INTT weekly meeting

INTT auto-calibration update

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Motivation

- **Problem:**

Manual run-by-run calibration is inefficient and labor-intensive.

- **Proposal:**

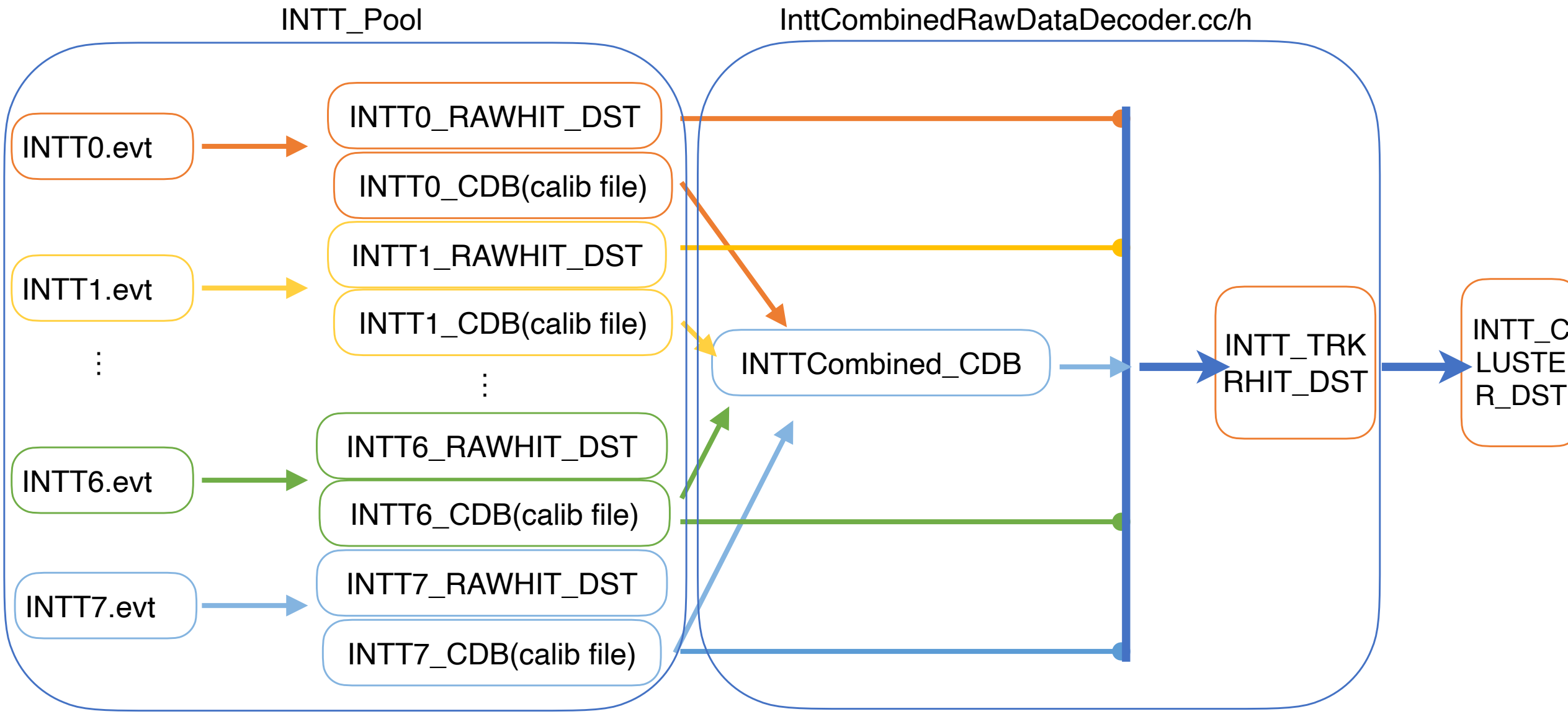
  Embed timing and bad channel calibrations into production macros for automatic application during processing.

- **Benefit:**

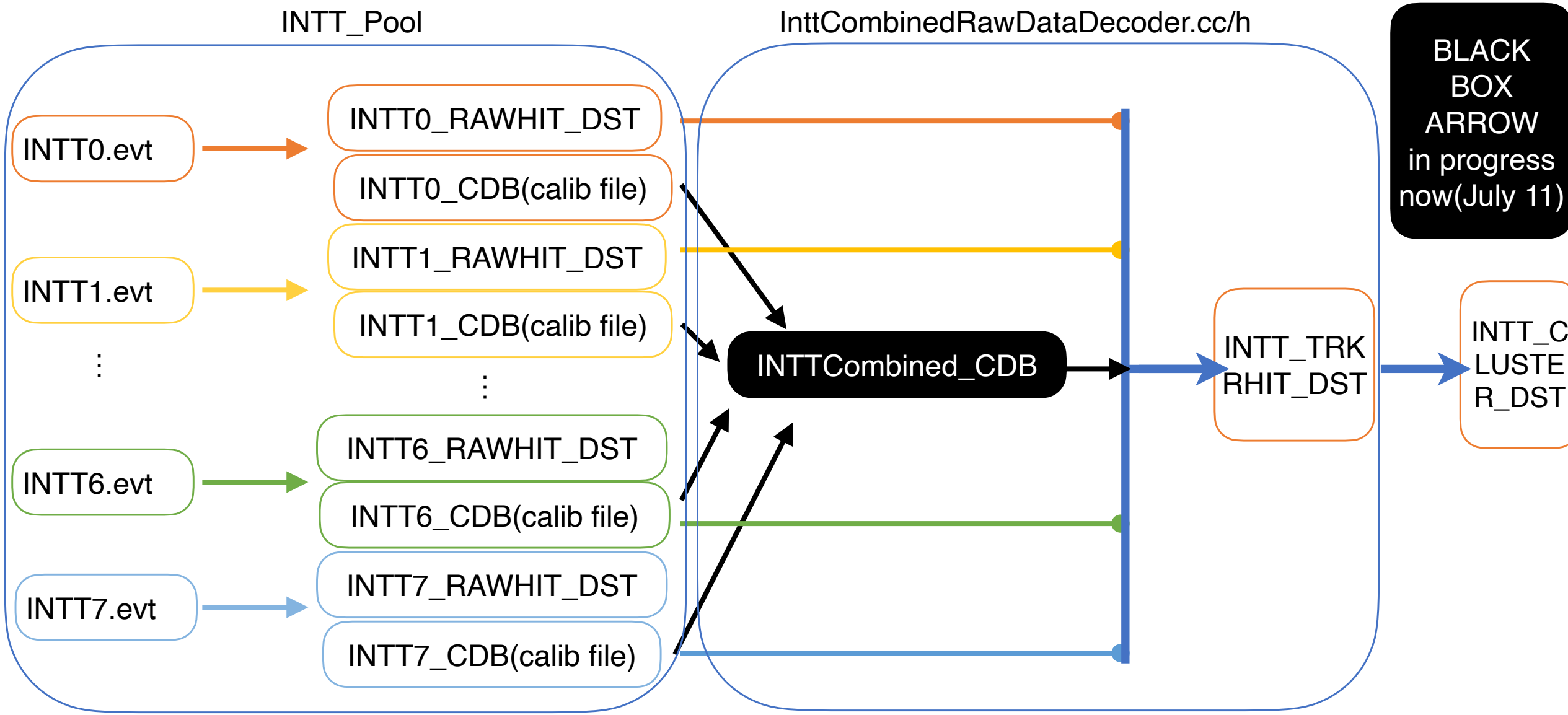
Calibration is automatically applied during production → no extra steps needed.

Of course, we need to check the auto-produced calibration files by human-eyes

Auto calibration workflow overview



Auto calibration workflow(now we are here)



Current Calibration files location

- location:

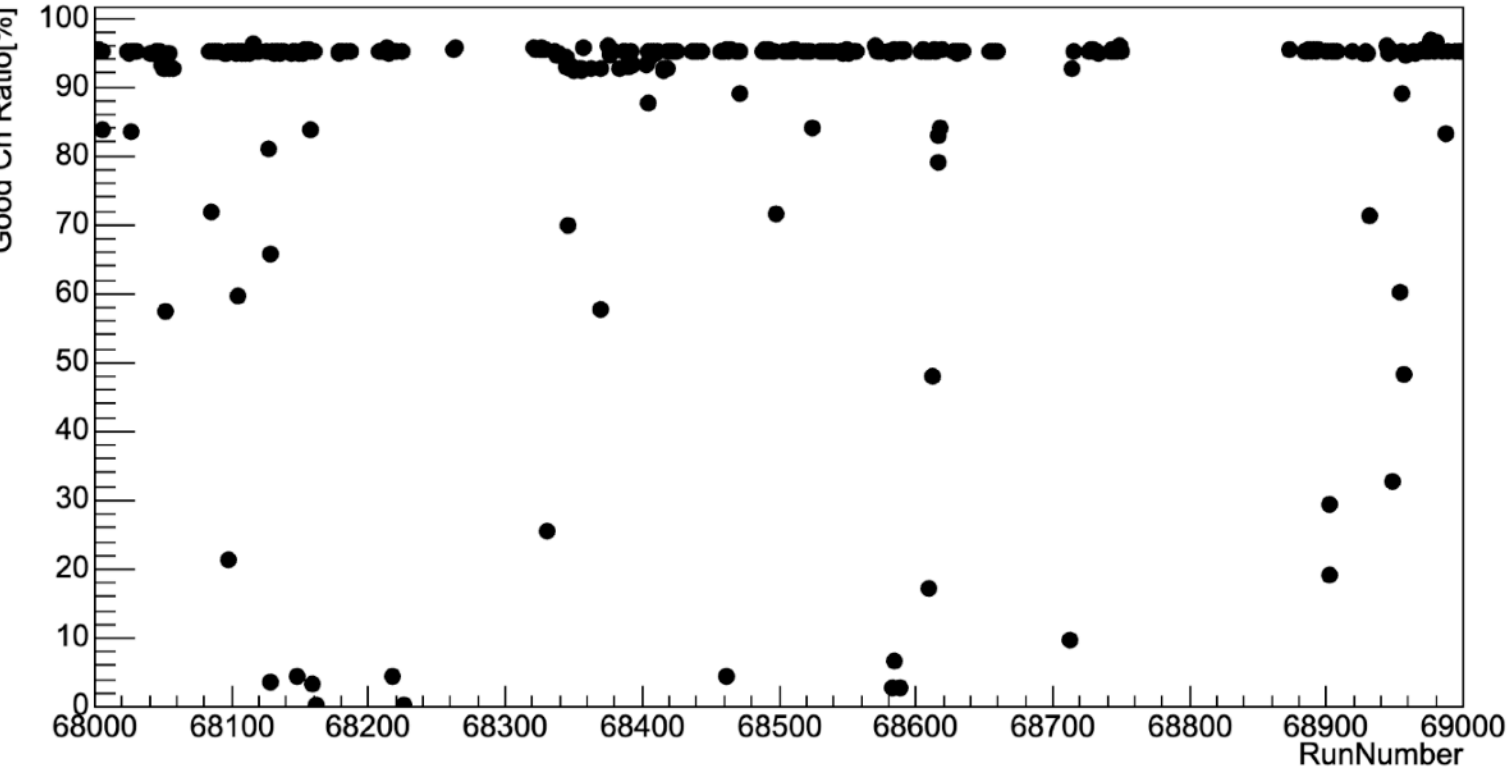
```
/sphenix/data/data02/sphnxpro/production/run3auau/physics/
new_nocdbtag_v001/DST_STREAMING_EVENT_intt*/run_*/hist/
CALIB*
```

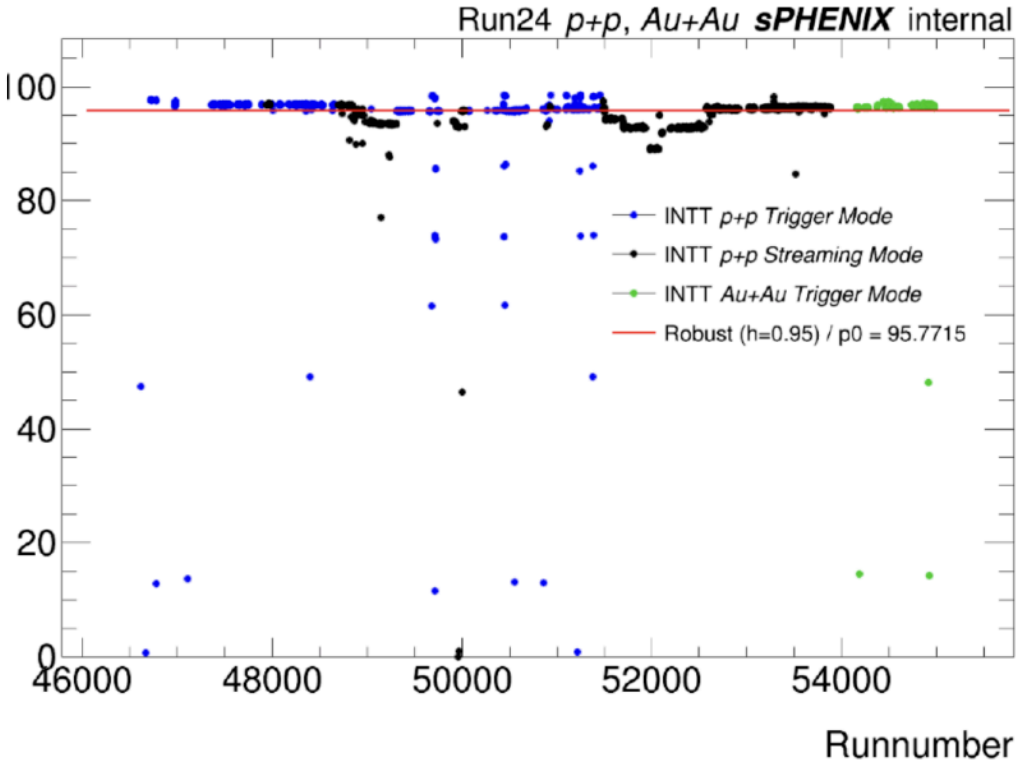
Note: We don’t determine where to save the files.

The file location must be determined by the Production team because they use their special SDCC ID to produce large amounts of files efficiently.

Quick Look at automatic-CDB (BADMap)

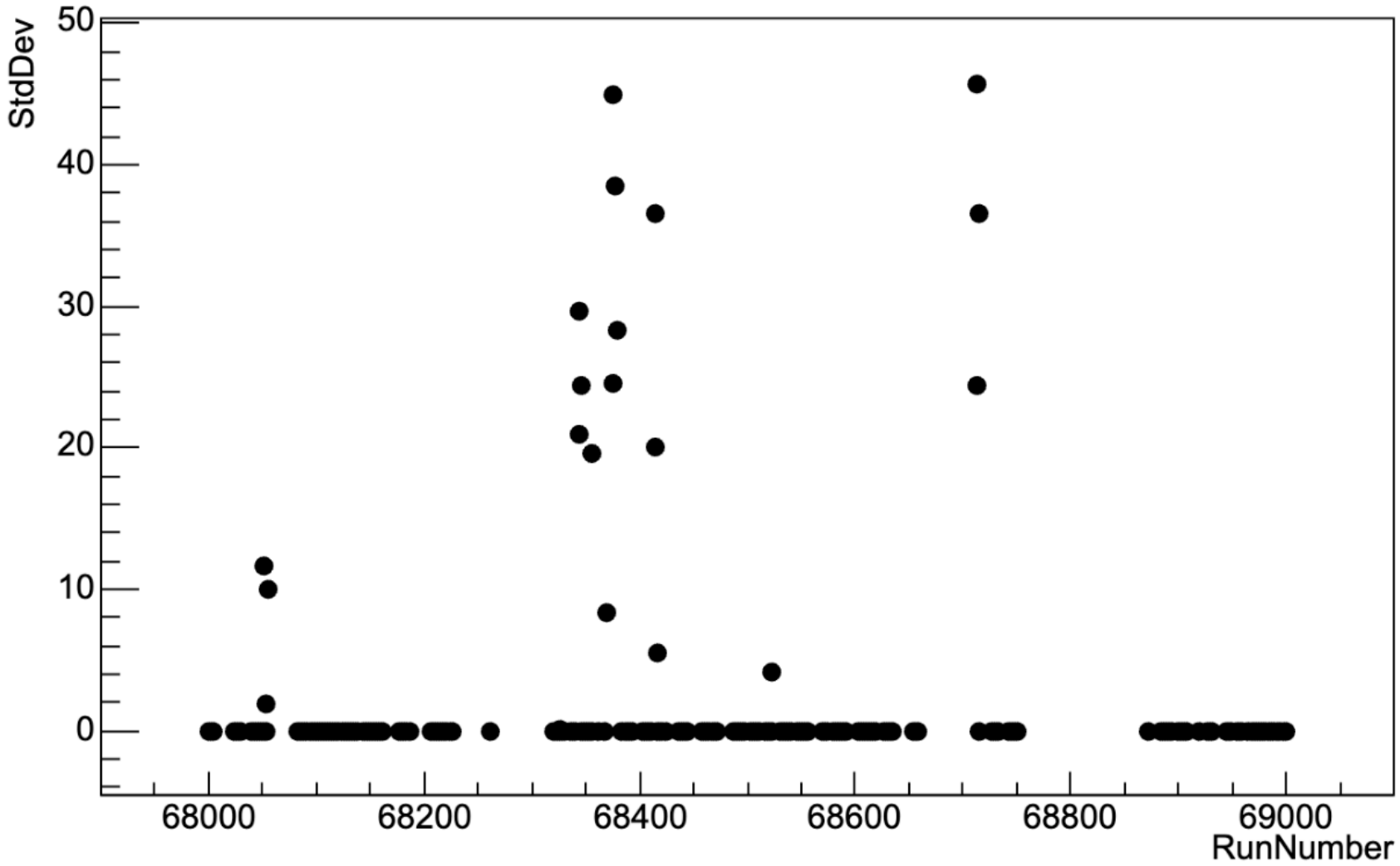
Good ch ratio for most of runs ~ 95%





Quick Look at automatic-CDB (BCO)

StdDev of 112 FEEs BCO peaks(should be 0)

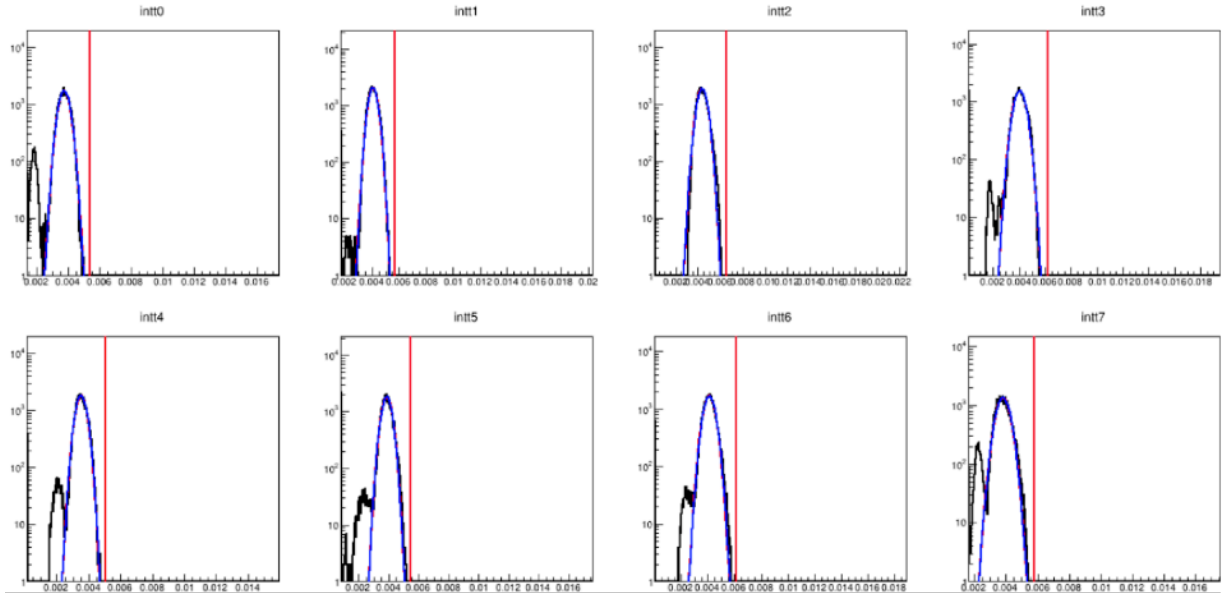


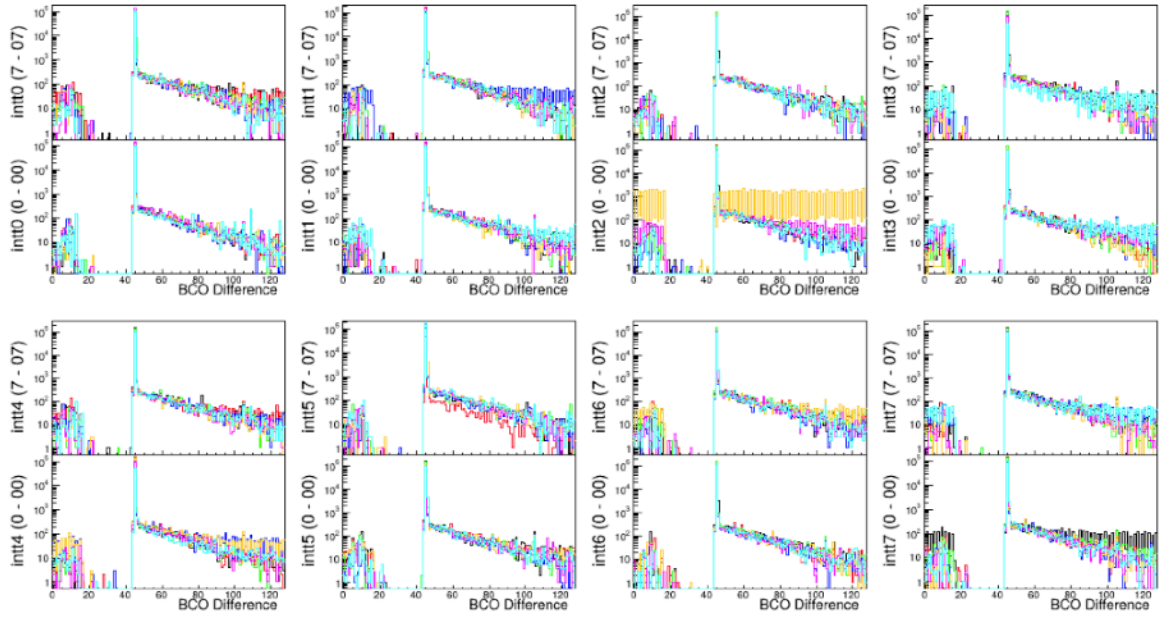
Histograms(plots) for QA

Add hitrate distribution and BCO timing plots to the official HTML QA page.

→ Can be redesigned for better readability or comparison.

PR has been merged and doing some test.





Summary

🛠️ Integration of Felix-by-Felix Calibration (CDB) into Production

• Status:

✔ Felix-by-Felix CDB files are now automatically included in production

✔ The CDB files generated per server look very good and stable

• Next Steps (In Progress):

• How to combine per-Felix calibration files

• Where to store the merged file

➤ Discussion ongoing with Joe and the production team

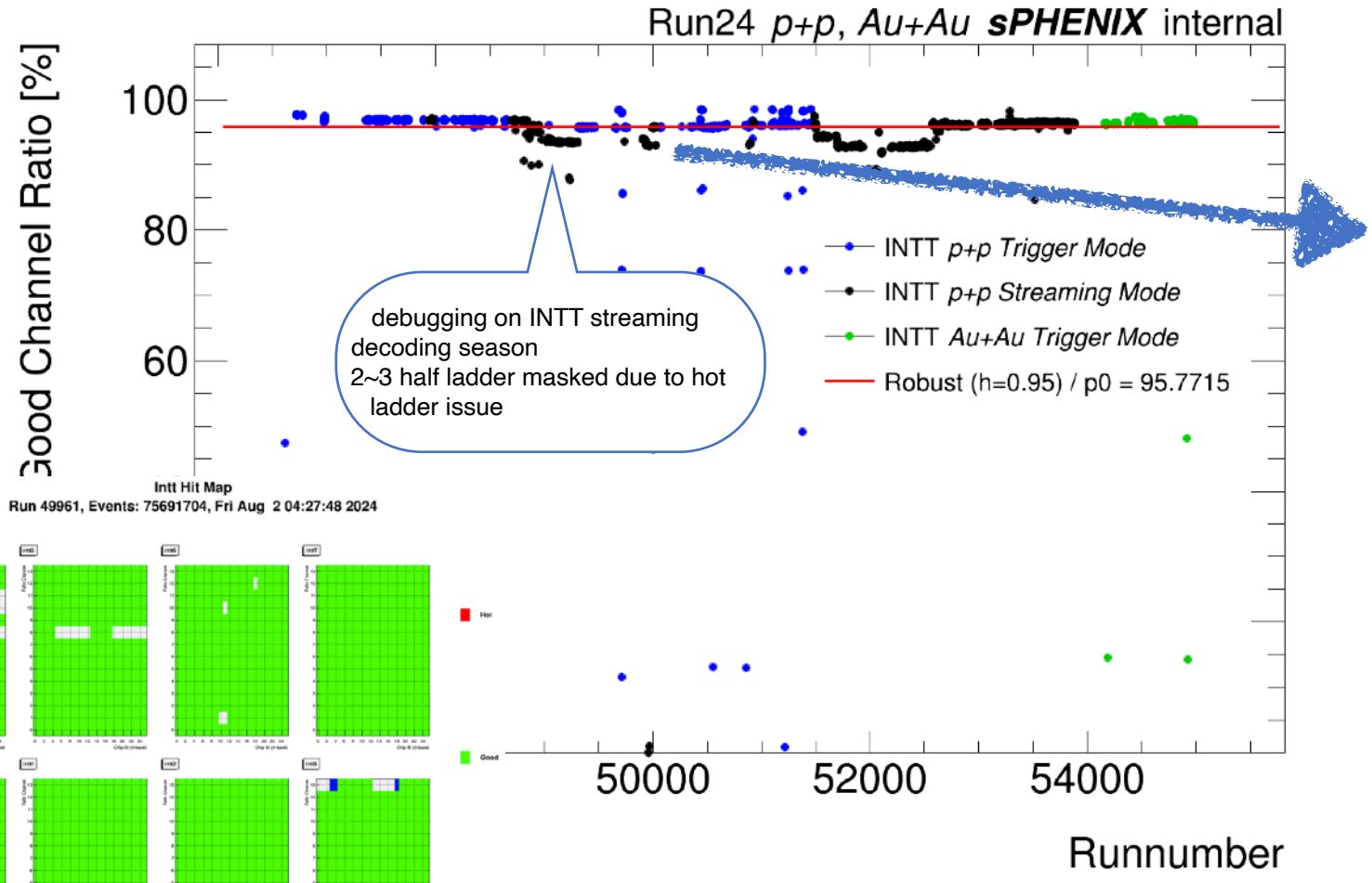
• QA Effort:

Working on integrating these calibration results into the offline QA web page for transparency and monitoring.

BACKUP

Remarkable past record(1)

Good Channel Ratio (BCO_QA == GOOD && Runtime > 300s)



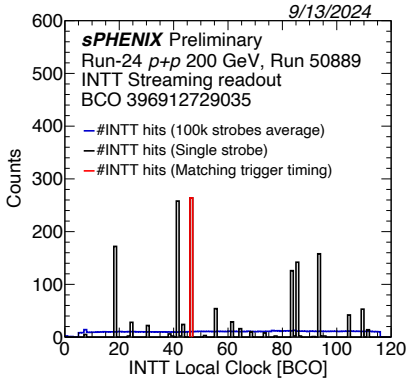
BLUE : Triggered mode

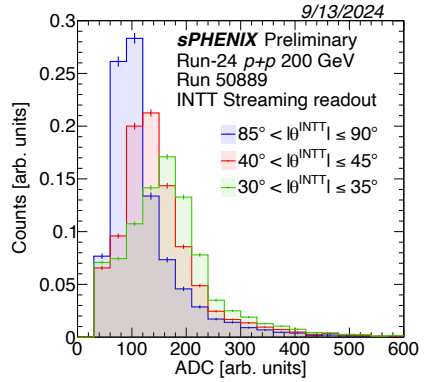
BLACK : Streaming mode

GREEN : AuAu Trigger mode

Linear / Robust (h=0.95) Fit

Run 50,889 / Golden run to clarify INTT is ready for streaming readout





INTT Run QA Result

RC-DAQ events in daq database
is used for # of events estimation

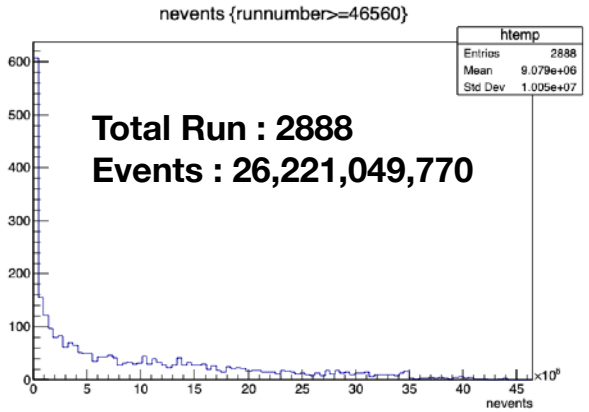
From Jun 21(Run 46560) to End of Run

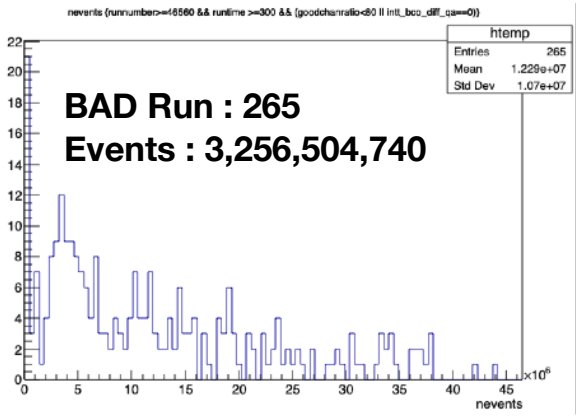
- Golden Run
  BCO alignment = GOOD
  Runtime >= 5 mins
  GOOD Channel ratio > 90%

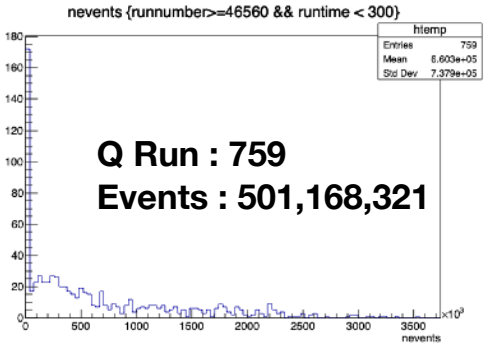
- Bad Run case 1
  Runtime >= 5mins
  BCO alignment = BAD

- BAD Run case 2
  Runtime >= 5mins
  Good Channel ratio < 80%

- Questionable case 1
  Runtime < 5mins





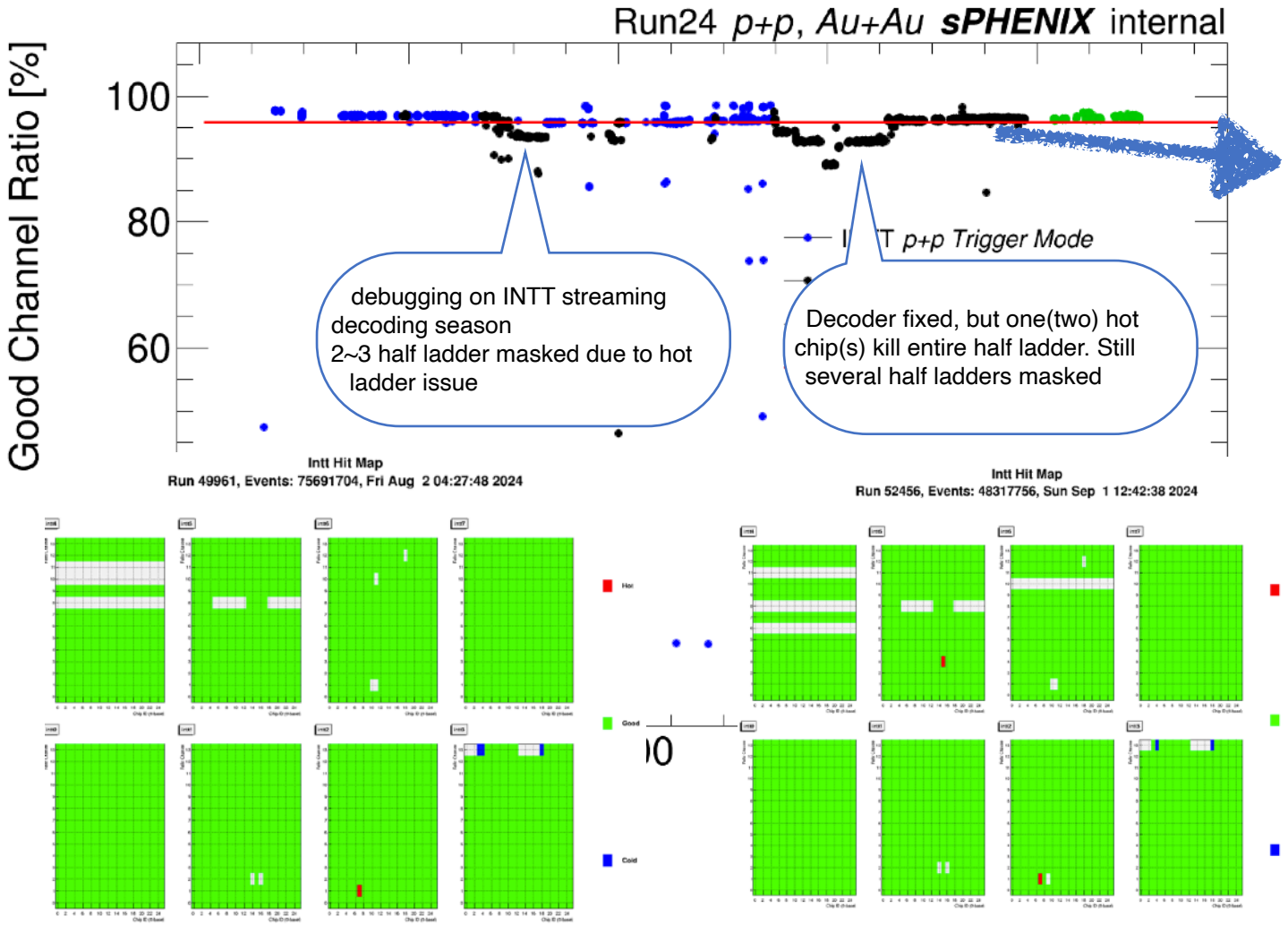


- Questionable case 2
  Runtime >= 5mins
  80% < Good Channel ratio < 90%

Category	Fraction of Runs (%)	Fraction of Event (%)
GOOD	63.67%	85.09%
BAD	9.18%	12.42%
Questionable	27.15%	2.49%

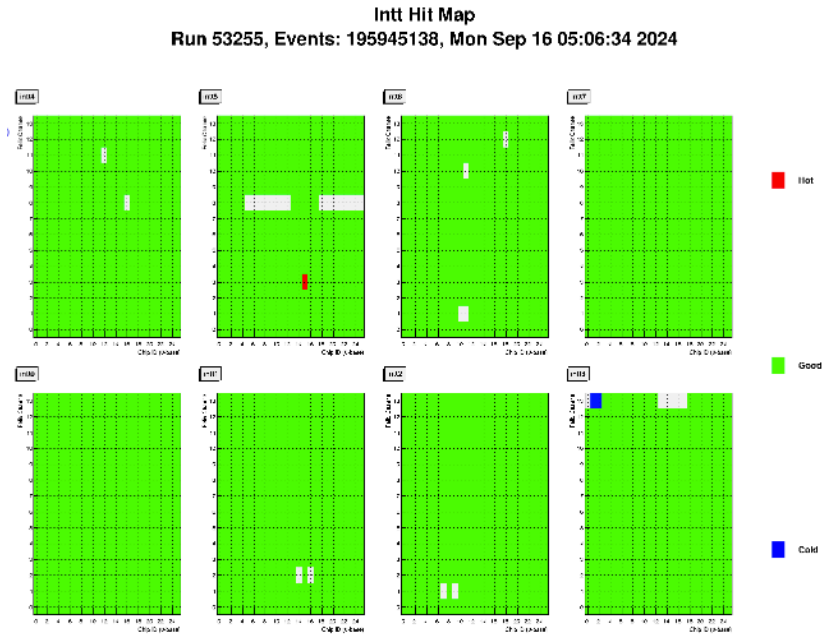
Remarkable past record(2)

Good Channel Ratio (BCO_QA == GOOD && Runtime > 300s)



FELIX Update by Raul
-> Chip masking on FELIX side available

INTT back to operating with ~95% GOOD channel



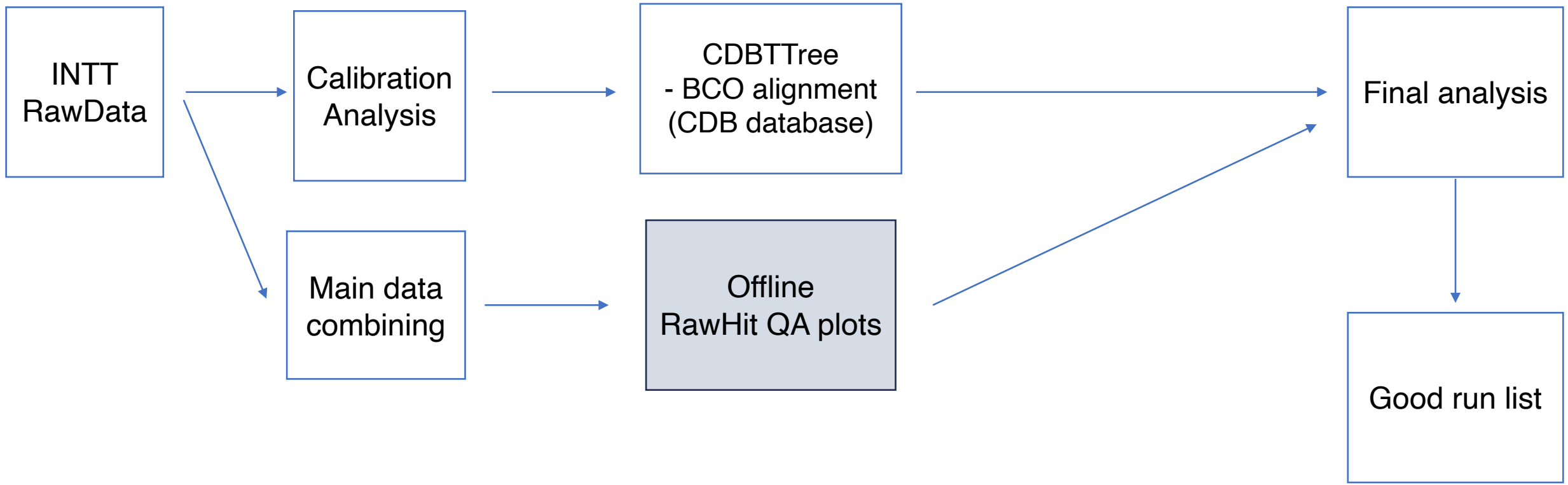
INTT Run QA structure(OLD)

RCDAQ

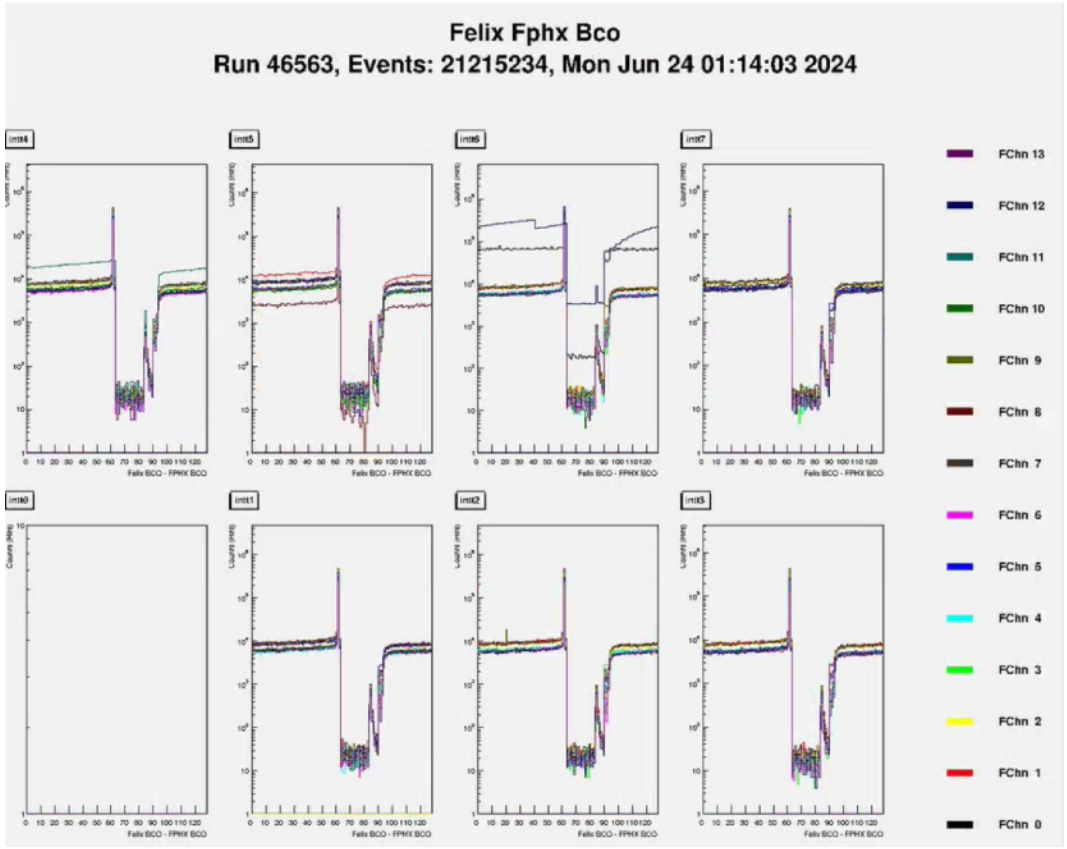
- Check BCO alignment based on Calibration result
- Check HitMap distribution from Offline RawHit QA, BUT..

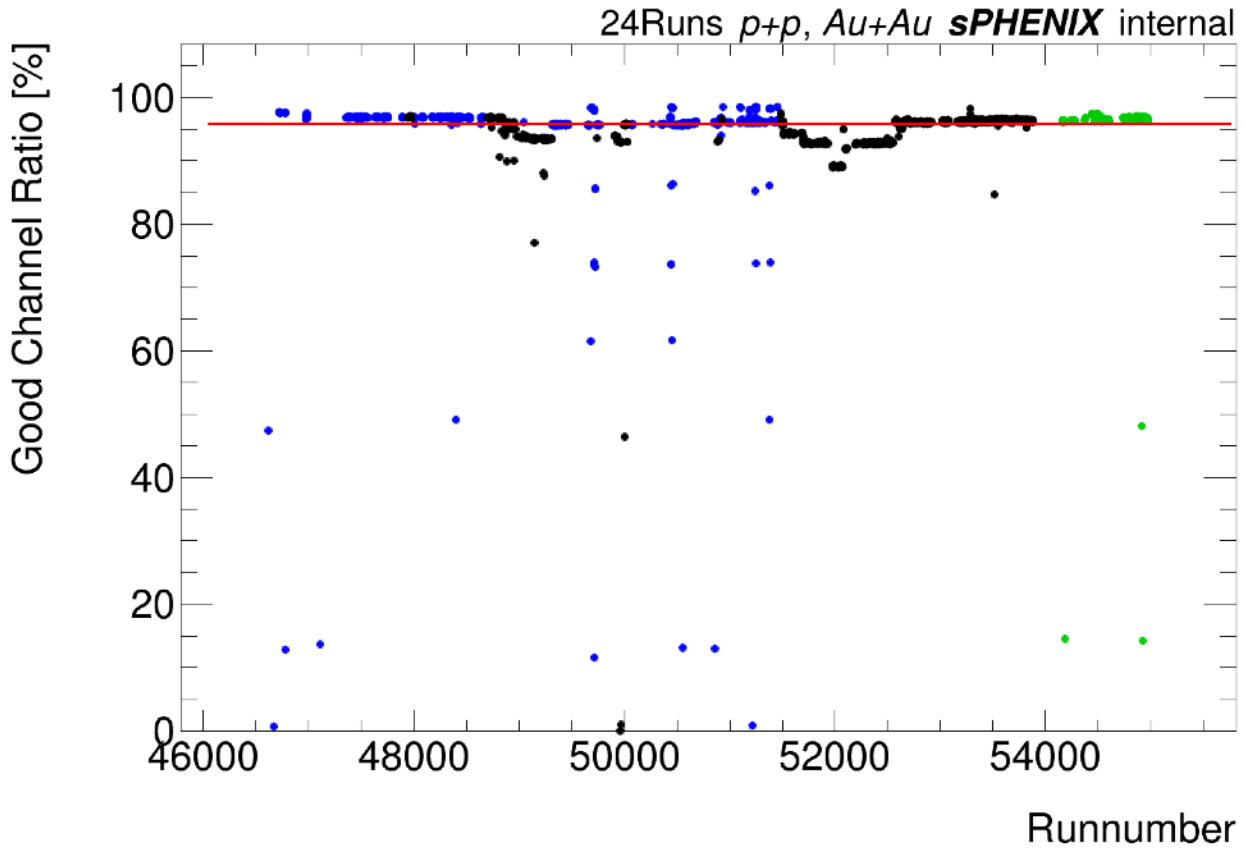
Only cover some streaming runs -> Only silicon runs have to be included for final list

No hot/cold channel rejection is included -> Only one hot channel can affect on entire half-ladder

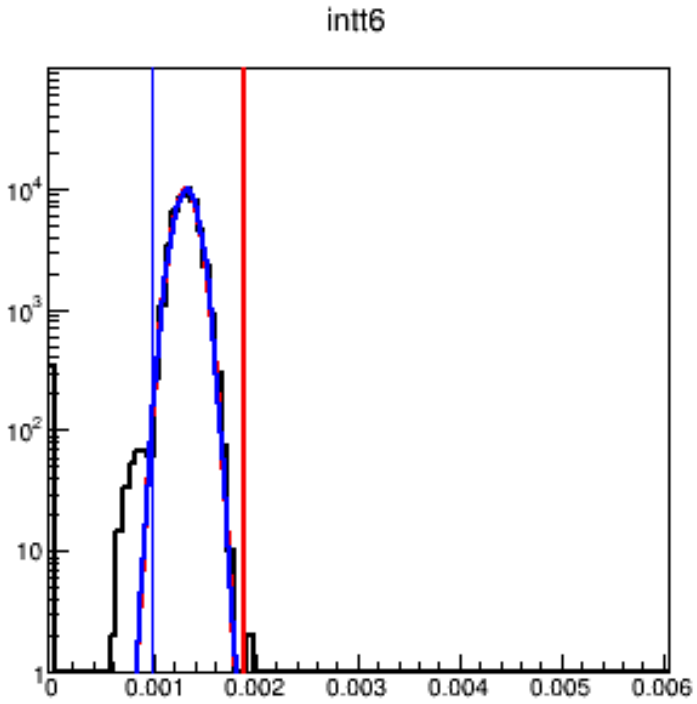


BACKUP


Felix Fphx Bco
Run 46563, Events: 21215234, Mon Jun 24 01:14:03 2024
FChn 13
FChn 12
FChn 11
FChn 10
FChn 9
FChn 8
FChn 7
FChn 6
FChn 5
FChn 4
FChn 3
FChn 2
FChn 1
FChn 0

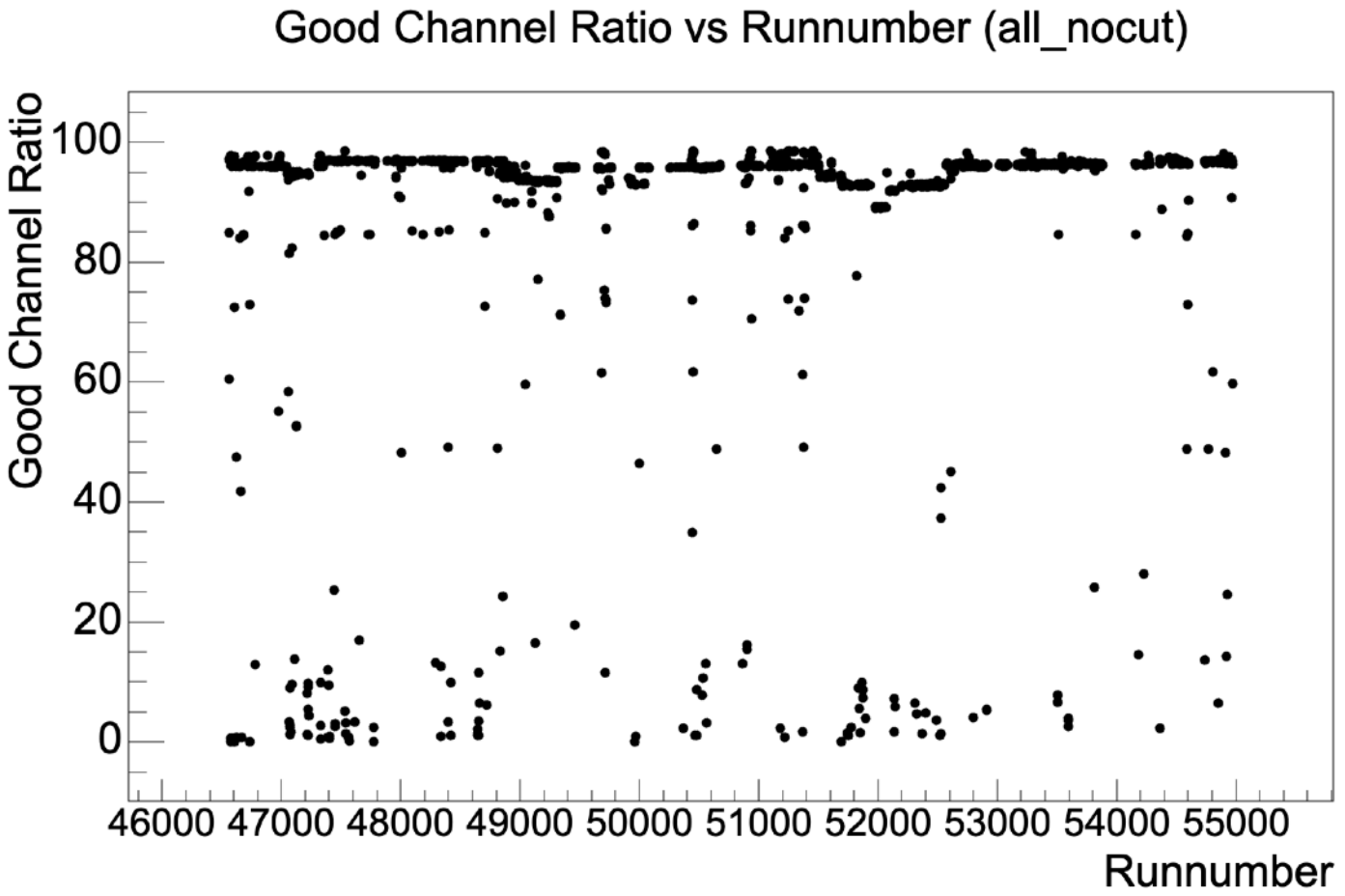

24Runs p+p, Au+Au sPHENIX internal
Good Channel Ratio [%]
100
80
60
40
20
0
46000
48000
50000
52000
54000
Runnumber

BACKUP

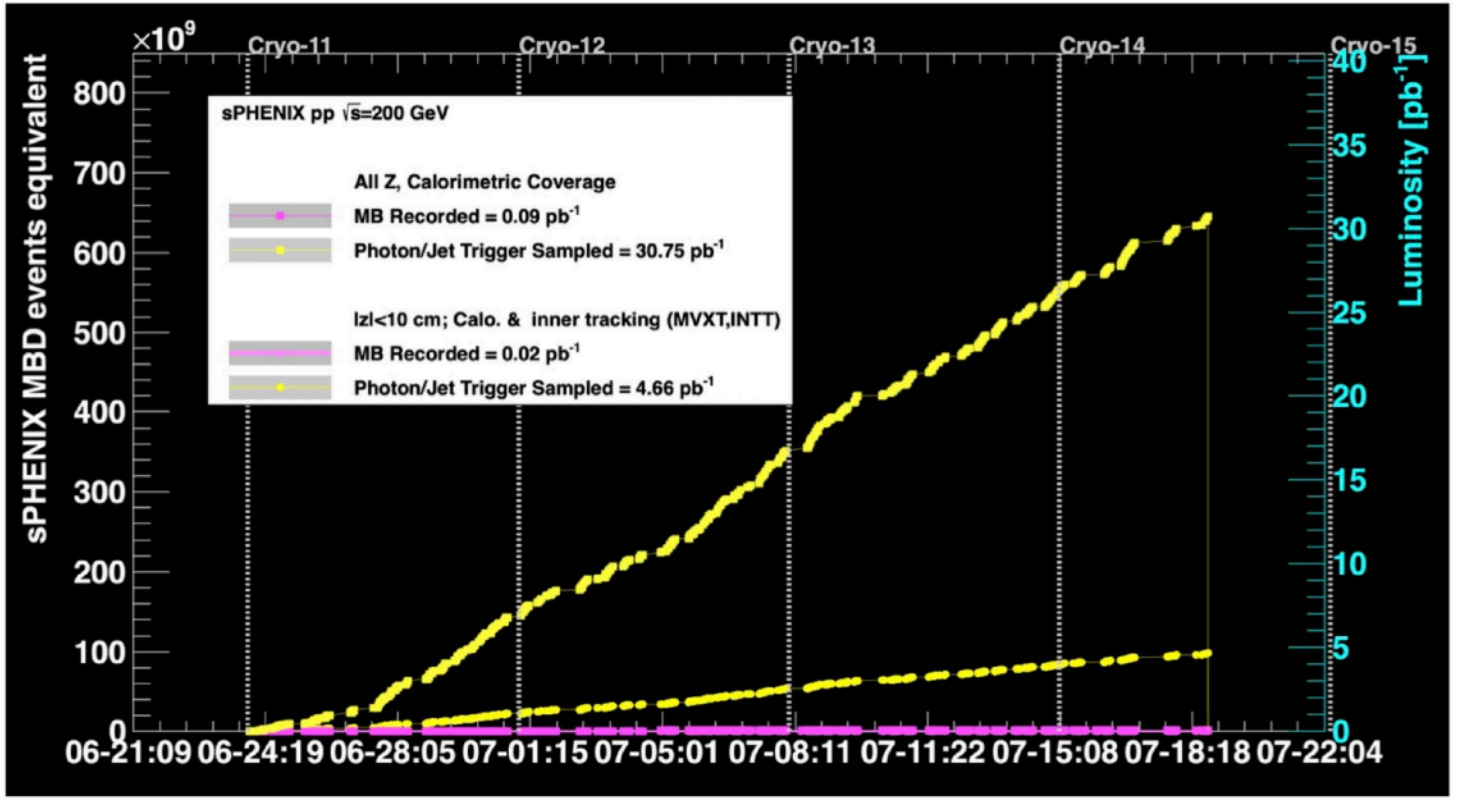


Dead/No hit Cold Hot

mean-3sig<good<mean+5sig



BACKUP

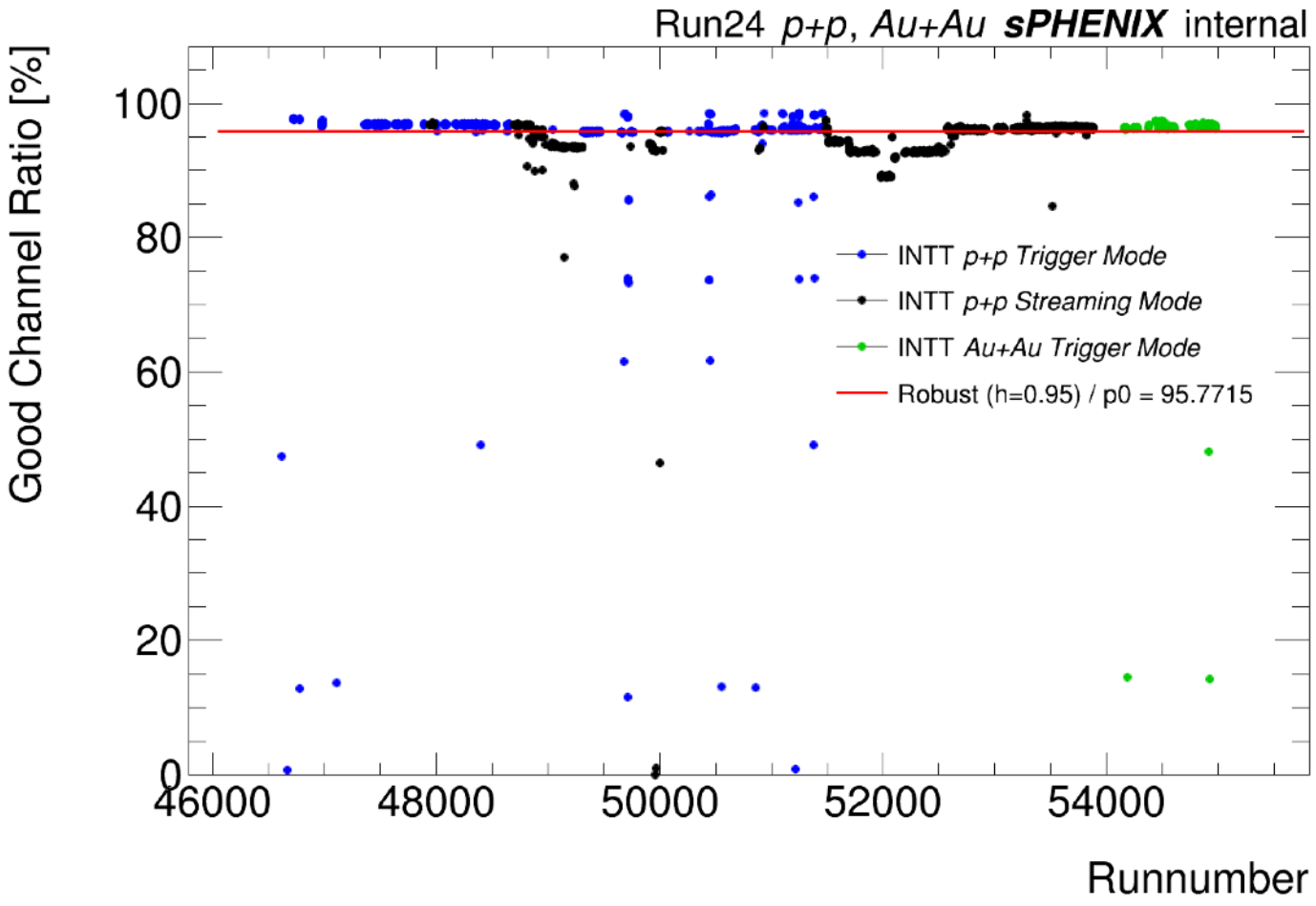


All our quality data is in the last three weeks.
30.7 pb^{-1} over all z-vertices, 4.6 pb^{-1} within |z| <10 cm

My personal suggestion, only worth analyzing data after June 24, 2024.

Good Channel Ratio for Run24

Good Channel Ratio (BCO_QA == GOOD && Runtime > 300s)



BLUE : Trigger mode

BLACK : Streaming mode

GREEN : AuAu Trigger mode

Linear / Robust (h=0.95) Fit

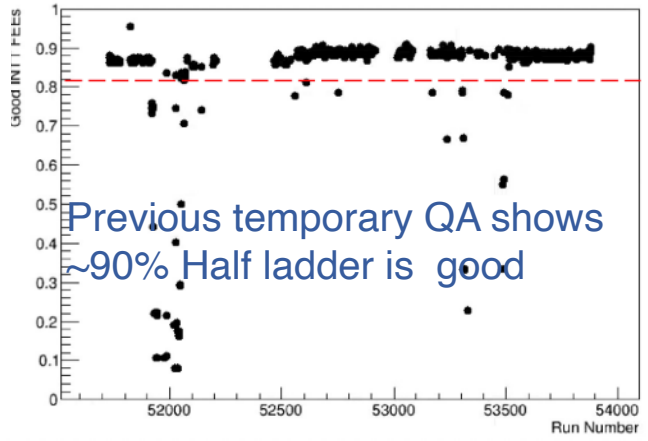
```
Minimizer is Linear / Robust (h=0.95)
Chi2                      =       107060
NDf                       =         1890
p0                        =      95.7715
```

95% of the INTT channels are GOOD for overall Run24 data

WHEN

1)FELIX is properly configured.

2)At least more than 5mins run to ensure stability and to accumulate the statistics



Previous temporary QA shows ~90% Half ladder is good