

Step by step code instruction:

The code is available here `/star/u/tinglin/work/summer2014/cvsversion/myCal/`

Main macro for analysis is `macro/runEEmcCalMaker.C`. I use the `Sched/myinput.html` as input file for it.

`Myinput.html` has the following options:

```
# Location of the run number list file
lists/temp.lis
# Iteration number
0
# Prepost calibration done?(true:1; false:0)
0
# Tower calibration done?(true:1; false:0)
0
# Change SMD mask and gain file?(true:1; false:0)
0
# Change pre1 pre2 and post showers mask and gain file?(true:1; false:0)
0
# Change tower mask and gain file?(true:1; false:0)
0
```

Use the same list during the whole calibration.

**Step 0:** Get the code. `/star/u/tinglin/work/summer2014/cvsversion/myCal/`  
Then run `createLinks.pl <file want to output>`

**Step 1:** Get a good run number list. The code only deal with `st_physics_*_raw_*.MuDst.root` files. Make sure the run number list you use have such files. `Sched/sub.xml` handles the data. Change the path in this file to your own directory. **Remember to check the URL command like storage, production, filename, filetype or so. Sometime you may need to set triggerID to select the events you want. Use “myCalMk -> addTrigIdFilter(triggerID)” in macro/runEEmcCalMaker.C.**

**Step 2:** Run the `macro/runEEmcCalMaker.C` interactively from your parent calibration directory. `root4star -b -q macros/runEEmcCalMaker.C .` Make sure you get the right `mudst.root` file in the 14<sup>th</sup> line of the code. After it runs you should get a file in the directory you ran it from called `R<default run>.hist.root` and a text file `eemcDbDump.dat` that contains all of the database settings. If you get that, great, you did everything right.

**Step3:** If you plan to calibrate from the very beginning, **set all options to 0** in `Sched/myinput.html`. This file deals with the parameters need to change in `macros/runEEmcCalMaker.C`. After that type: `./submit.pl` to submit the jobs.

**Step 4:** After all the jobs complete, use `macros/myhadd.C` to add everything in the histogram. You need to run this each time you finish an iteration worth of jobs: `macros/addIteration <iter>`  
As a side note, this usually takes forever to run because root is really slow when you have a bunch of files open.

**Step 5:** Now that you've done your first pass through the data, the next step is to get preliminary gains for the shower max using inverse slopes. Originally I had set the doSmdGains.C code up to do the inverse slopes only if you were on iteration 0 and do final fits otherwise. Modify the if(iter==x) statements as necessary to fix this. Run with macros/fitSlopes.sh <iter> <gainfac> from your parent directory.

Chose proper gain factor to match the earlier year's final SMD gains. First set the factor to 1, get naive SMD slope gains, normalized that to run9 SMD gains, get the real factor from the mean of ratio.

Remove the gain files you got before. Use this factor to do the real SMD slopes gain.

The output file is in EEMC\_Cal/iter-0/table/ & iter-0/ps/. Check over the plots by eye and make sure the strips list in mask file really look bad. Anything in the mask file will generally have a 0 or negative gain in the gain file. Add the trip id which fit these criteria but not enrolled in SmdAll.Mask.dat.

**Remember: only those strips or sectors which have no accounts or behave very wired than its neighbor in its raw spectrum should be masked out, see the examples below. You may need to re-fit the gain by hand if Root did a very bad fit. Track the gain files and comment the bad strips or sectors' gains out.**

**Step 6:** At this stage you've completed your first fit, even if it just preliminary. So what you need to do is re-fill the distributions using these gains. Change the options in myinput.html to 1-0-0-1-0-0. By default, the code will read the mask and gain files in

EEMC\_Cal/iter-0/table/SmdAll.\*.dat. Feel free to change this in macro/runEEmcCalMaker.C

line named by \*gainaddress or \*maskaddress if you want to use other gain files or mask files.

Submit the jobs, then add the histograms together again. The next thing to do is to fit the "thin" layers, the pre- and post-shower layers. Use command: macro/fitPrePost.sh 1.

**Step 7:** If you are satisfied with the pre/post fits from the previous iteration, you will run the calibration maker again, this time reading in your new gains and masks for the pre/post. Change the options in myinput.html to 2-1-0-1-1-0. Then submit jobs, add together the histograms, and fire macro/fitTowers.sh 2.

**Step 8:** If you are satisfied with your tower fits at this stage, use plTwCal.C to make the famous plot that compares the tower gains to the ideal gains for that eta bin. Then you should be ready to do the final fit of the smd strips. Change the options in myinput.html to 3-1-1-1-1-1. Then submit jobs, add together the histograms. Randomly select a run number you use. Use macro/reCalSmd.sh <current iteration> <R'run-number'.hist.root>. The re-calibrated SMD gains is in iter-\*/table/smdAll.reCal.Gain.dat

**Step 9:** Now you have all the gains. You can re-iterate what you did before to check if the gains converge.

### Some final comments

Sometimes the code will crash. Several suggestions:

- 1). Each time the job finished, check if any of the R-runnumbers.hist.root have the same statistics as before.
- 2). doSmdGains.C sometimes crashed without any reason. Do not worried about it, just re-run the code again.

**My results for run9 is here:**

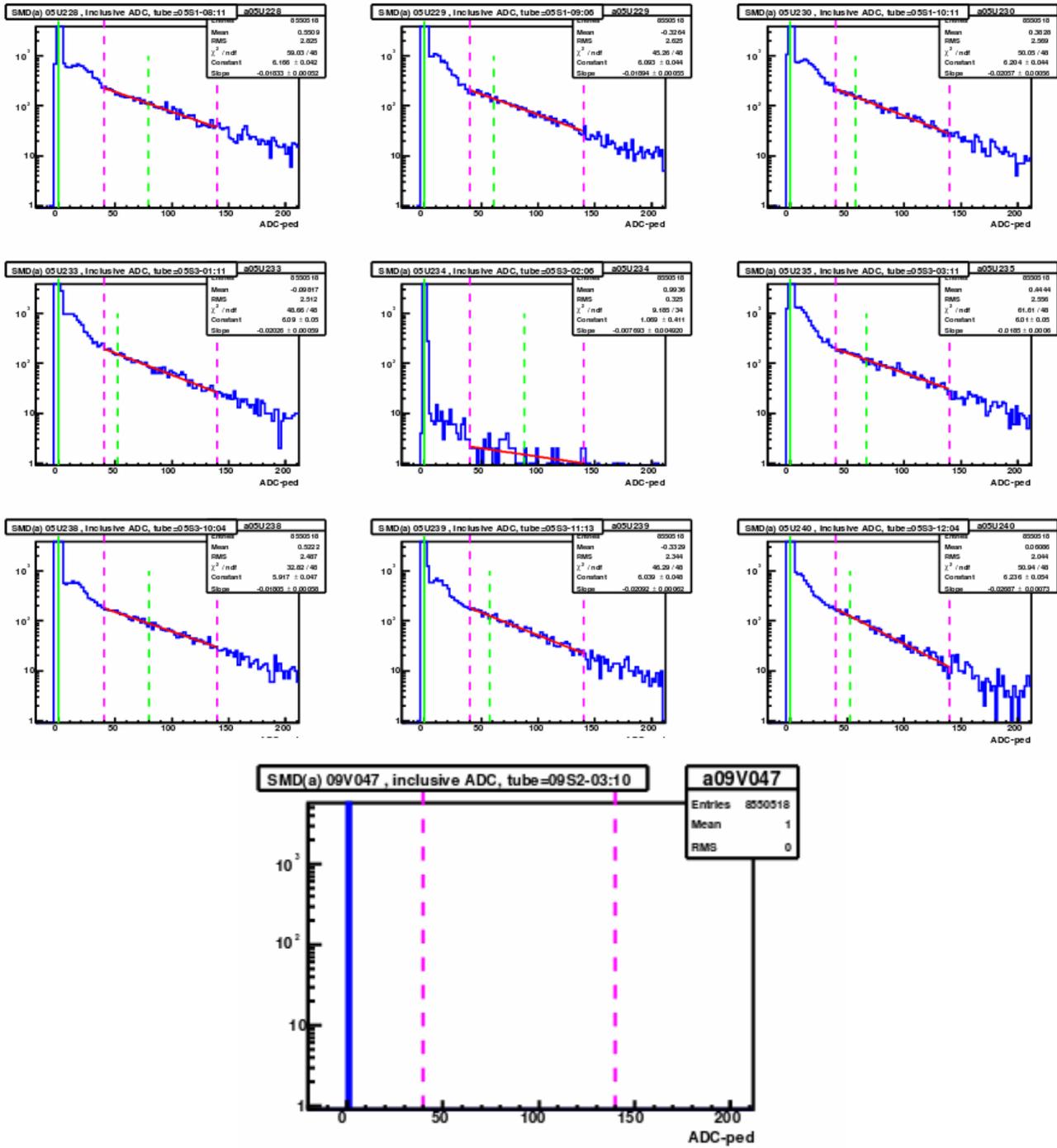
<https://drupal.star.bnl.gov/STAR/system/files/EEMC-cal-run6%2526run9forpresentation1117201>

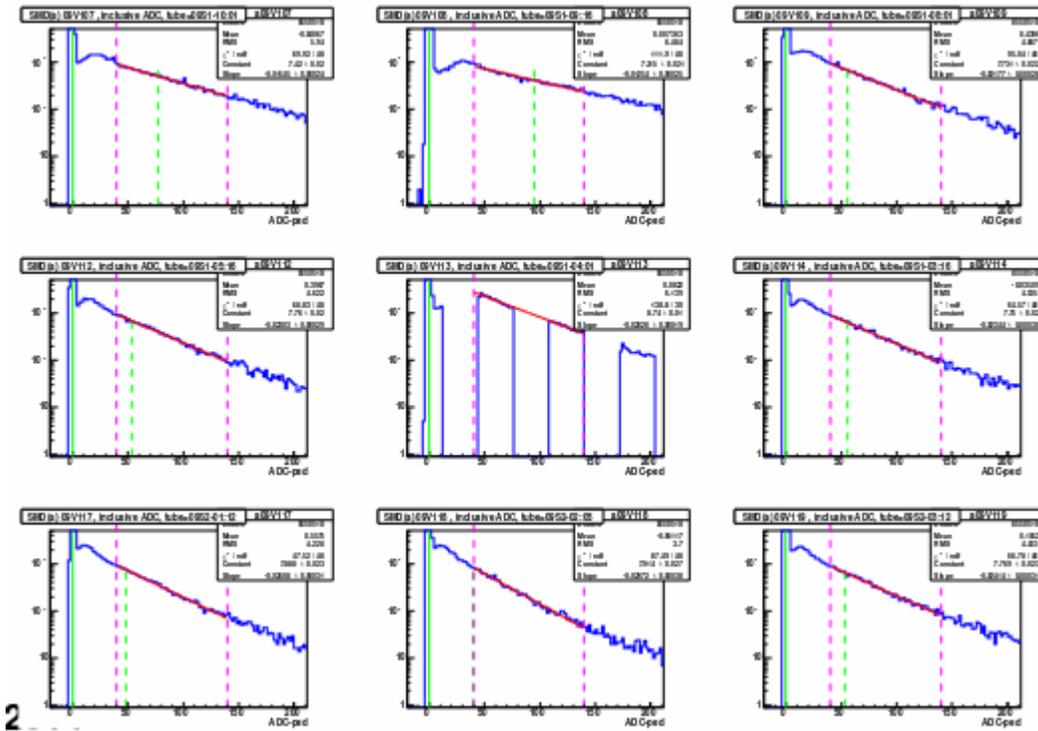
## 4\_1.pdf

Histograms are stored in /star/u/tinglin/work/summer2014/cvsversion/myCal/EEMC\_cal/. Check EEMC\_cal/note.dat to see what is contained in the different iter-\*/ directories.

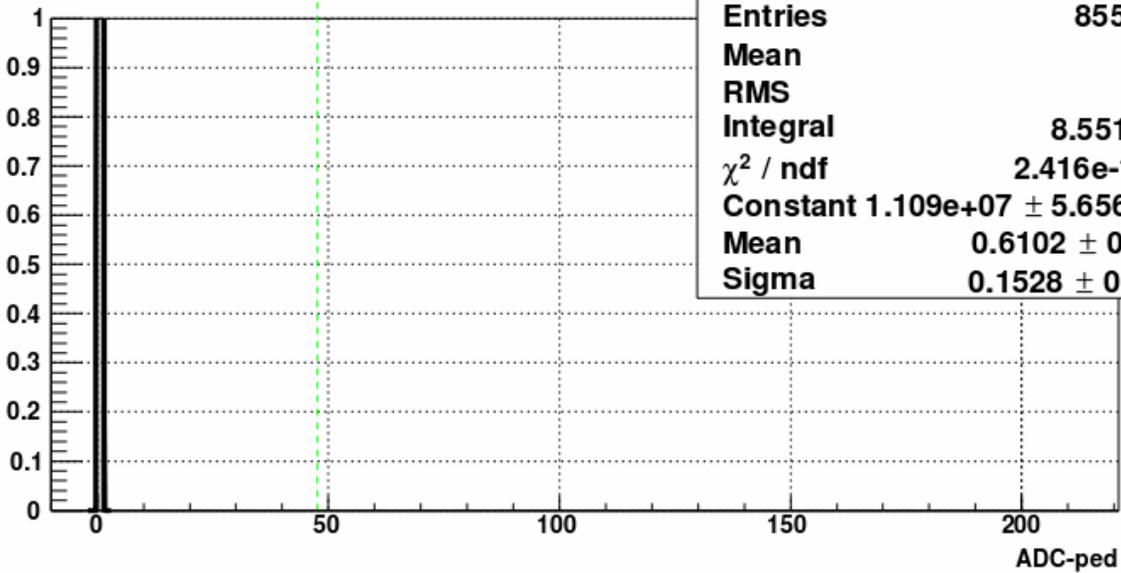
Typical files need to be mask out:

SMD: middle one, which is very different from its neighbor.





Pres1(a) 02PA11 , inclusive ADC



a02PA11	
Entries	8550518
Mean	0.5
RMS	0
Integral	8.551e+06
$\chi^2 / \text{ndf}$	2.416e-10 / 0
Constant	$1.109\text{e}+07 \pm 5.656\text{e}+04$
Mean	$0.6102 \pm 0.0011$
Sigma	$0.1528 \pm 0.0015$