# KLM global/local runs report

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Summary of last week

- **Global cosmic run, KLM basically run smoothly (a few ttlost)**
  - sometimes KLM BUSY happened directly after run start (event number tag at 0). Can be cured by shifters' abort-restart. This issue looks was fixed by Nakao-san's reprogramming KLM COPPER FTSWs on March.03 ~18:00.
  - KLM was excluded once due EB1_KLM02 node crashed, fixed by Konno-san later.
- **Global high rate test (scintillator dummy firmware)**
  - Can handle ~1trg/6us trigger limiter, input Poisson 50kHz, output ~28-29kHz.
  - Log: https://confluence.desy.de/display/BI/Global+Cosmic+Run?preview=/77816375/86672629/globalHighRateTest_March02.pdf
  - On March. 05, Yamada-san fixed the bottleneck of output rate which was caused by network parameters for KLM coppers. Then he got a run with output rate ~33kHz, but soon KLM run into FTSW BUSY.
- **Local UT3 cosmic run with GUI**
  - Track rate is stable from run to run.
  - Validated the GUI operations.
- **Problems:**
  - BF4 (DC17) crate is dead. Power cycle (via PDU) does not help.
  - BF1, BF2, BB6 are not healthy. Tried power cycle on March.05. Not cured.
  - Efficiency matching to CDC (KLM track rate) is varying from run to run.
    - Golden Sunday (Feb.25) night with stable efficiencies must happened by chance. If we look at Nov 2017 global cosmic run, we also sometime see several good runs in a row. https://confluence.desy.de/display/BI/Global+Cosmic+Run?preview=/77816375/81096558/GCRdataTaking_Nov29.pdf
    - No clearly changes at Feb.25 night, except ECL adjusted energy threshold but we have checked with ECL people that the change does not affect trigger.
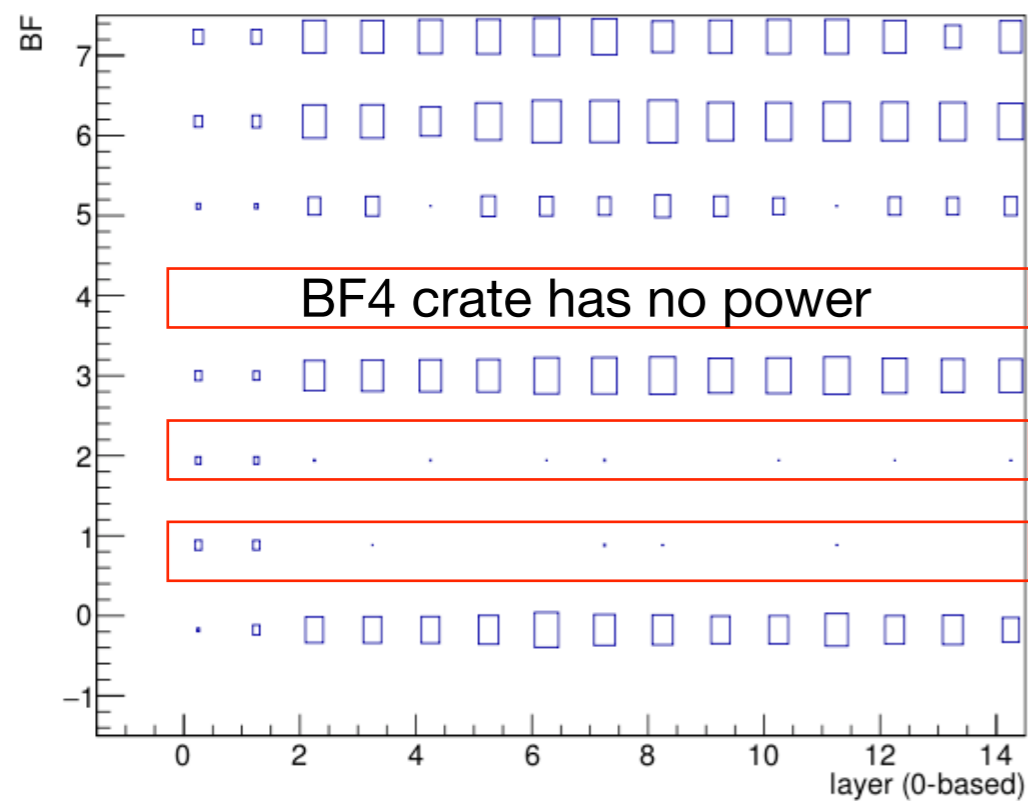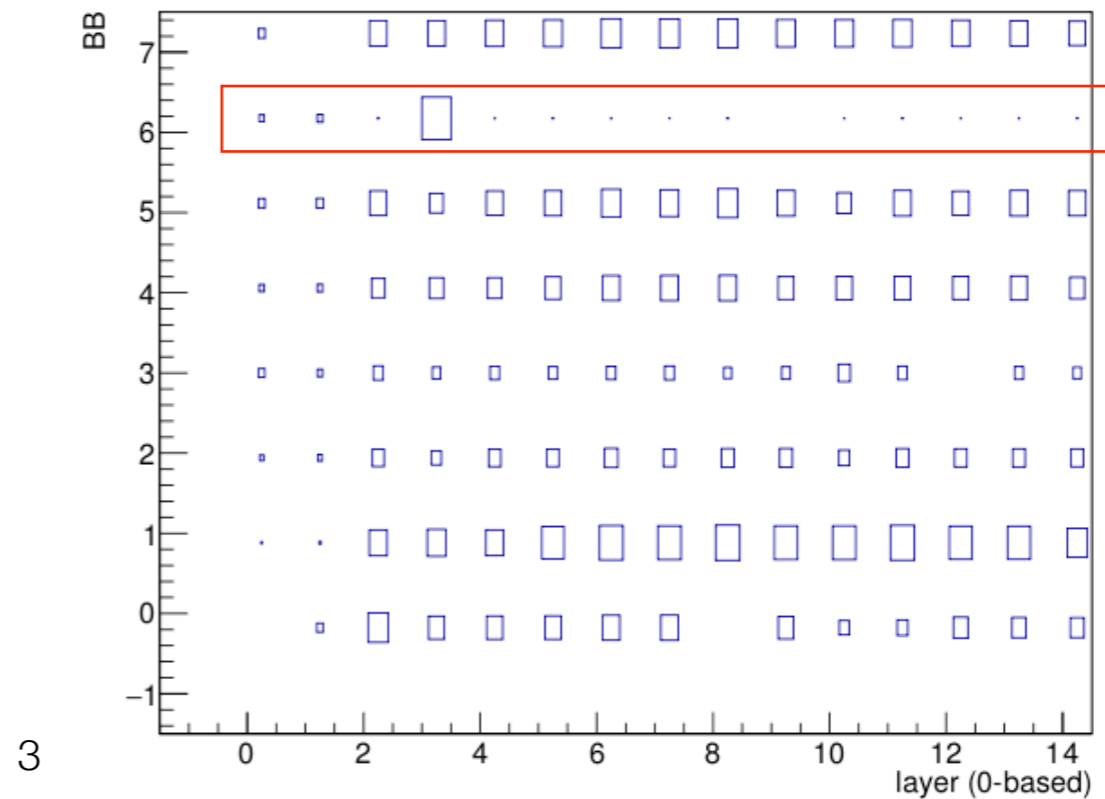
Bad sectors

Global Cosmic Run (GCR)

Run1431 BB

BF4 crate has no power
BF2
BF1
BB6
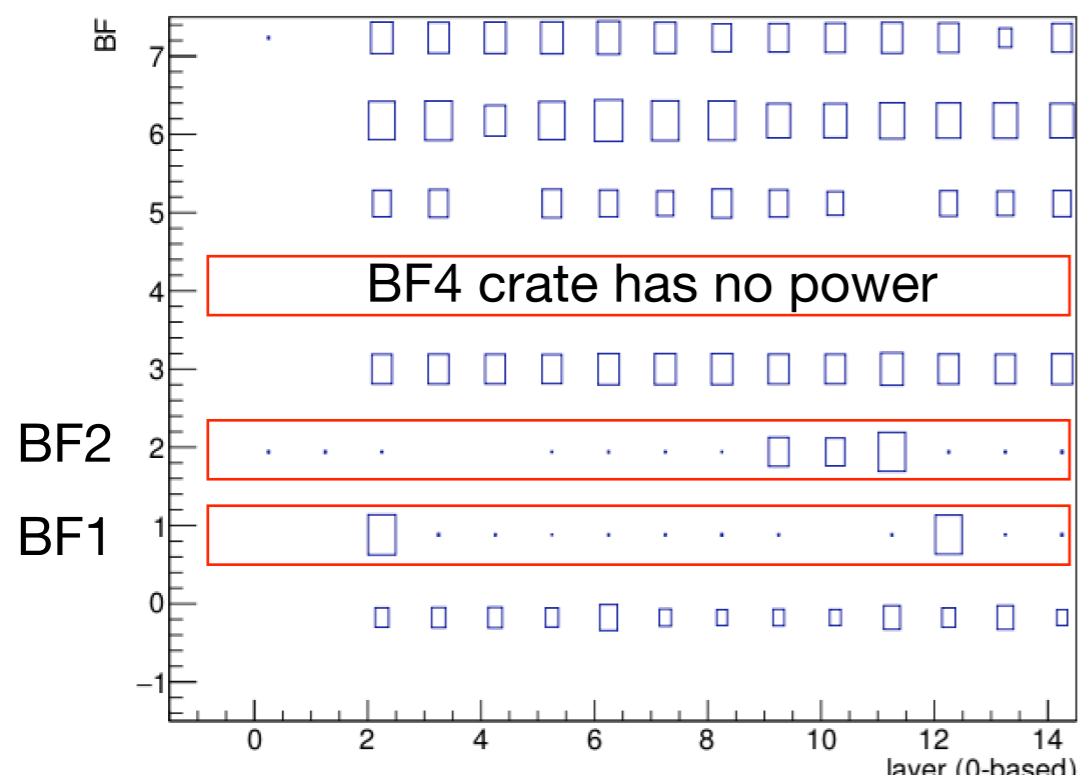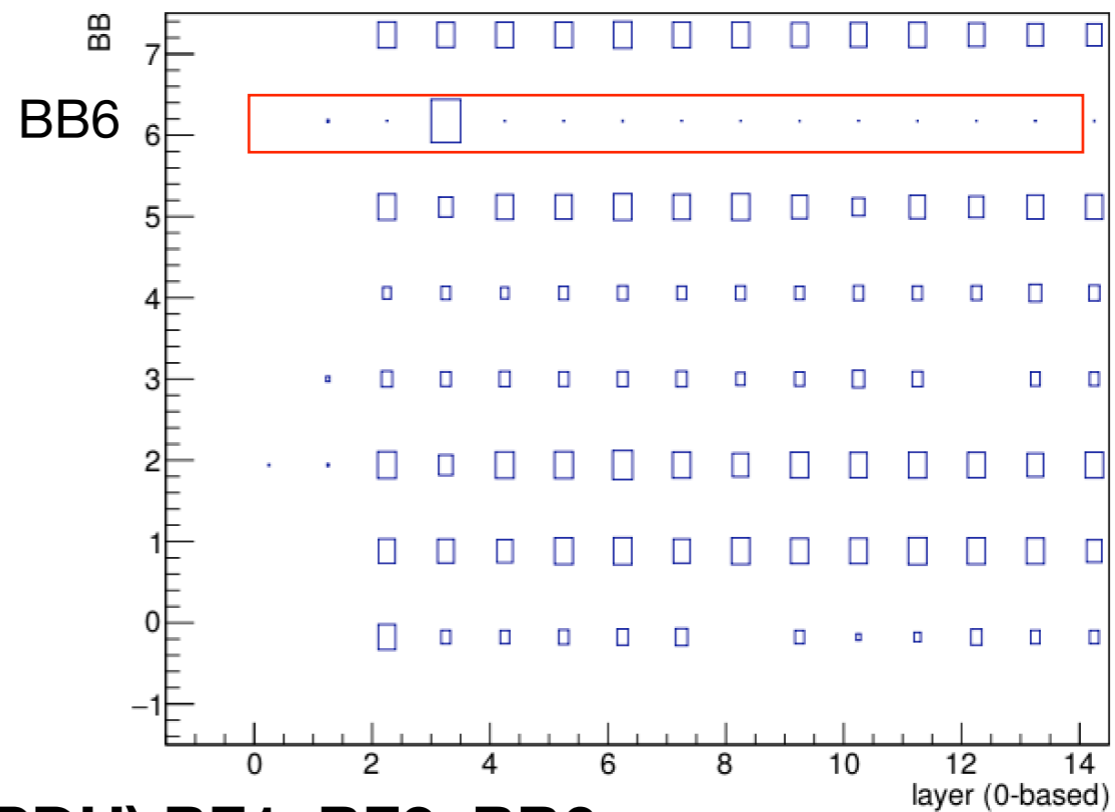
Local Cosmic Run after power cycle (via PDU) BF1, BF2, BB6 Run1357 BB

BF4 crate has no power
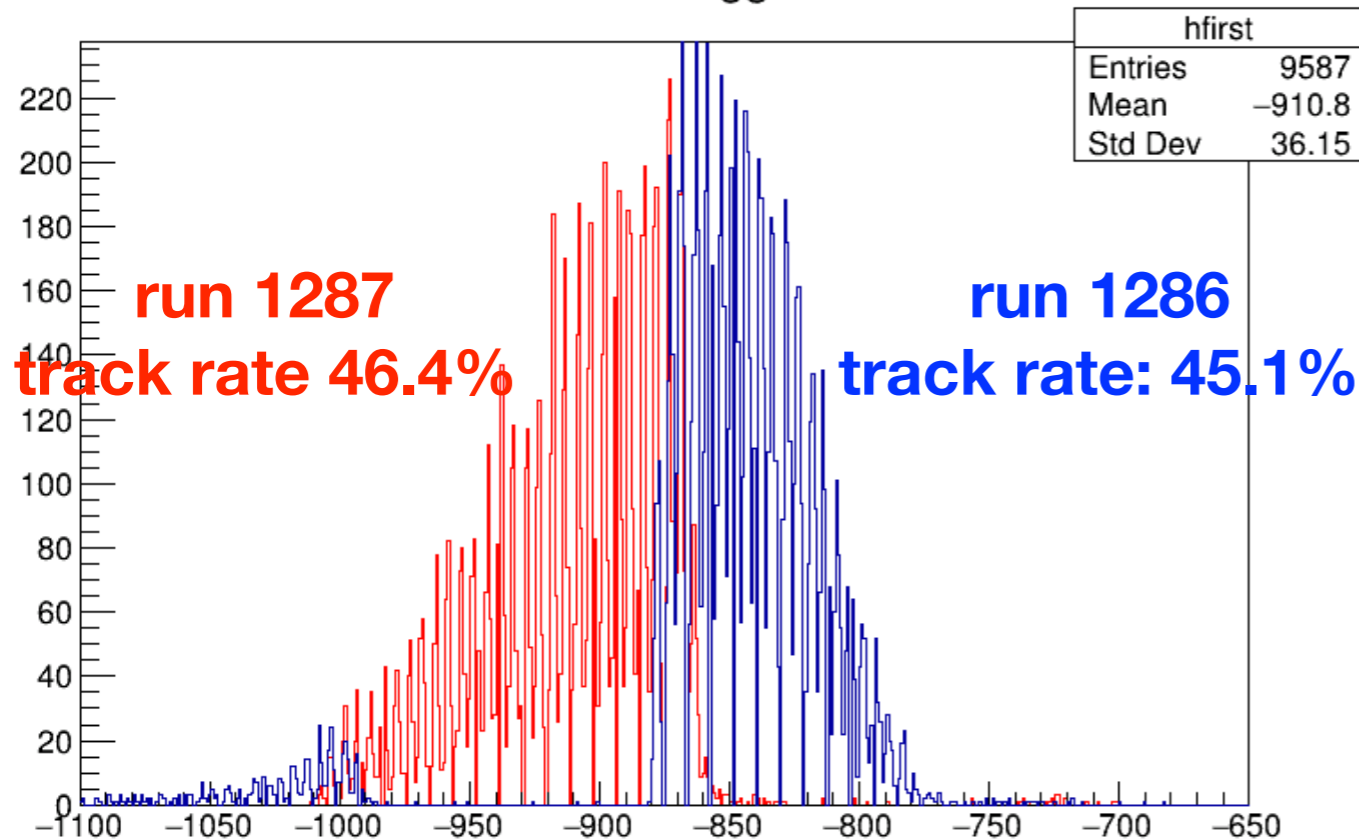
3

Local cosmic runs operated by GUI

look at minimum CTime of hits-on-track

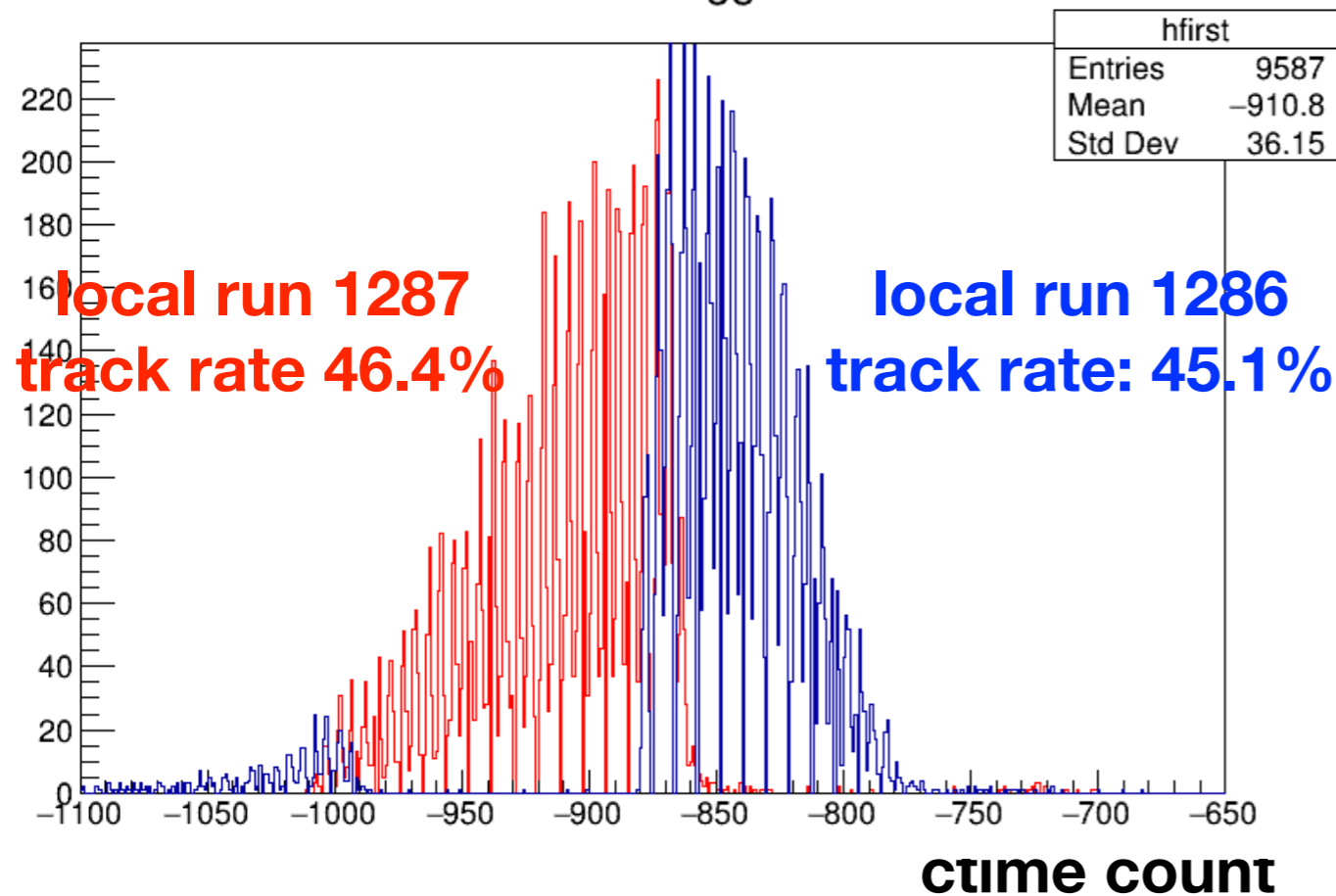| Run Number	Events Sampled	% of Events with KLM Tracks
01276	5.4k	45.2%
01280	11.0k	45.5%
01282	14.7k	45.0%
01283	16.6k	45.3%
01285	16.3k	45.3%
01286	18.7k	45.1%
01287	16.1k	46.4%
01288	9.9k	47.2%

- **run control SW is same in local and global mode.**
- **GUI has been tested in local mode, track rate is stable from run to run.**
- **I have tested varied GUI operations in local mode, there is a Log file:** https://confluence.desy.de/display/BI/BKLM+Local+Runs?preview=/77816425/84344418/20180228_GULocal.pdf
- **In addition, GUI SW does nothing, it does not upload any configurations. Configures for KLM are determined by our commands lines before we join global runs.**
- **Thus, I came to the conclusion that there is no problem with GUI and its SW. Efficiency matching to CDC varying in global runs should be caused by other reasons, probably timing issues.**

Trigger latency in local and global

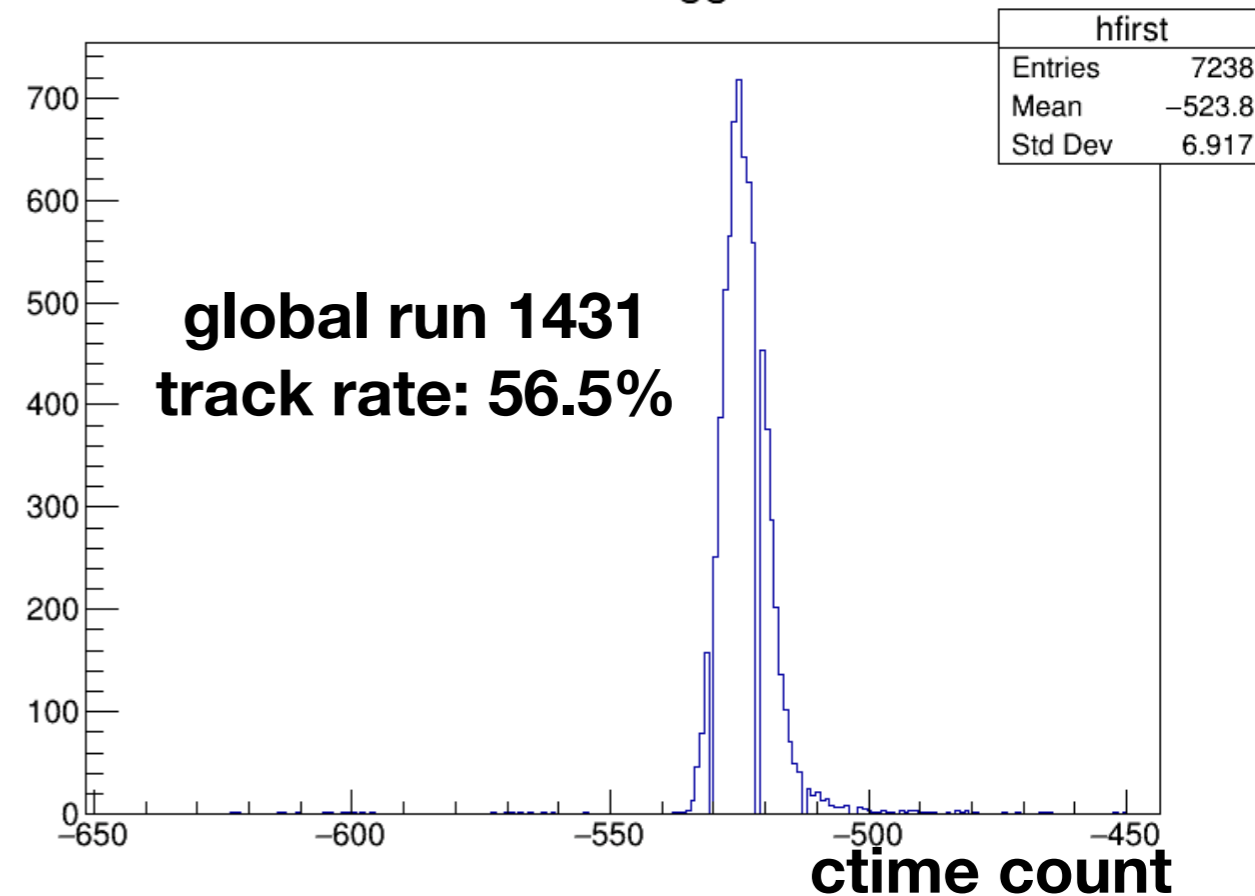- **look at minimum CTime of hits-on-track, look at its differences from trigger CTIME**

local UT3 cosmic run

min CTime - triggerTime

hfirst	
Entries	9587
Mean	−910.8
Std Dev	36.15

local run 1287 track rate 46.4%

local run 1286 track rate: 45.1%

ctime count

global cosmic run

min CTime - triggerTime

hfirst	
Entries	7238
Mean	−523.8
Std Dev	6.917

global run 1431 track rate: 56.5%

ctime count

- **In local mode, the trigger latency has quite wide variation, and has different trigger latency comparing to global cosmic run. Thus I have to set different look back window for local and global.**
- **In local mode I used a RPC loopback window: [0x465, 0x2B1] that is [1125, 689]. In global [768, 332]. Same width.**
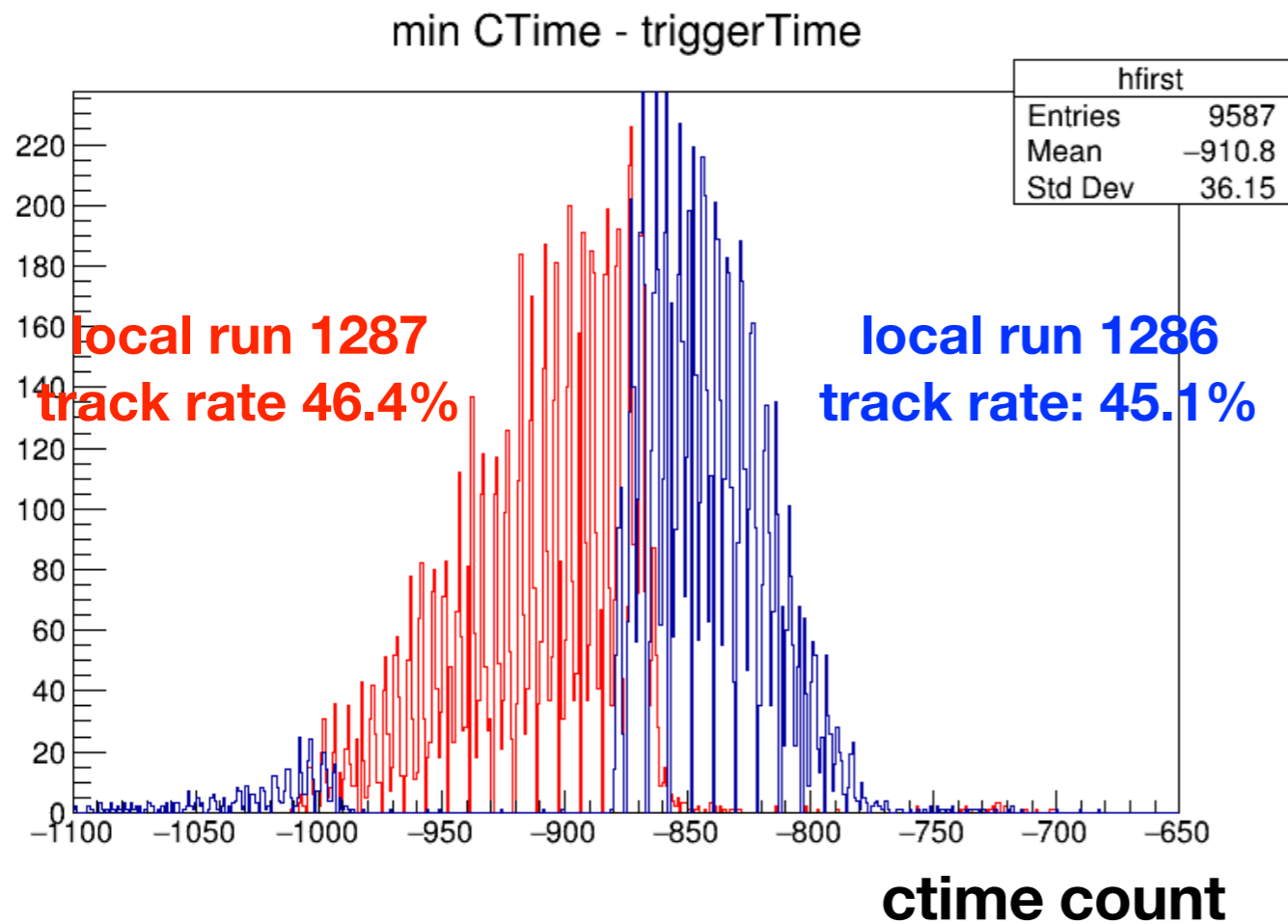
5

test local trigger delay

local UT3 cosmic run
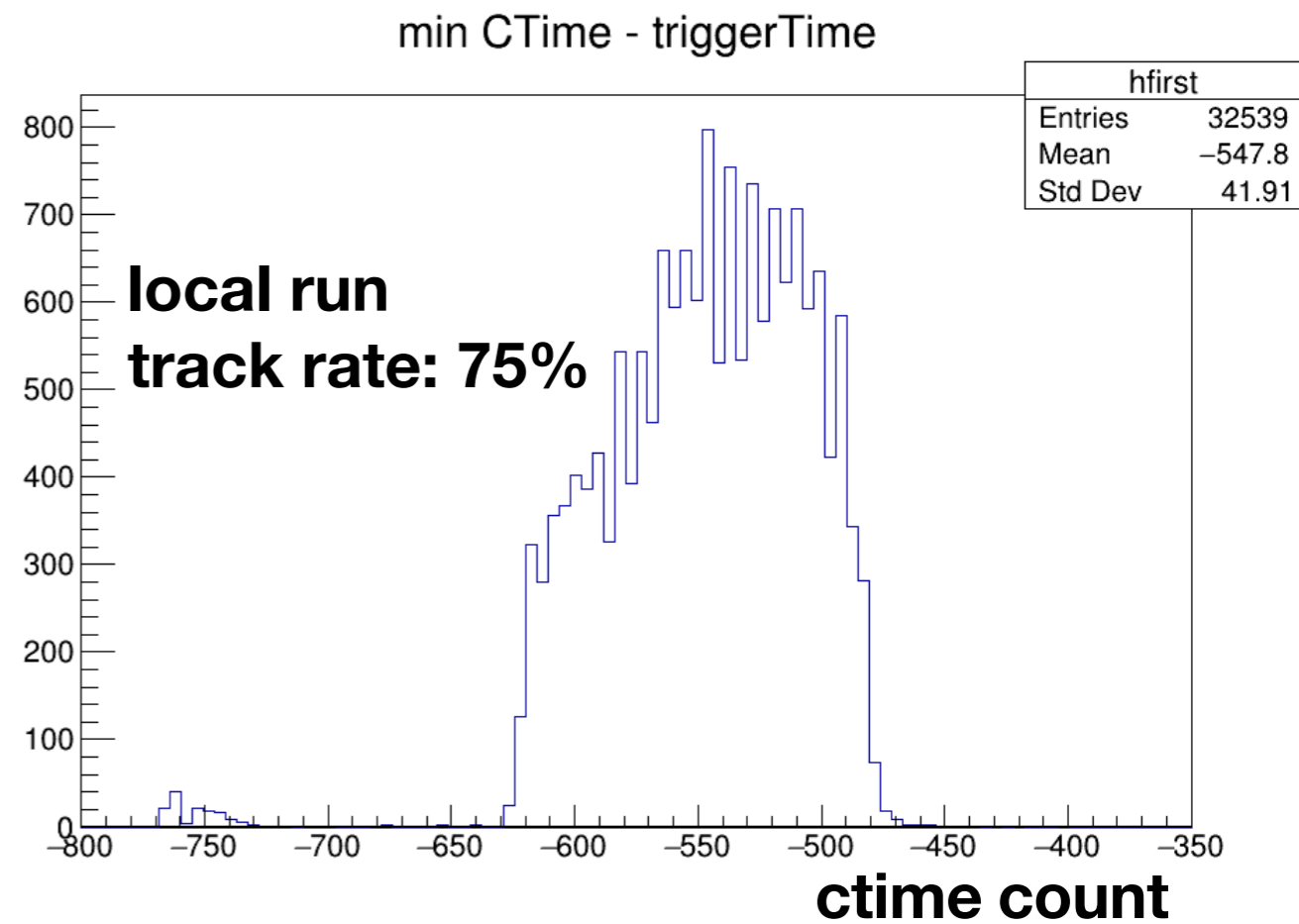
look at minimum CTime of hits-on-track
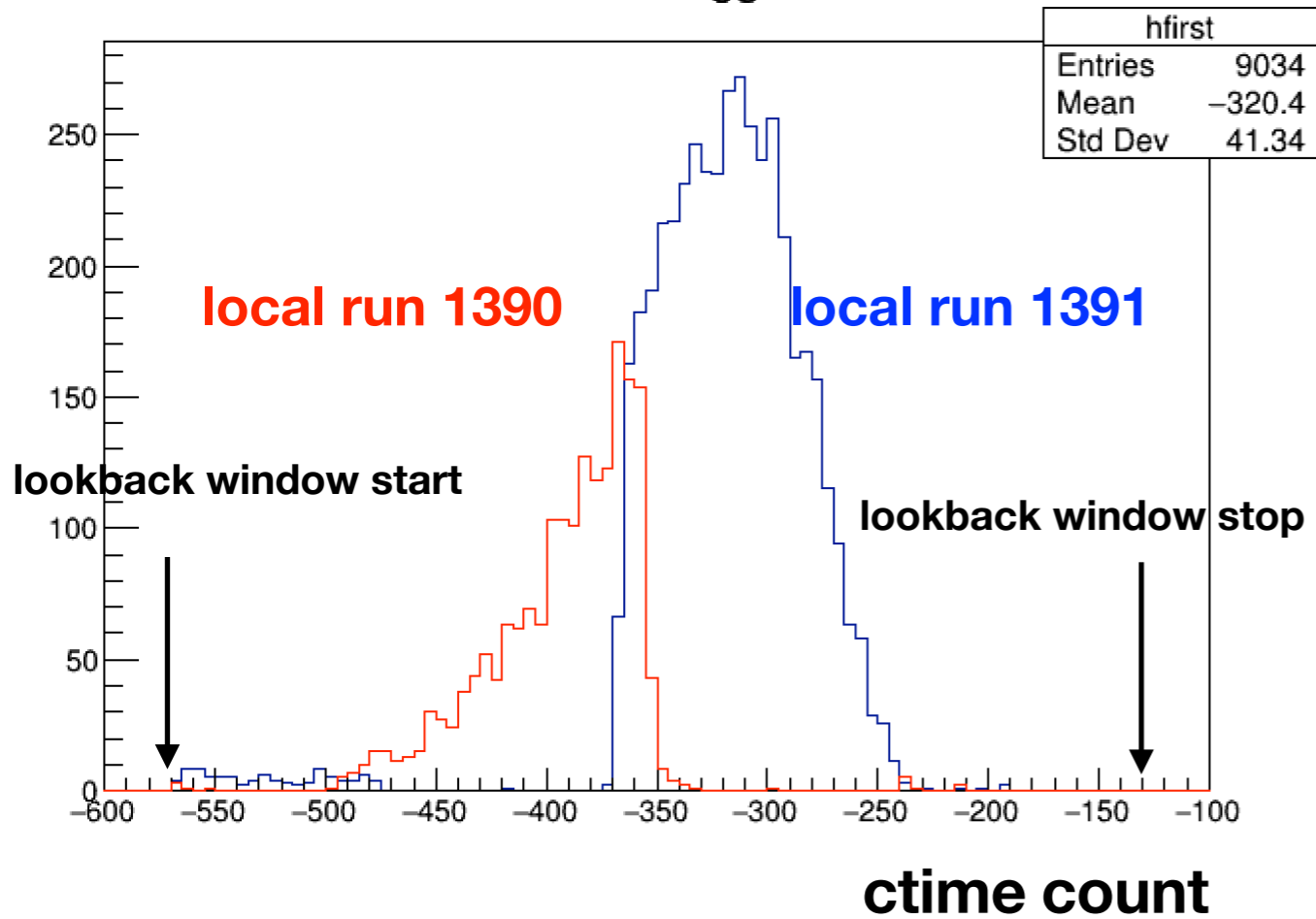
trigger delay 0x216
RPC lookback window [1125, 689]

trigger delay 0xc8
RPC lookback window [768, 332]

ctime count

test local trigger delay(2)

trigger latency

min CTime - triggerTime

hfirst	
Entries	9034
Mean	−320.4
Std Dev	41.34

local run 1390   **local run 1391**

lookback window start

lookback window stop

ctime count

all configuration SAME :
trigger delay 0x00 (no delay)
RPC lookback window [0x238,0x84] =
[568, 132]

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Run Number	Events Sampled	% of Events with KLM Tracks
01390	10.k	28.8%
01391	10.k	69.3%
01392	10.k	28.7%
01393	10.k	28.6%
01394	10.k	69.8%
01395	10.k	28.9%

Global Cosmic run

RPC lookback window [768, 332]
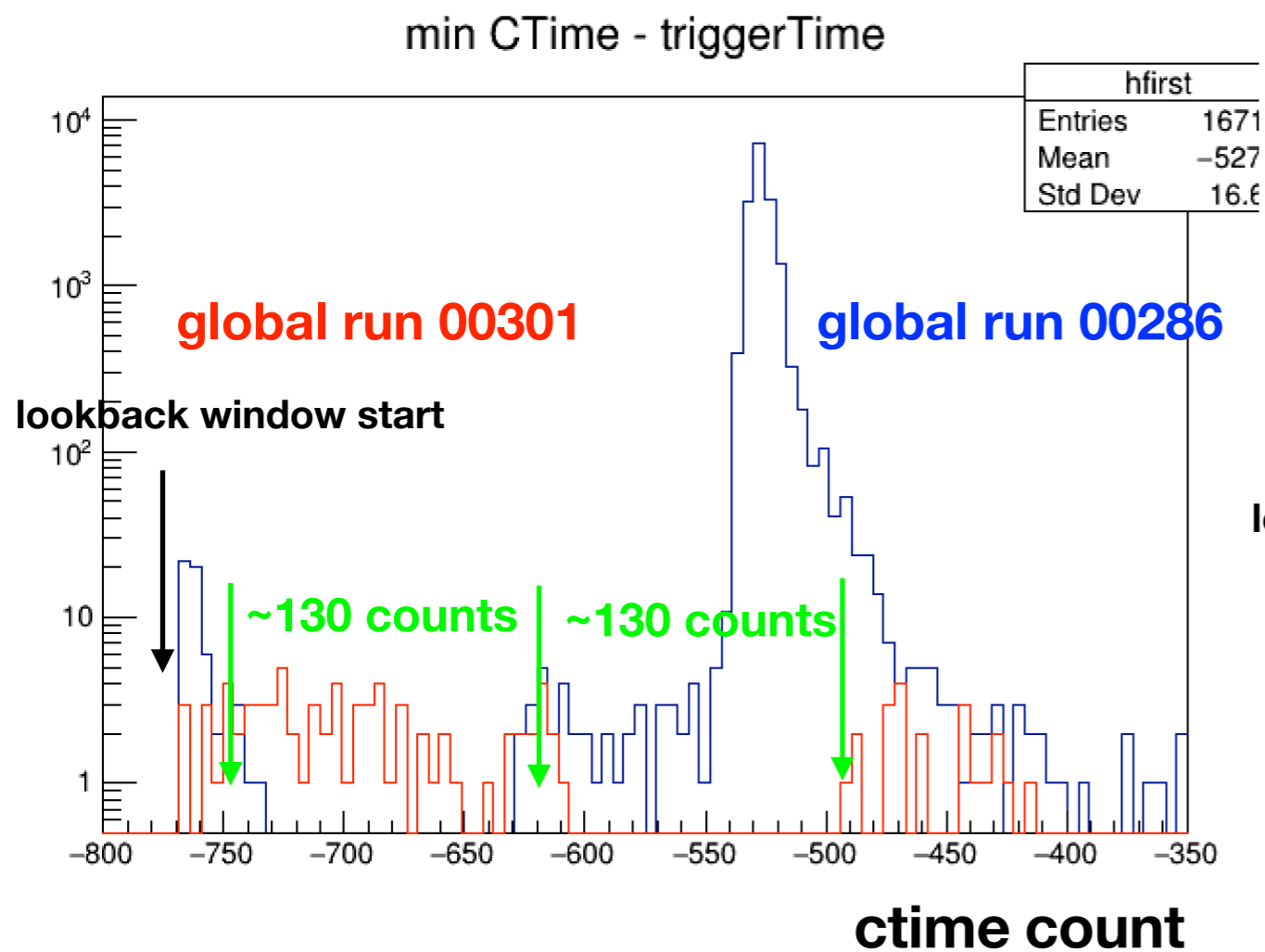
KLM local run

trigger delay 0x00 (no delay)
RPC lookback window [0x238,0x84] = [568, 132]

min CTime - triggerTime

hfirst
Entries 1671
Mean −527
Std Dev 16.6

global run 00301

global run 00286

lookback window start

~130 counts   ~130 counts

ctime count

min CTime - triggerTime

hfirst
Entries 9034
Mean −320.4
Std Dev 41.34

local run 1390

local run 1391

lookback window start

lookback window s

~130 counts   ~130 counts

ctime count