

TPC Gain Calibration Update

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Pass2 Missing Runs/Calib status

2917 runs out of 2962 have histogram output in afs

Finished, to be transferred:

12649
12651
12657
13347
14313
14315
14369
14371
14949
15009
15093
15115
15129
15531
15533
15801
17191
17199
17233
17235
17247
17311

Jon came up with a “missing run” list with 37 runs not accounted for.

Crashed:

12083

Some of them need an updated release with bug fixes for the Swimmer in order not to crash (runs 145xx)

Still

I submitted the other odd-numbered runs (27 of them) at LLNL

Processing:

14841
16997
17239
17339

Anode calibrations for all 2917 runs in afs and the 22 completed runs to the left have been refit and constants are in DB

Need to check on Drift calibration constants



Gain calibration code status

Considerations:

Need to apply gain/drift corrections to digit ADC during cluster-finding to be able to use a universal ADC threshold for including digits in a cluster.

Do not need to propagate corrected digit ADCs once the threshold comparison has been done. Anode correction is the same for all digits in a cluster and drift correction variation within a cluster is $< 1\%$.

After the TPCR2DClusters are fit or evaluated for their integrated ADC and made into a TPCRHit, the anode and drift corrections can be applied.

Need a member variable in TPCRHit to store the uncertainty on the integrated signal (“dE” and “ddE”)



Code modifications I

TPCRecoJP/TPCRStatus

Added new status flags for whether or not anode/drift corrections were done.

TPCRecoJP/TPCR2DClusterFind

In methods Form2DClusters, Make2DClusters, GetNextDigit, SortRawDigit, added gain/drift corrections to ADCs before threshold comparisons

If flags DoAnodeGainCorr and DoDriftAttenCorr are set in the job description xml file, the corrections are applied; otherwise not.

Update status flag if gain/drift corrections were applied.

RecoBase/RBTrackPoint

Added a variable "ddE" and associated setters/getters to hold uncertainty in hit's evaluated ADC signal.

TPCRecoJP/TPCRHitFind

After cluster signals have been evaluated, if flags DoAnodeGainCorr and DoDriftAttenCor are set in the job description xml file, the corrections are applied and TPCRHit->SetdE(val) and TPCRHit->SetddE(val) are called.

Update status flag if gain/drift corrections were applied.



Code modifications II

TPCRecoJP/TPCRTrackFind

In CalcDedx method, uncertainties in hit dE included in determining $\langle dE/dx \rangle$ for track.
(Weighted average of truncated hit list, where weight is $1/\text{uncertainty}$)

Flags in job description xml file allow user to vary the truncation parameters (defaults are bottom 5% and top 30% of hit dE's dropped from calculation)

Currently ddE is just a placeholder: in TPCRHitFind, $ddE = \sqrt{dE}$ since we haven't yet decided how to combine uncertainties for different cases (fitted vs summed clusters)

Otherwise, everything except the weighted $\langle dE/dx \rangle$ calculation has been coded.



To-do

Implement dE uncertainty calculation in TPCRHitFind

Finish coding weighted $\langle dE/dx \rangle$ calculation in TPCRTrackFind

Test code on ~10 runs or so, compare with/without corrections

- Number/size of clusters
- $\langle dE/dx \rangle$ resolution

Check everything in to cvs

Estimated completion: Friday/Monday barring major issues

