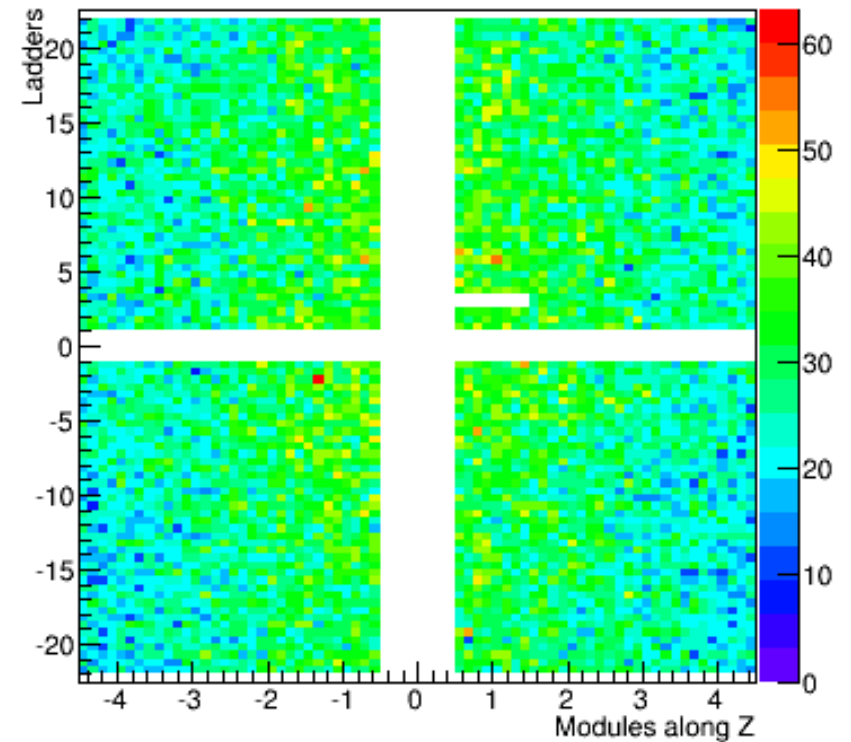
Simulation

Layer 3



Current detector status

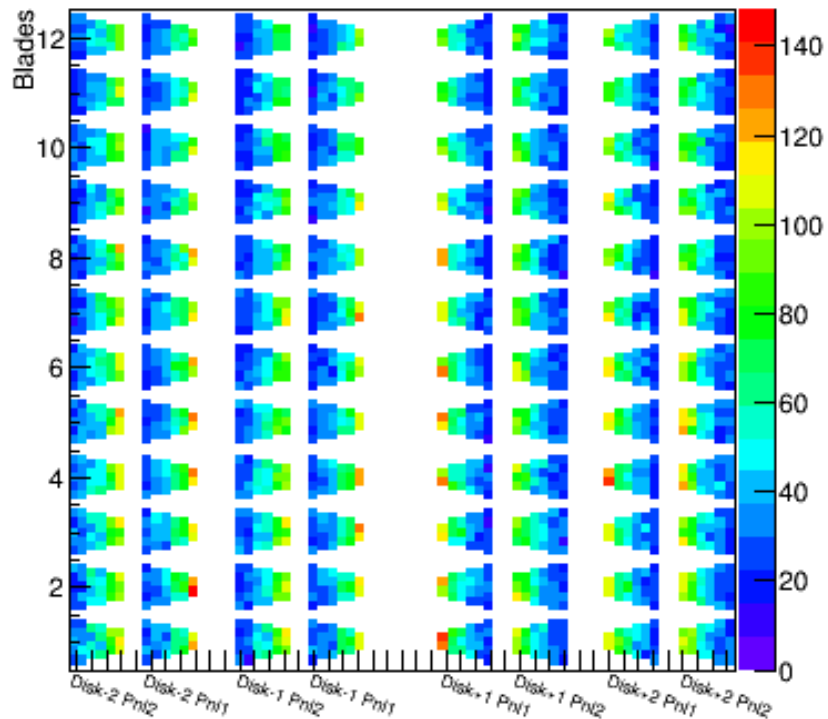
Layer 3



Consistency of MC payload with data?

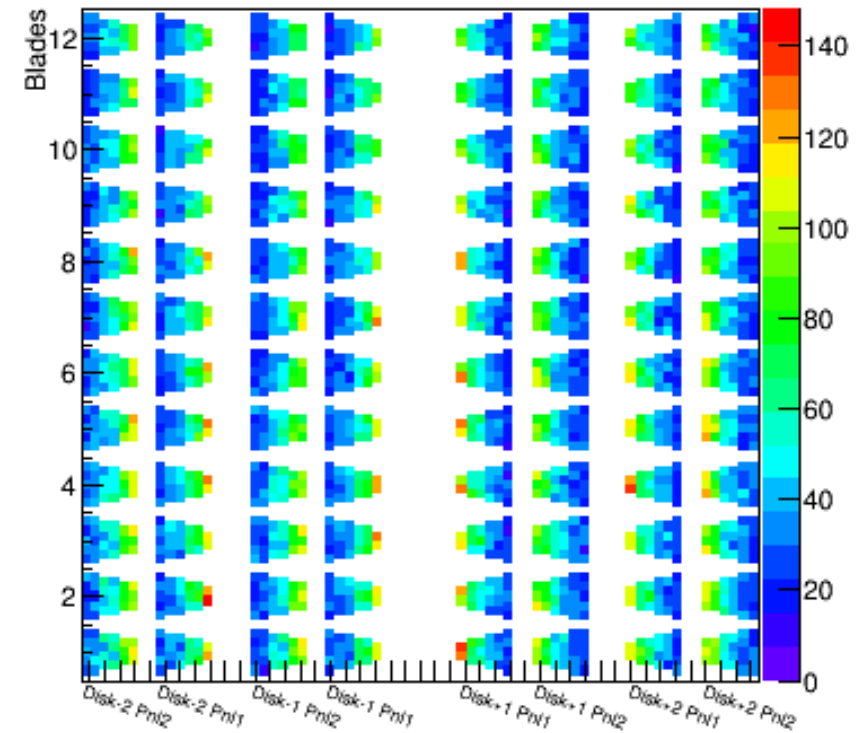
Simulation

FPix Inner Shells (+x)



Current detector status

FPix Inner Shells (+x)



Consistency of MC payload with data?

