INTT weekly meeting

INTT Run QA Analysis

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Review / Motivation

Thanks to Devon for his initial effort on temporary INTT QA for upcoming QuarkMatter

Jaein and Takahiro co-work with Devon for temporary GoodRunList and has been published.

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

✅ INTT BCO Diff ✅ INTT Hit Acceptance ✅ INTT FEE RMS ✅ MVTX Hit Acceptance ✅ MVTX chi2/ndf ✅ MVTX B/A ratio ✅ MVTX Run length

> 51732 51733 51735 51736 51740 51741 51742 51753 51754 51762 51763 51764 51768 51772 51777 51778 51825 51826 51827 51828
> 51829 51831 51837 51838 51839 51840 51841 51842 51843 51854 51855 51856 51858 51860 51865 51874 51877 51878 51881
> 51886 51900 51901 51902 51905 51906 51907 51908 51914 51915 51921 51936 51979 51981 51988 52020 52027 52031 52050

limitation of previous temporary QA

- Only cover some streaming runs -> Only silicon runs has to be included for final list
- No hot/cold channel rejection is included -> Only one hot channel can affect on entire half-ladder
- Bug revealed on Offline QA code(fixed)

Considering time-limit, It's enough for QuarkMatter as we discussed in privies INTT meeting,

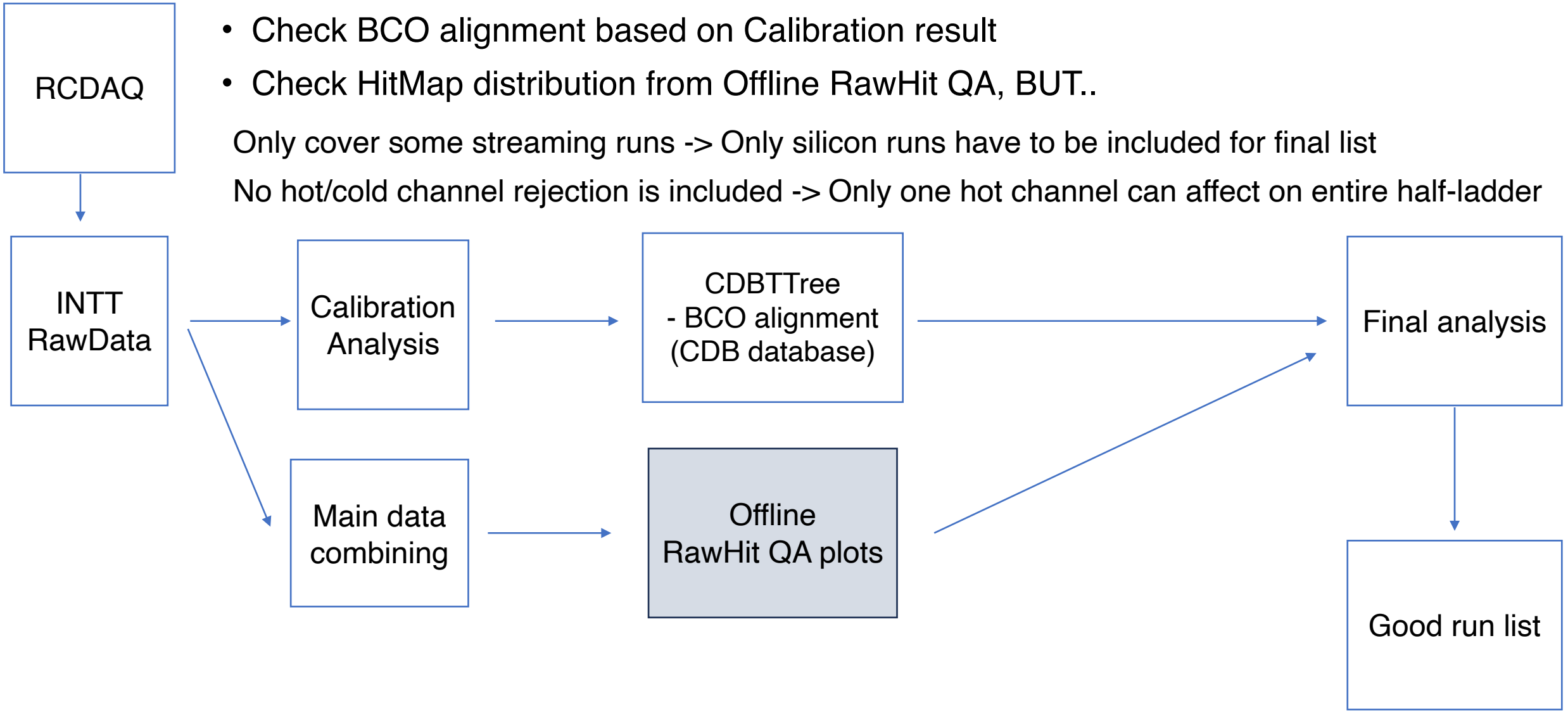
But, final good run list has to be performed by INTT expert. (Responsibility on INTT group)

INTT Run QA structure(OLD)

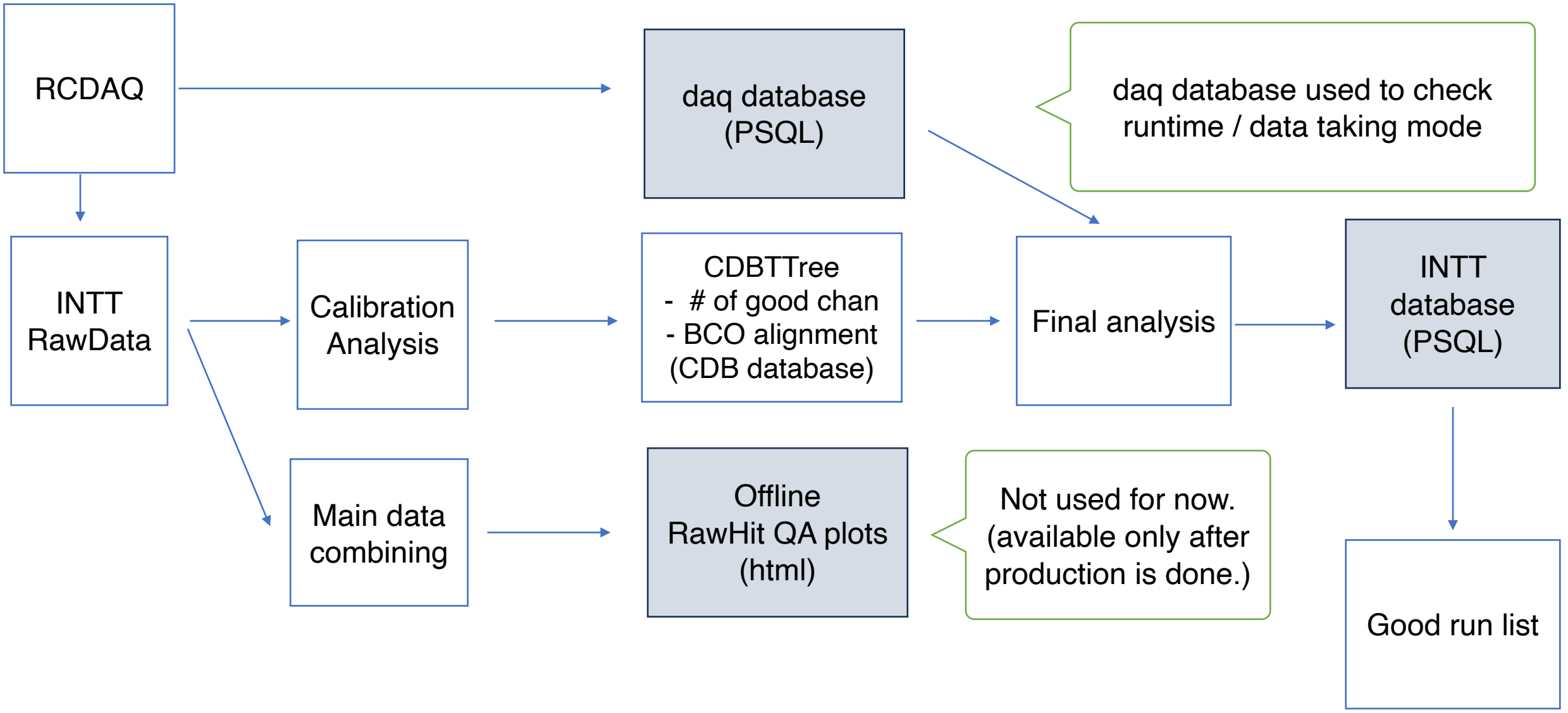
- Check BCO alignment based on Calibration result
- Check HitMap distribution from Offline RawHit QA, BUT..

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



INTT Run QA structure Proposal

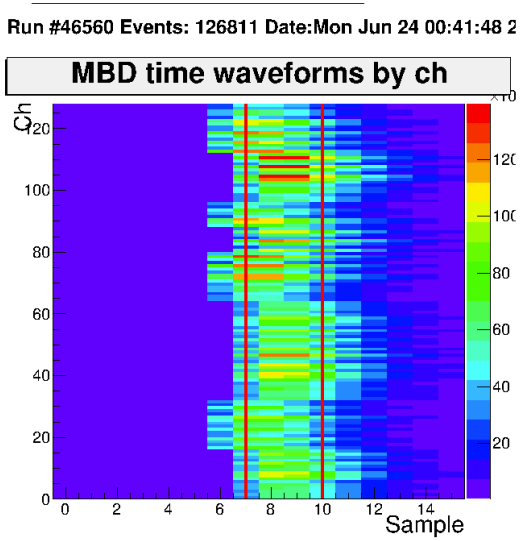


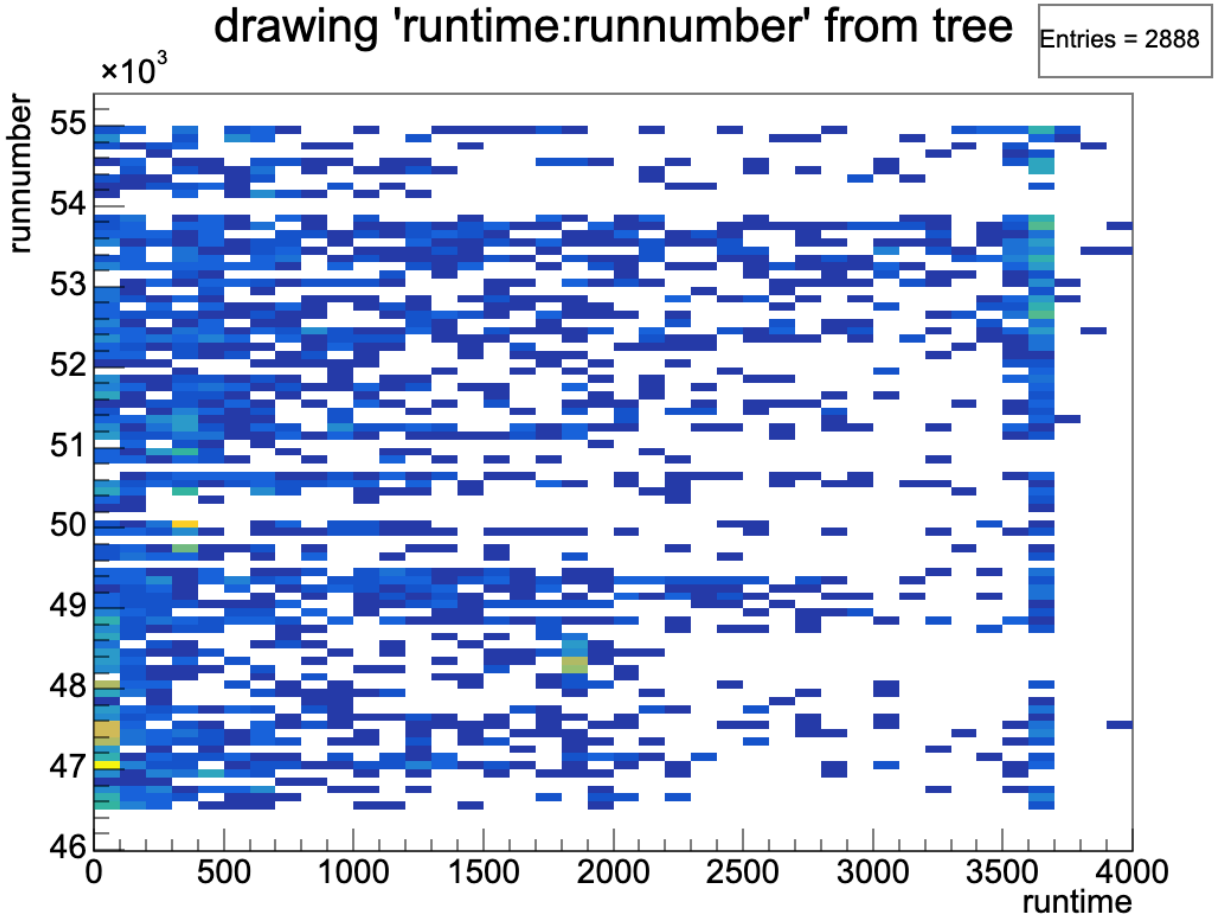
INTT Run range for QA

Selection
run which requires:
-information in daq database available
-INTT included run (raw data file in SDCC)
-Physics mode
(I expect any QA with beam/cosmics/
calib mode data should be done by analyzer.)

-From Jun 21(Run 46560) to End of Run
=> Trigger configuration with Photon/Jet
published with 0 X-ing angle

In total, **2,888** runs including pp and AuAu





INTT QA items

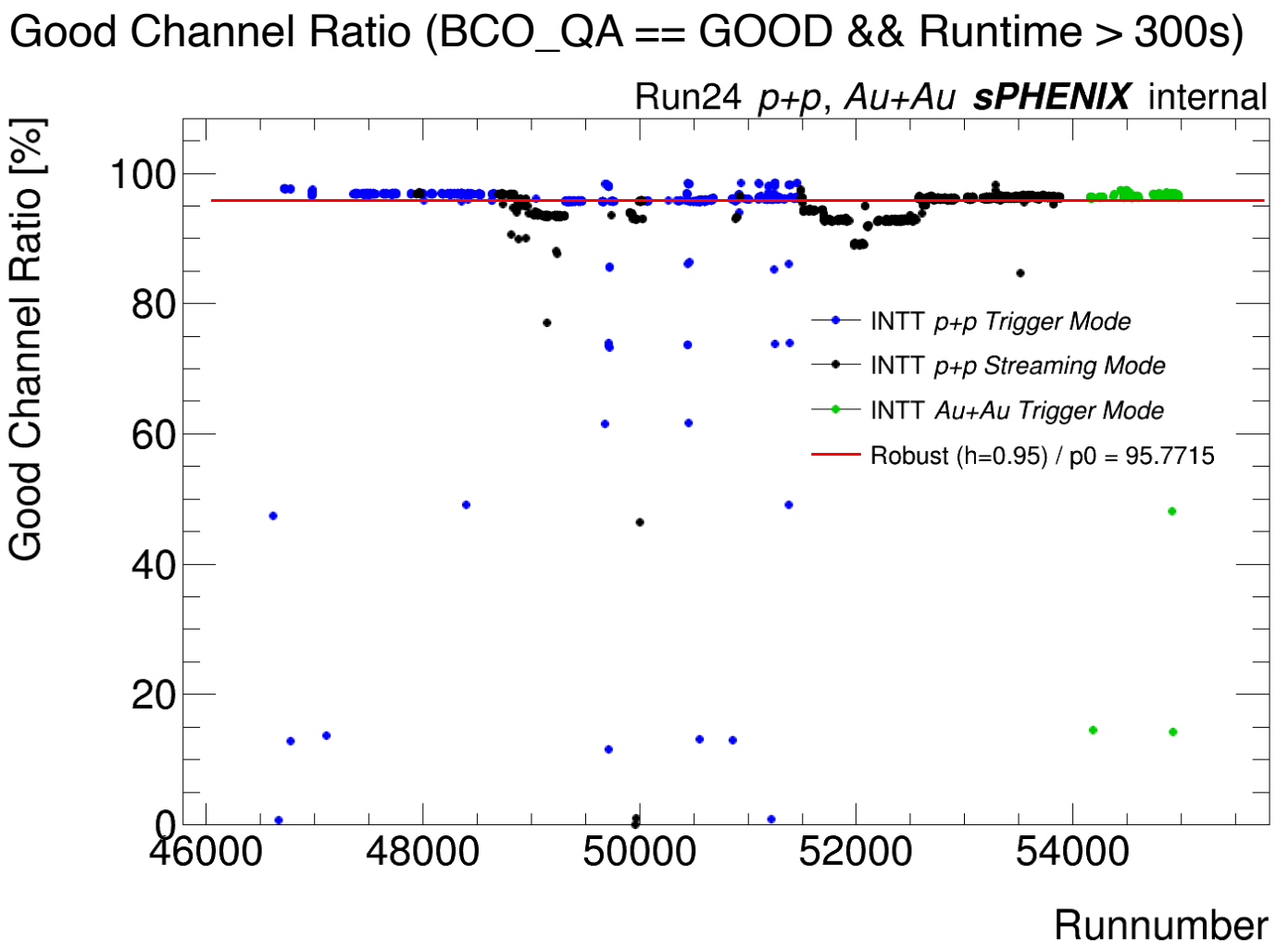
- Unified criteria regardless of data taking mode(streaming/trigger) and beam condition(X-ing, pp, AuAu)

- BCO QA
  BCO alignment should be perfect expected for masked half ladder
  Most straightforward method to ensure stability of INTT FELIX configuration / timed-in

- runtime >= 300s
  barely remember runtime > 5 mins is required for checking FELIX stability in terms of recording rate drop for OnlMon shifter

- GOOD channel ratio
  -> Ratio of good channel after removing No-hit/Dead/Cold/Hot channels based on calibration result
  More accurate method than just using offline QA without channel by channel calibration
  Need to determine threshold for good run classification

Good Channel Ratio for Run24



BLUE : Trigger mode

BLACK : Streaming mode

GREEN : AuAu Trigger mode

Linear / Robust (h=0.95) Fit

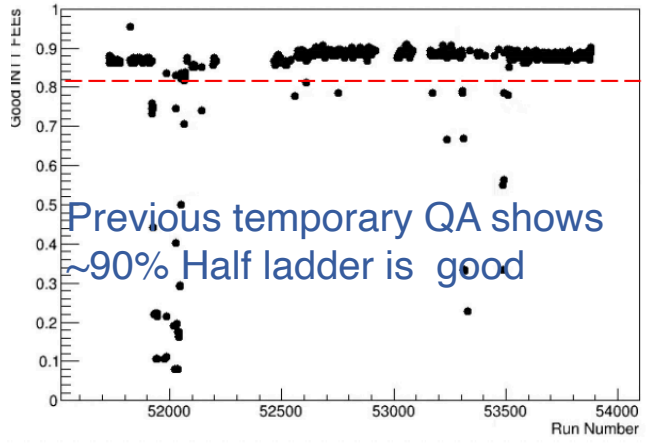
```
Minimizer is Linear / Robust (h=0.95)
Chi2                      =       107060
NDf                       =         1890
p0                        =      95.7715
```

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

WHEN

1)FELIX is properly configured.

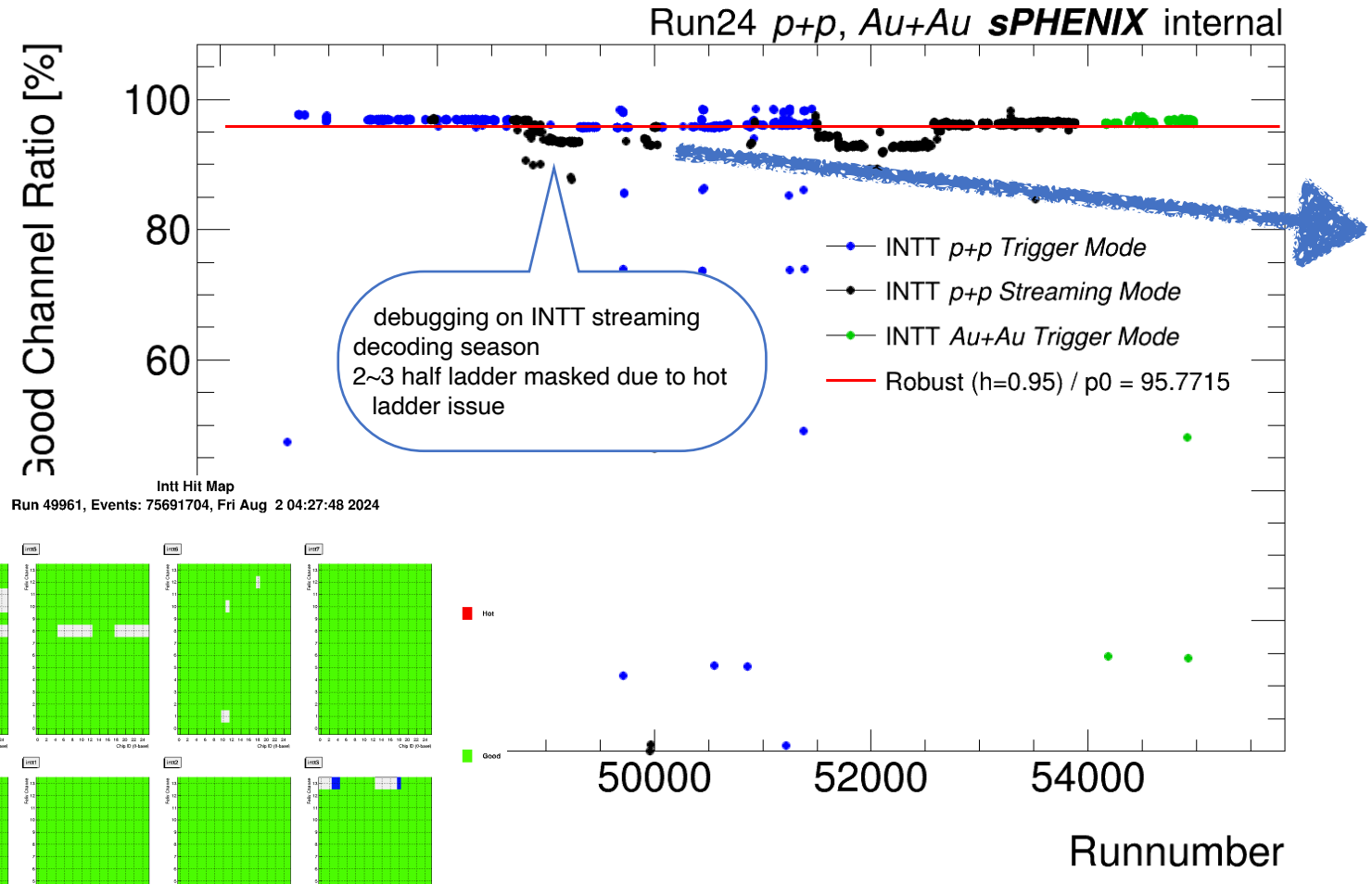
2)At least more than 5mins run to ensure stability and to accumulate the statistics



Previous temporary QA shows ~90% Half ladder is good

Remarkable past record(1)

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



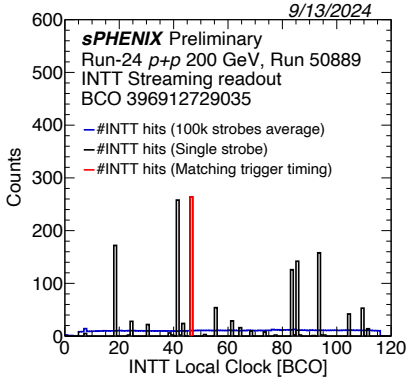
BLUE : Triggered mode

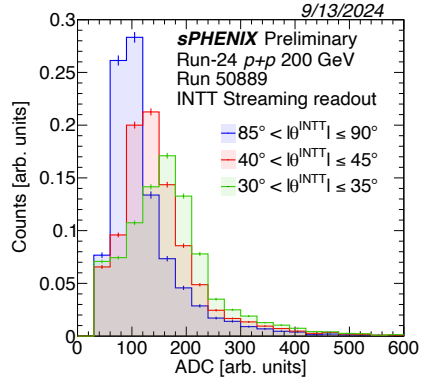
BLACK : Streaming mode

GREEN : AuAu Trigger mode

Linear / Robust (h=0.95) Fit

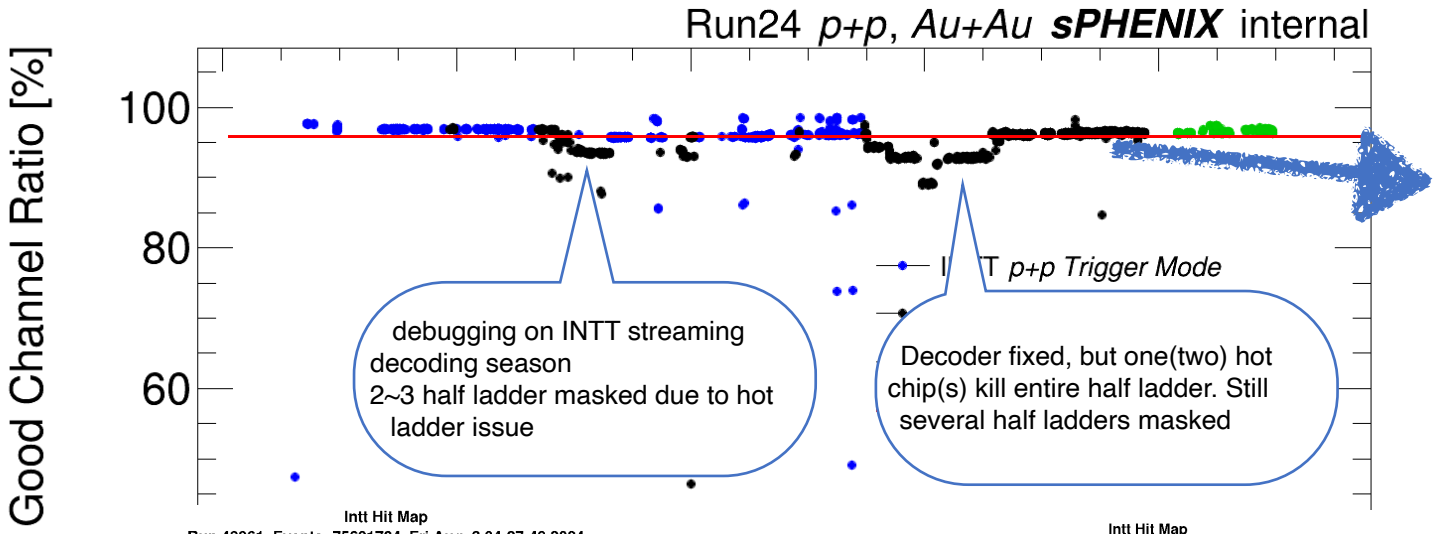
Run 50,889 / Golden run to clarify INTT is ready for streaming readout

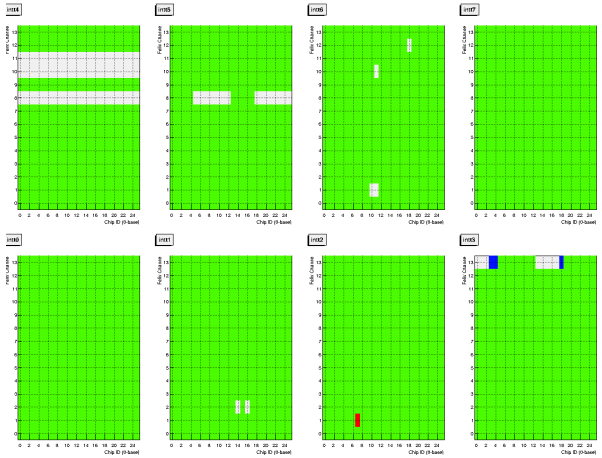


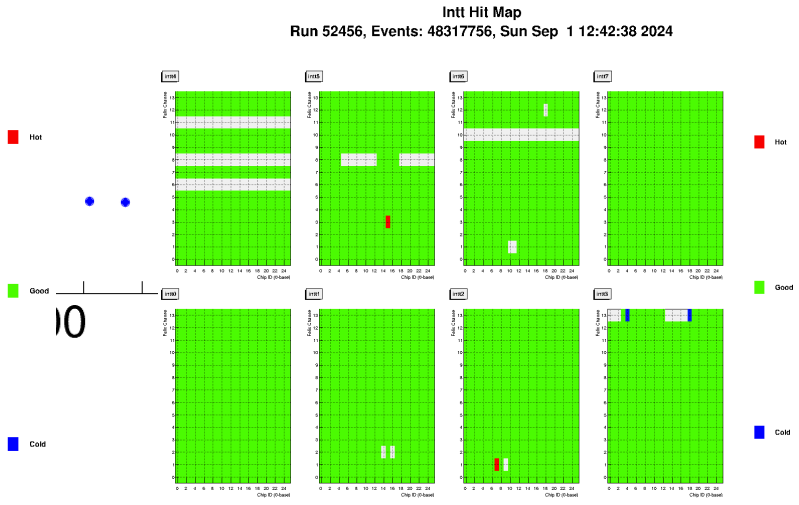


Remarkable past record(2)

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

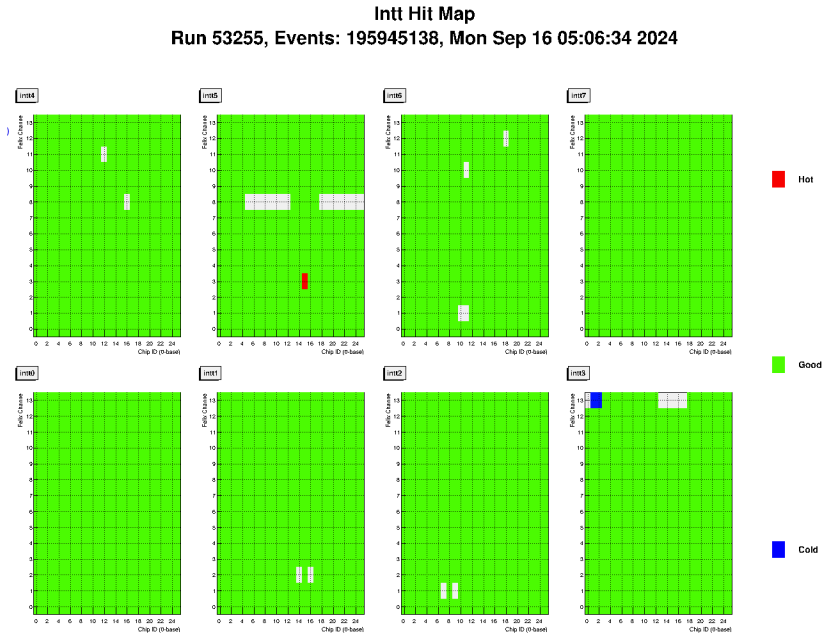




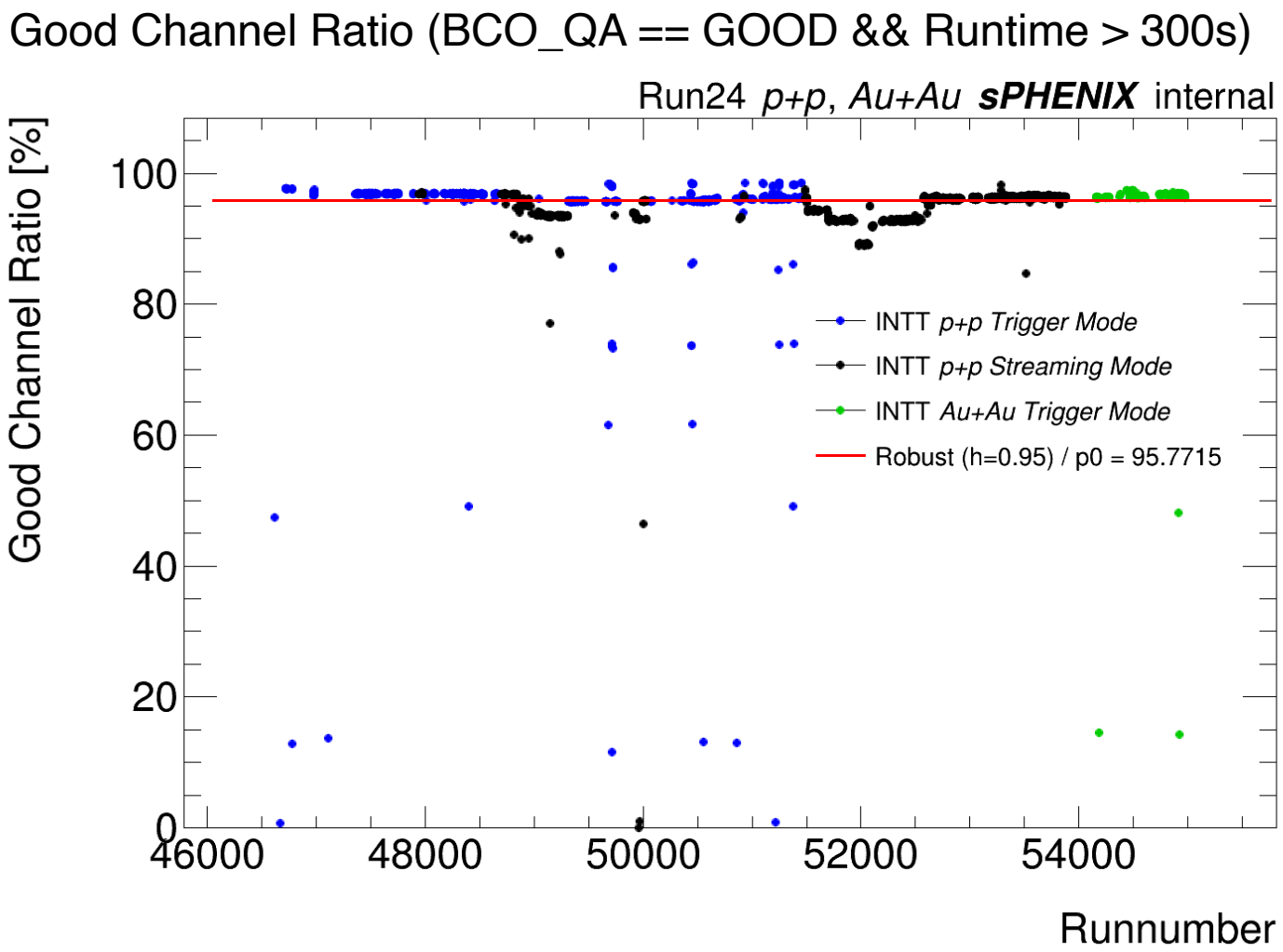


FELIX Update by Raul
-> Chip masking on FELIX side available

INTT back to operating with ~95% GOOD channel



INTT Run QA criteria Proposal



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

- Questionable case 1
  Runtime < 5mins
- Questionable case 2
  Runtime >= 5mins
  80% < Good Channel ratio < 90%

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

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

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

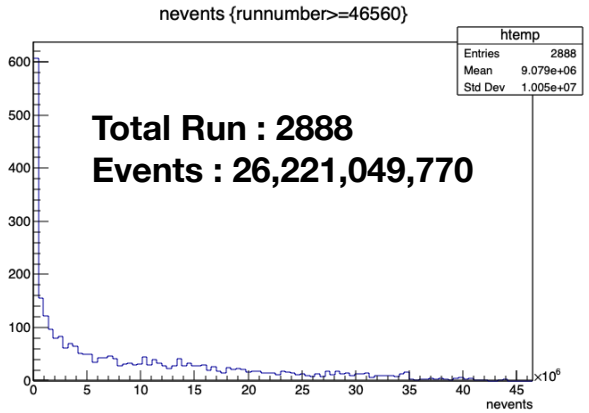
- Golden Run
  BCO alignment = GOOD
  Runtime >= 5 mins
  GOOD Channel ratio > 90%

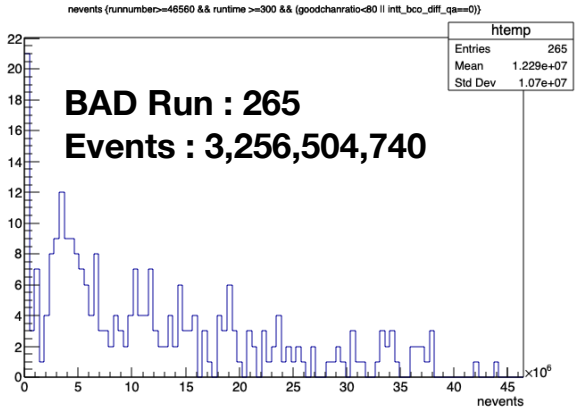
- Bad Run case 1
  Runtime >= 5mins
  BCO alignment = BAD

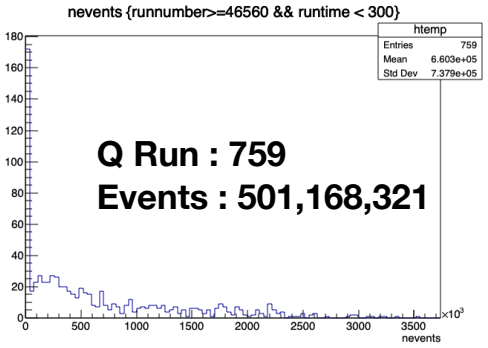
- BAD Run case 2
  Runtime >= 5mins
  Good Channel ratio < 80%

- Questionable case 1
  Runtime < 5mins

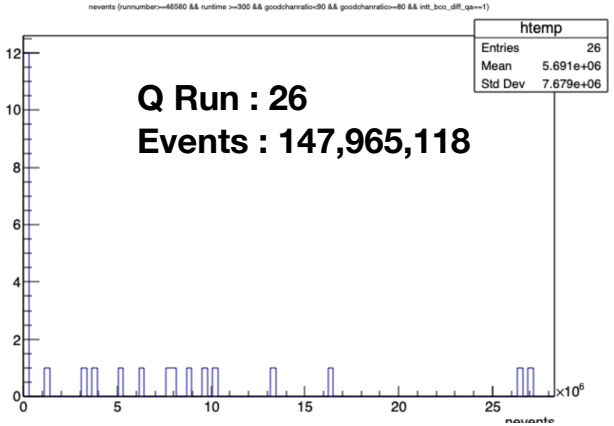
- Questionable case 2
  Runtime >= 5mins
  80% < Good Channel ratio < 90%





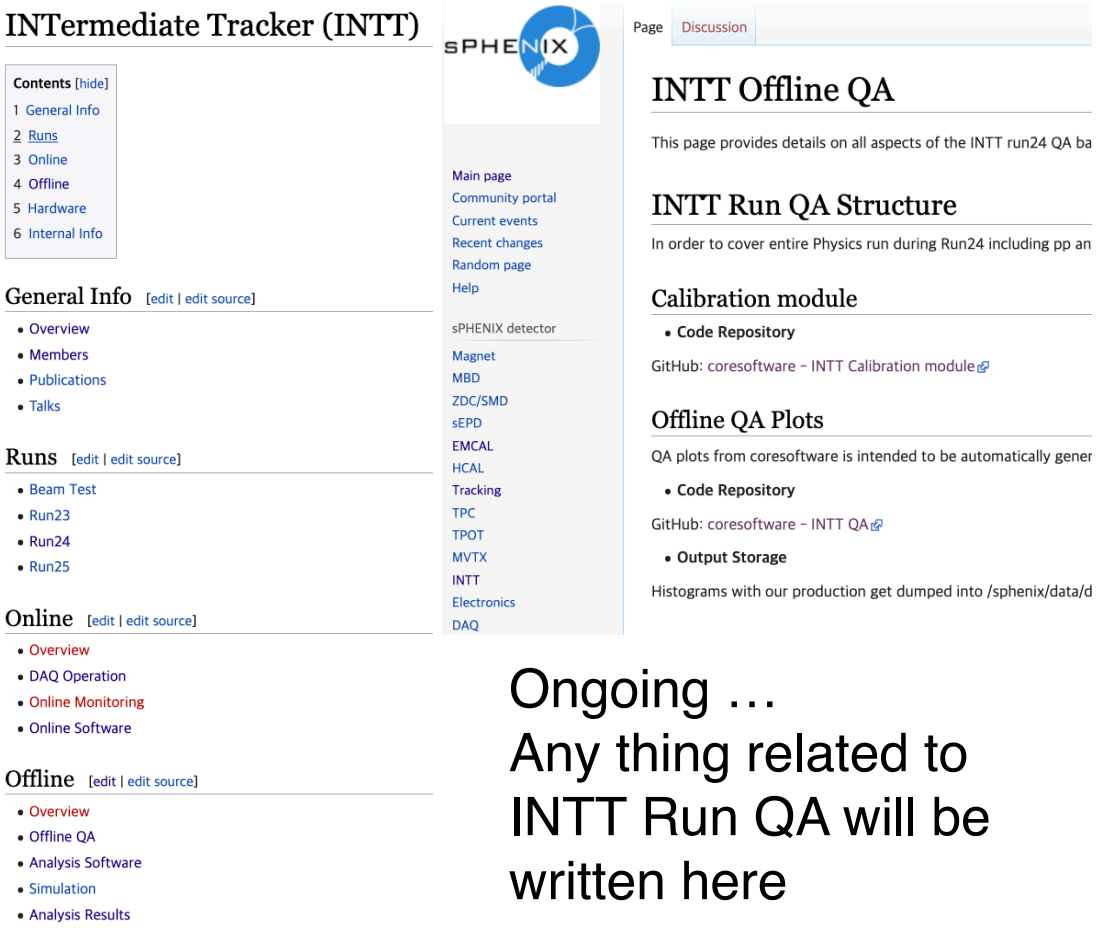


Category	Fraction of Runs (%)	Fraction of Event (%)
GOOD	63.67%	85.09%
BAD	9.18%	12.42%
Questionable	27.15%	2.49%



Organization for documentation

- Wiki documentation



INTermediate Tracker (INTT)

Contents [hide]
1 General Info
2 Runs
3 Online
4 Offline
5 Hardware
6 Internal Info

General Info [edit | edit source]
- Overview
- Members
- Publications
- Talks

Runs [edit | edit source]
- Beam Test
- Run23
- Run24
- Run25

Online [edit | edit source]
- Overview
- DAQ Operation
- Online Monitoring
- Online Software

Offline [edit | edit source]
- Overview
- Offline QA
- Analysis Software
- Simulation
- Analysis Results

sPHENIX

Main page
Community portal
Current events
Recent changes
Random page
Help

sPHENIX detector
Magnet
MBD
ZDC/SMD
sEPD
EMCAL
HCAL
Tracking
TPC
TPOT
MVTX
INTT
Electronics
DAQ

Page Discussion

INTT Offline QA

This page provides details on all aspects of the INTT run24 QA ba

INTT Run QA Structure

In order to cover entire Physics run during Run24 including pp an

Calibration module
- **Code Repository**

GitHub: coresoftware - INTT Calibration module

Offline QA Plots

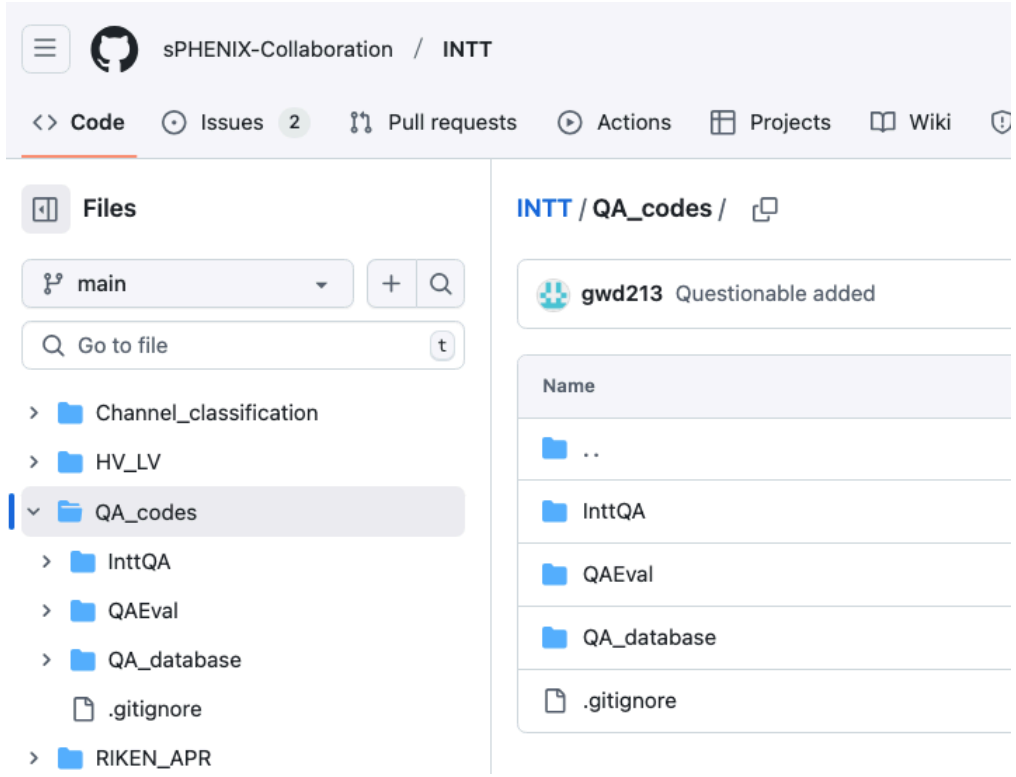
QA plots from coresoftware is intended to be automatically gener
- **Code Repository**

GitHub: coresoftware - INTT QA
- **Output Storage**

Histograms with our production get dumped into /sphenix/data/d

Ongoing …
Any thing related to
INTT Run QA will be
written here

- Code is available in GitHub



sPHENIX-Collaboration / INTT

Code | Issues 2 | Pull requests | Actions | Projects | Wiki

Files

main

Go to file t

- Channel_classification
- HV_LV
- QA_codes
  - InttQA
  - QAEval
  - QA_database
  - .gitignore
- RIKEN_APR

INTT / QA_codes /

gwd213 Questionable added

Name

- ..
- InttQA
- QAEval
- QA_database
- .gitignore

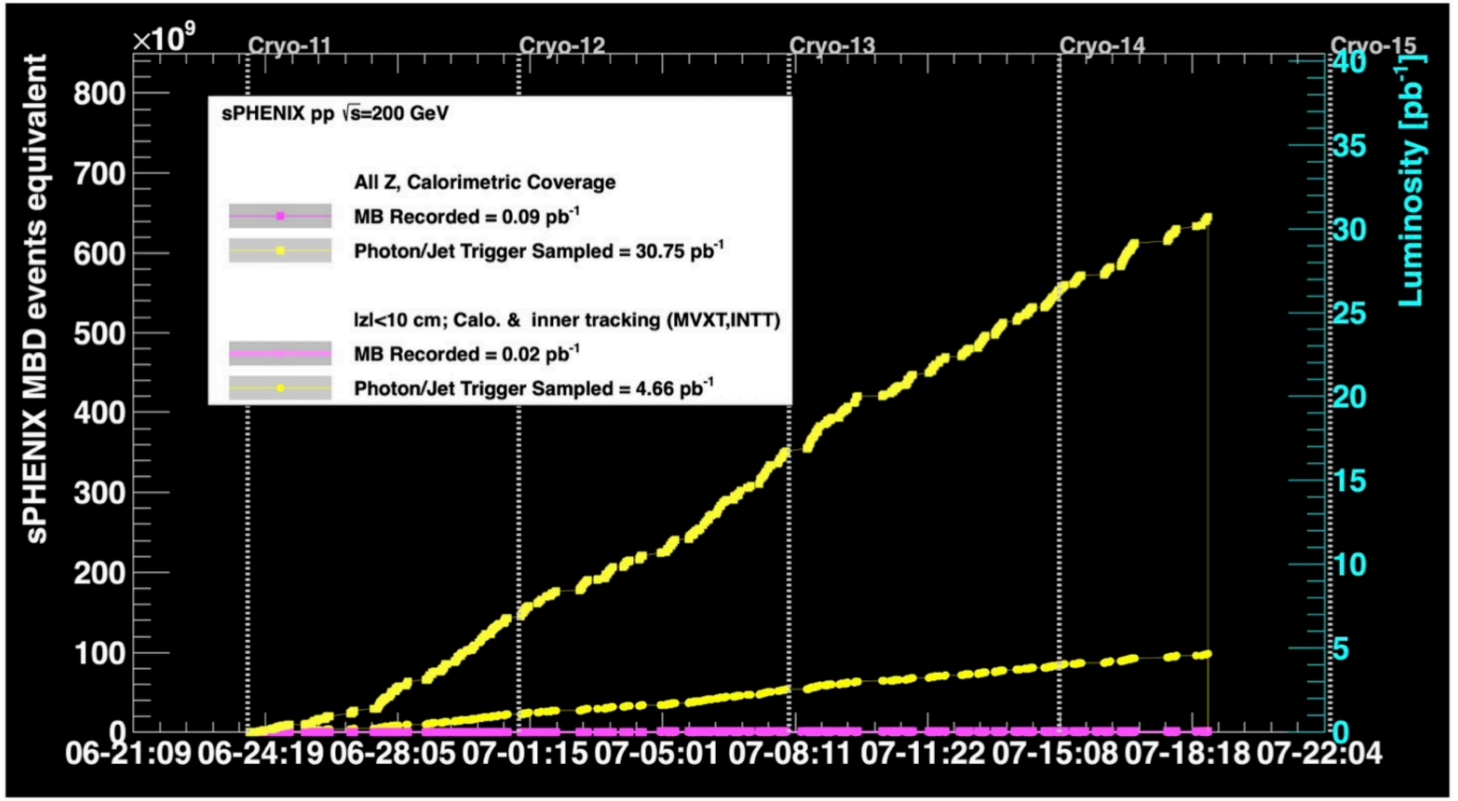
InttQA -> Genki's Offline QA code
QAEval -> Main analysis for Run classification
QA_database -> Code related to intt_expert PSQL maintenance

Task assignment / Plan

- Maintenance entire QA code at least until Run24 list published(Jaein)
- INTT wiki writing (Jaein)
- Calibration Result check (Takahiro)
- Learning QA code and investigating if there is any mistake/cross-check(Takahiro)

- Counting GoodChanRatio after applying permanent dead channel masking
- Checking database if we can count MBD trigger, If so, calculate fraction again based on MBD Trig

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

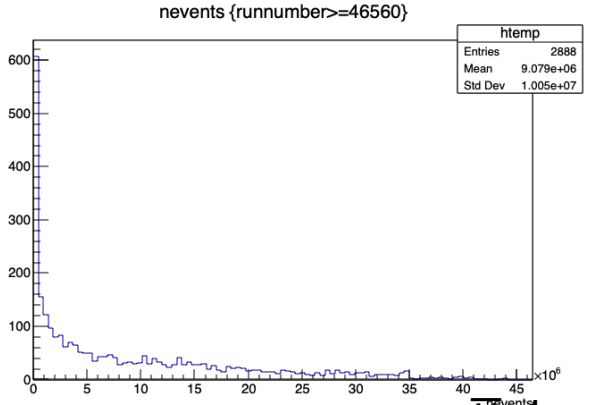
My personal suggestion, only worth analyzing data after June 24, 2024.

BACKUP (No Questionable for 80<GOOD<90)

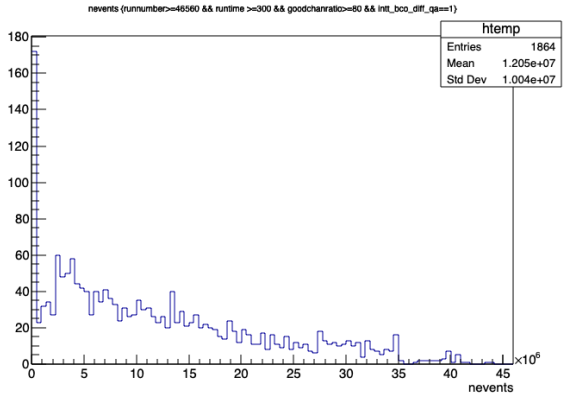
From Jun 21(Run 46560) to End of Run

- Golden Run
  BCO alignment = GOOD
  Runtime >= 5 mins
  GOOD Channel ratio > 80%
- Bad Run case 1
  Runtime >= 5mins
  BCO alignment = BAD
- BAD Run case 2
  Runtime >= 5mins
  Good Channel ratio < 80%
- Questionable
  Runtime < 5mins

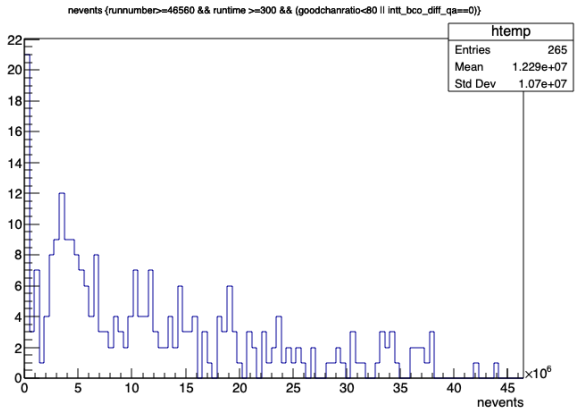
Total Run : 2888
Events : 26,221,049,770



GOOD Run 1864
Events : 22,463,376,709



BAD Run : 265
Events : 3,256,504,740



Q Run : 759
Events : 501,168,321

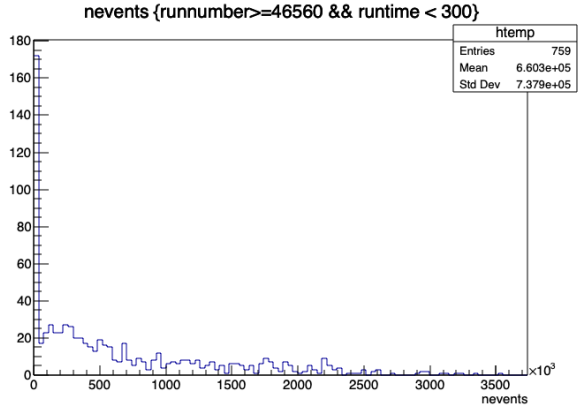
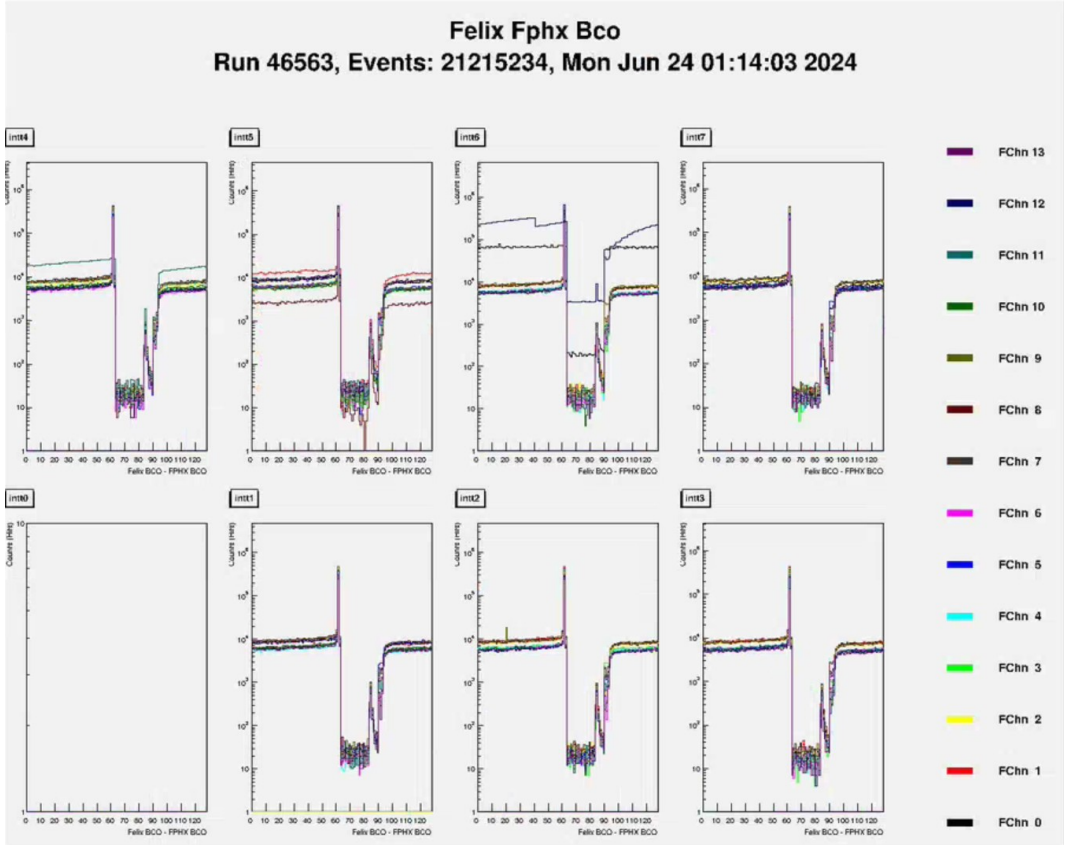
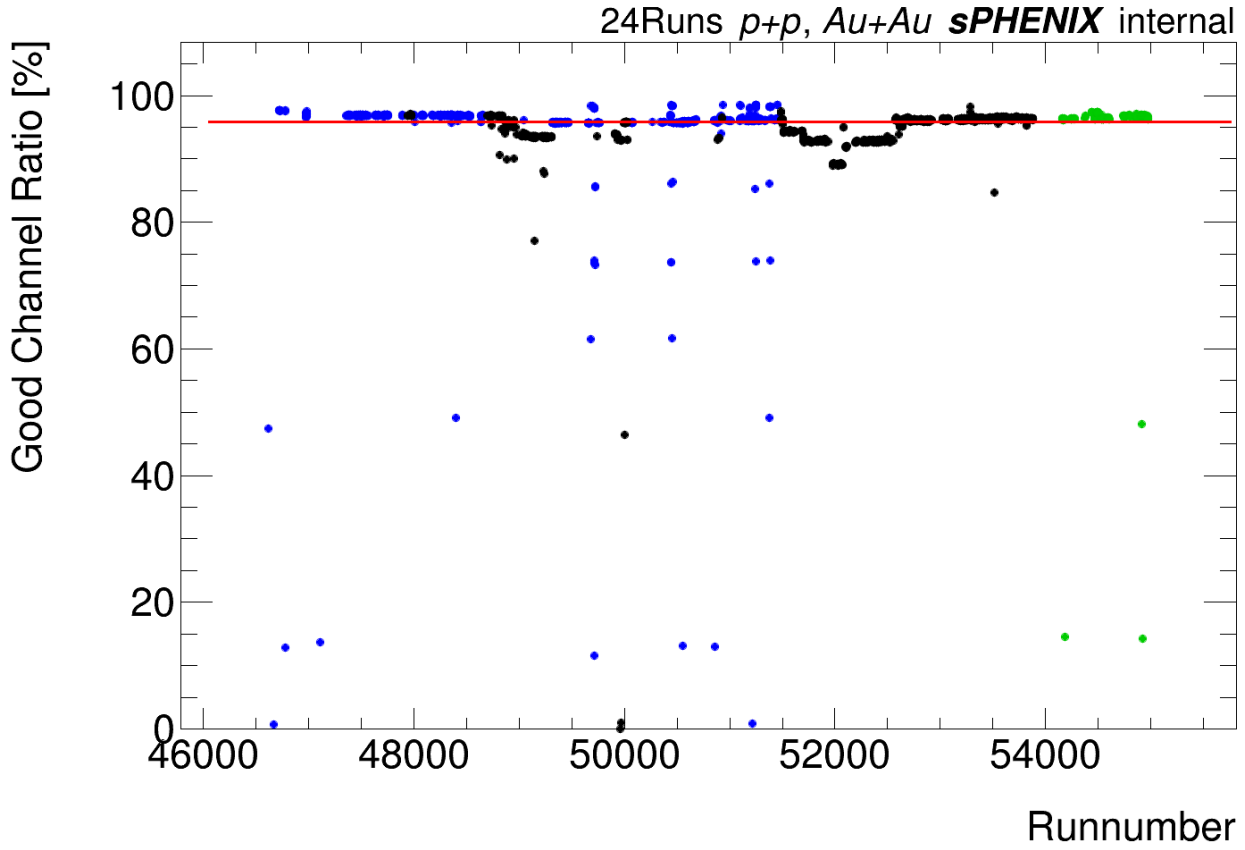


표1

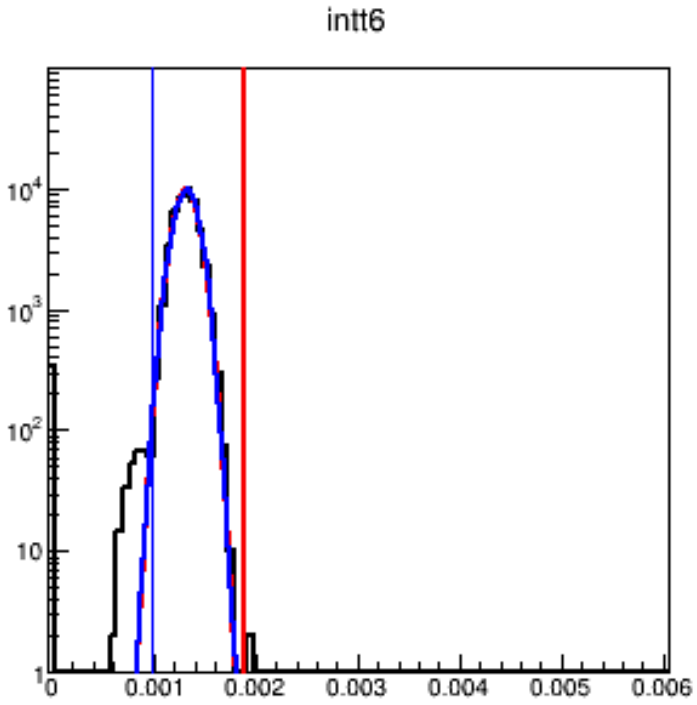
Category	Fraction of Runs (%)	Fraction of Event (%)
GOOD	64.54%	85.67%
BAD	9.18%	12.43%
Questionable	26.28%	1.91%

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