Replies to Winter2020 pass1 review

Recommendation:
There was a discrepancy between the number of electrons in sector 4 shown in the sampling fraction plots (Yordanka) and in timelines (Electrons/trigger). The number of entries in the sampling fraction plots was not presented, but visually it looked like the number of electrons in sector 4 was much higher than in other sectors. The timelines showed the sector 4 had the lowest number of electrons/trigger. This discrepancy must be understood before pass1 starts.

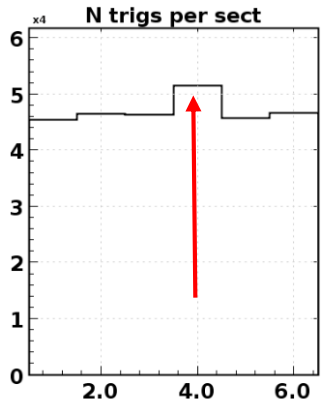
We investigated the monitoring code, which produces also the plots fitted in the timelines.
Let us call:

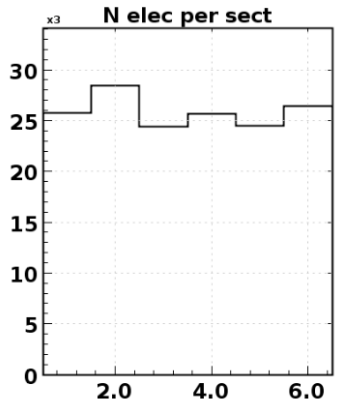
- **Ne1: Number of electrons in the sampling fraction plots,**
- **Ne2: Number of electrons in the plots used by the timelines,**
- **Ntrig: number of triggers in the plots used by the timelines.**

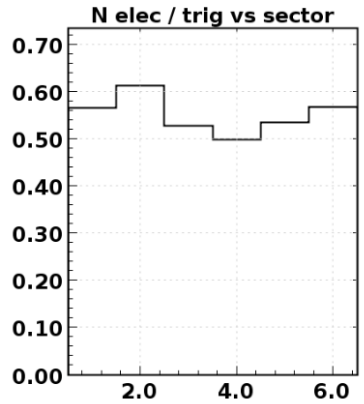
Ne1 and Ne2 have <u>different definitions</u> in the monitoring code:

- **Ne1: number of trigger electrons for which there is REC::Calorimeter bank and abs(vz+3)<12 and p>1.5 GeV/c.**
- **Ne2: number of trigger electrons for which there is a PCAL entry, DC entry and a matching track in TimeBasedTrkg::TBTracks.**

The selection criteria seem to be more restrictive for Ne2, but the minimum momentum cut for Ne1 may lead to a larger Ne2 than Ne1.
However, the lower ratio Ne2/Ntrig for sector 4 seems to be primarily due to the <u>larger Ntrig for that sector</u>.
If the committee deems it necessary, we can investigate more to try and understand why S4 had more triggers.
However, the sector-by-sector variations we observe in the electron/trigger yields are compatible with what was observed in the other RGB run periods.







Comment:

1. The forward DC has not been calibrated for this run period. Calibration constants from RG-K have been used instead, resulting to a larger spread in means and wider widths of residuals. This is a re-occurring situation with DC calibration and should be fixed for the final processing (pass2) of any data set. We believe, no matter how small changes in the calibration constants are, all the detectors must be calibrated using the run(s) of the given run period.

At the closeout, we have been informed that DC was calibrated overnight using one of RG-B runs. The review committee will appreciate to see a new timelines of residuals (mean and widths).

A new pass0 cooking was done after DC calibration, full timelines can be found at:

https://clas12mon.jlab.org/rgb/pass0/v25.18_prod/tlsummary/

And they are to be compared to the previous ones:

https://clas12mon.jlab.org/rgb/pass0/v25.14_prod/tlsummary/

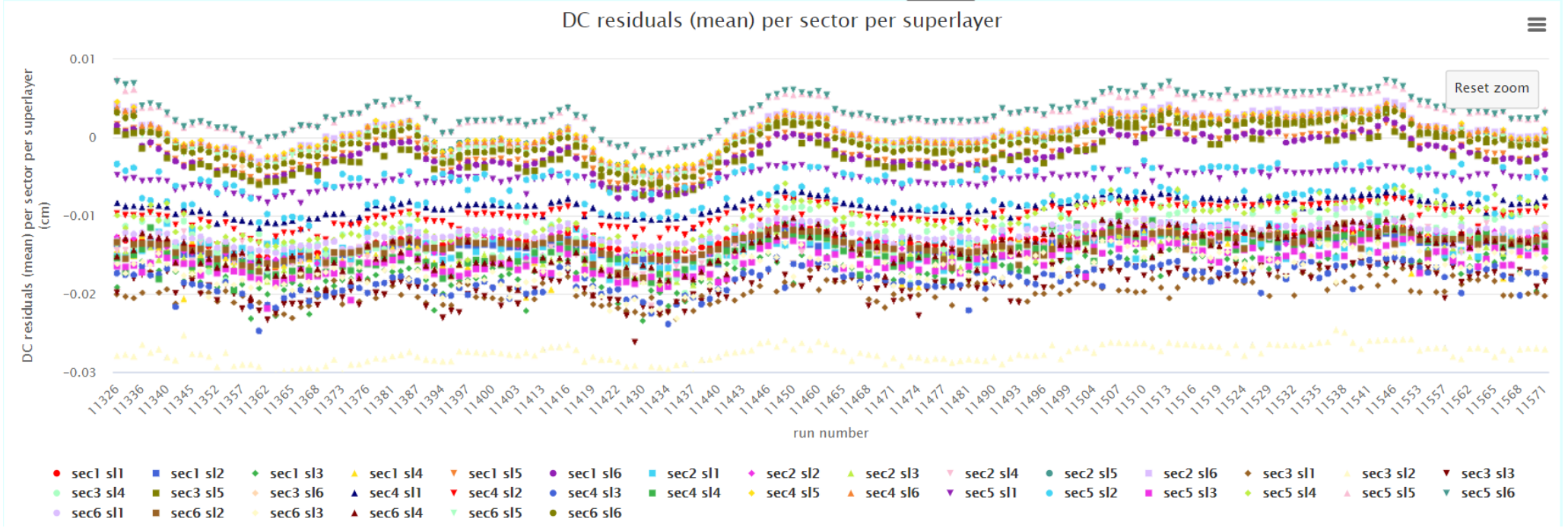
Comparisons for the required DC plots are provided in the next two slides

Improvement (~100 microns) in the sigma of the residuals, in particular for SL3 and SL4

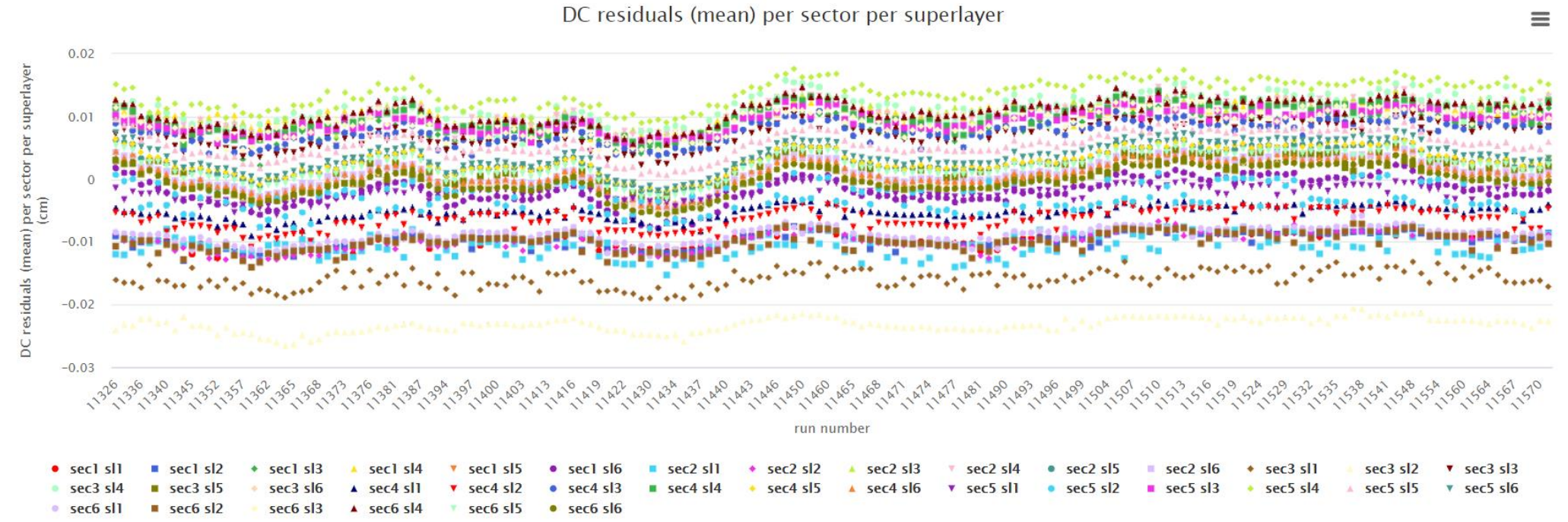
The means show shifts by 50-100 microns, depending on SL and sector

No evident changes in the calibration quality and stability of the calibrations of the other subdetectors

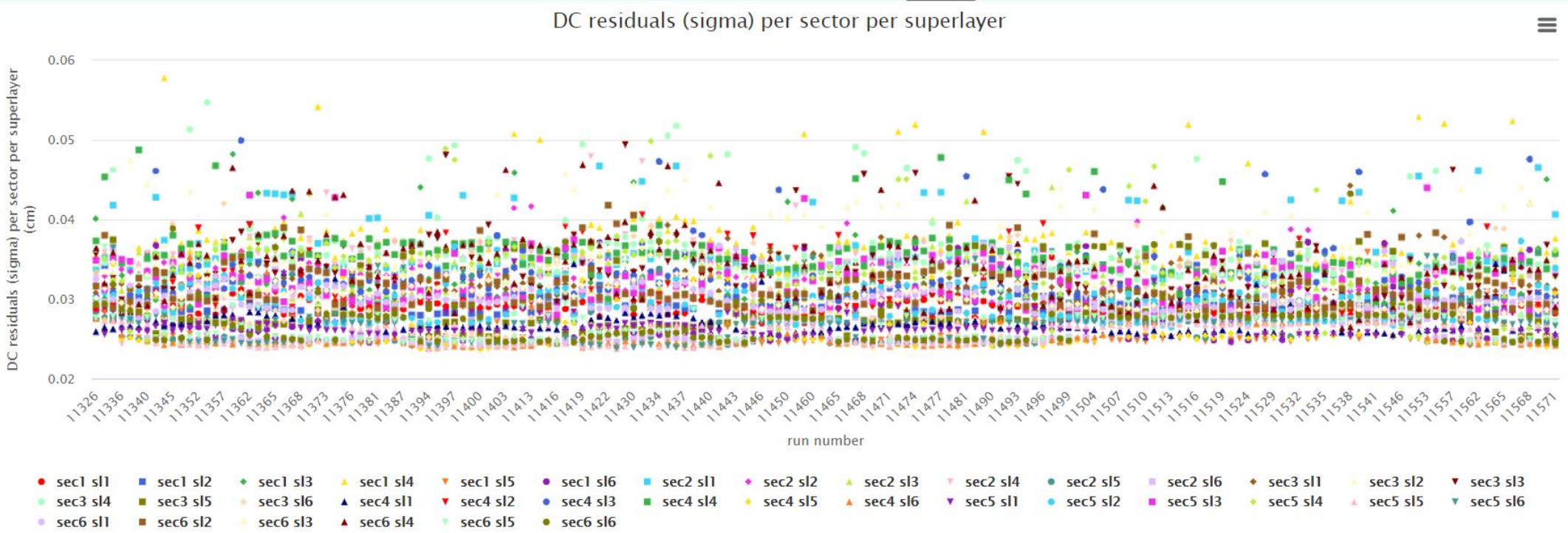
NEW


DC residuals (mean) per sector per superlayer
Reset zoom
DC residuals (mean) per sector per superlayer (cm)
0.01
0
-0.01
-0.02
-0.03
11326 11336 11340 11345 11352 11357 11362 11365 11368 11373 11376 11381 11387 11394 11397 11400 11403 11413 11416 11419 11422 11430 11434 11437 11440 11443 11446 11450 11460 11465 11468 11471 11474 11477 11481 11490 11493 11496 11499 11504 11507 11510 11513 11516 11519 11524 11529 11532 11535 11538 11541 11546 11553 11557 11562 11565 11568 11571
run number
sec1 sl1 sec1 sl2 sec1 sl3 sec1 sl4 sec1 sl5 sec1 sl6 sec2 sl1 sec2 sl2 sec2 sl3 sec2 sl4 sec2 sl5 sec2 sl6 sec3 sl1 sec3 sl2 sec3 sl3
sec3 sl4 sec3 sl5 sec3 sl6 sec4 sl1 sec4 sl2 sec4 sl3 sec4 sl4 sec4 sl5 sec4 sl6 sec5 sl1 sec5 sl2 sec5 sl3 sec5 sl4 sec5 sl5 sec5 sl6
sec6 sl1 sec6 sl2 sec6 sl3 sec6 sl4 sec6 sl5 sec6 sl6

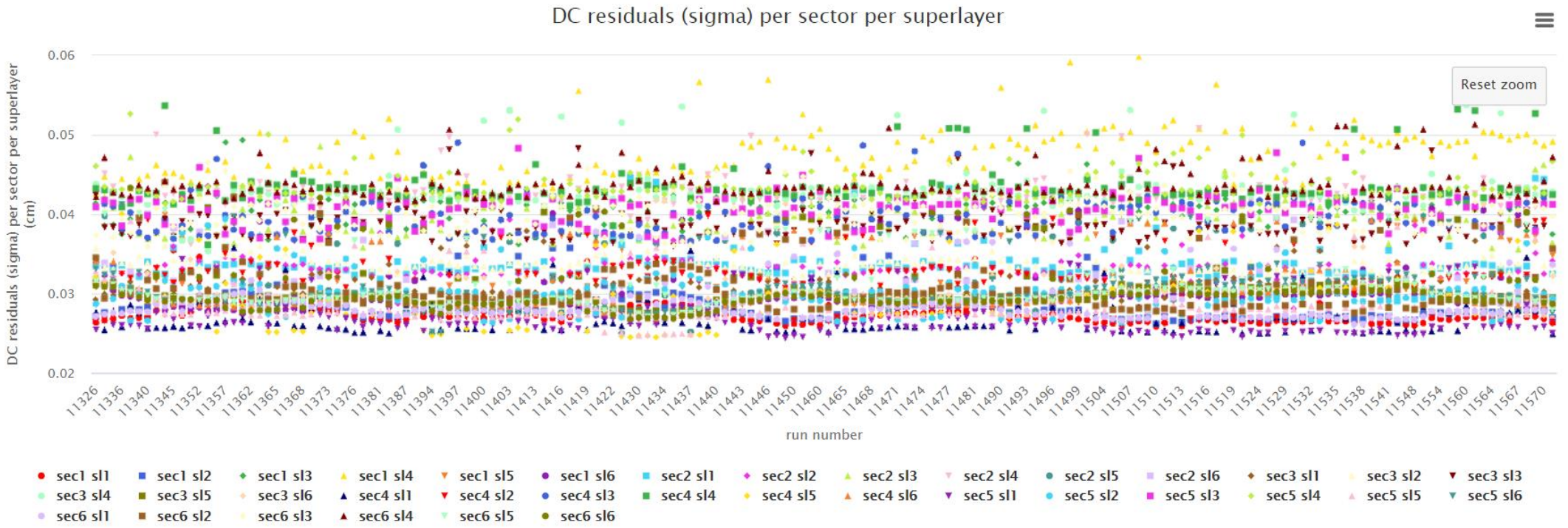
OLD


DC residuals (mean) per sector per superlayer
DC residuals (mean) per sector per superlayer (cm)
0.02
0.01
0
-0.01
-0.02
-0.03
11326 11336 11340 11345 11352 11357 11362 11365 11368 11373 11376 11381 11387 11394 11397 11400 11403 11413 11416 11419 11422 11430 11434 11437 11440 11443 11446 11450 11460 11465 11468 11471 11474 11477 11481 11490 11493 11496 11499 11504 11507 11510 11513 11516 11519 11524 11529 11532 11535 11538 11541 11548 11554 11560 11564 11567 11570
run number
sec1 sl1 sec1 sl2 sec1 sl3 sec1 sl4 sec1 sl5 sec1 sl6 sec2 sl1 sec2 sl2 sec2 sl3 sec2 sl4 sec2 sl5 sec2 sl6 sec3 sl1 sec3 sl2 sec3 sl3
sec3 sl4 sec3 sl5 sec3 sl6 sec4 sl1 sec4 sl2 sec4 sl3 sec4 sl4 sec4 sl5 sec4 sl6 sec5 sl1 sec5 sl2 sec5 sl3 sec5 sl4 sec5 sl5 sec5 sl6
sec6 sl1 sec6 sl2 sec6 sl3 sec6 sl4 sec6 sl5 sec6 sl6

NEW


DC residuals (sigma) per sector per superlayer
DC residuals (sigma) per sector per superlayer (cm)
0.06
0.05
0.04
0.03
0.02
run number
sec1 sl1 sec1 sl2 sec1 sl3 sec1 sl4 sec1 sl5 sec1 sl6 sec2 sl1 sec2 sl2 sec2 sl3 sec2 sl4 sec2 sl5 sec2 sl6 sec3 sl1 sec3 sl2 sec3 sl3
sec3 sl4 sec3 sl5 sec3 sl6 sec4 sl1 sec4 sl2 sec4 sl3 sec4 sl4 sec4 sl5 sec4 sl6 sec5 sl1 sec5 sl2 sec5 sl3 sec5 sl4 sec5 sl5 sec5 sl6
sec6 sl1 sec6 sl2 sec6 sl3 sec6 sl4 sec6 sl5 sec6 sl6

OLD


DC residuals (sigma) per sector per superlayer
DC residuals (sigma) per sector per superlayer (cm)
Reset zoom
0.06
0.05
0.04
0.03
0.02
run number
sec1 sl1 sec1 sl2 sec1 sl3 sec1 sl4 sec1 sl5 sec1 sl6 sec2 sl1 sec2 sl2 sec2 sl3 sec2 sl4 sec2 sl5 sec2 sl6 sec3 sl1 sec3 sl2 sec3 sl3
sec3 sl4 sec3 sl5 sec3 sl6 sec4 sl1 sec4 sl2 sec4 sl3 sec4 sl4 sec4 sl5 sec4 sl6 sec5 sl1 sec5 sl2 sec5 sl3 sec5 sl4 sec5 sl5 sec5 sl6
sec6 sl1 sec6 sl2 sec6 sl3 sec6 sl4 sec6 sl5 sec6 sl6

Recommendation:
In the first presentation, two beam energies were quoted for the run period, 10.2 GeV and 10.4 GeV. The run was at a fixed beam energy of 10.4 GeV. It was a wrong BSY energy reading in EPICS at the beginning of the run period that ended up in RCDB. The beam energy must be corrected to 10.4 GeV in RCDB for the initial period of the run.

We communicated the run range to be corrected to Sergei, who is the only one having the permissions to modify RCDB. He replied that he needs a script from Harut. Harut sent the script. Sergei said he'll do it ASAP.

Comment:
• With current farm load, and without competition from other CLAS12 run groups for data processing resources, the whole data set will be processed in about 1.5 – 2 month time frame. The skim output, about 6 TB, will be available for physics analysis either on volatile or on cache disks.
• Plans for storing skims for physics analysis – volatile vs. cache

We will put the skims first on volatile, have people check them and start their analyses. If all is good, the trains can be copied on tape (except J/psi, which is being optimized).

Comments:
• Run group developed a new optimized skims for physics analysis. There should be a unified plan for redoing skims with the latest wagons for the whole RG-B data set.
• Define the main physics reactions that likely to produce publications from the pass1 processed data

The latest, optimized wagon, has been run on all the Fall19 and Spring19 data. It will also be used for Winter during the cooking.
All RGB data will have the same skim definition

- **nDVCS and pDVCS will publish using these data. A draft of analysis note should come within a couple of months**
- **SIDIS multilplicity analysis by Orlando won't be ready in a relatively short time (focus is on RGA first)**
- **BAND plans to publish using these data, analysis note is in progress**
- **Gmn analysis is more or less satisfied with the quality of the current data but progress is slow, no analysis note in the short term**