PrimEx Calibration update

30th April 2020
Calorimetry Meeting

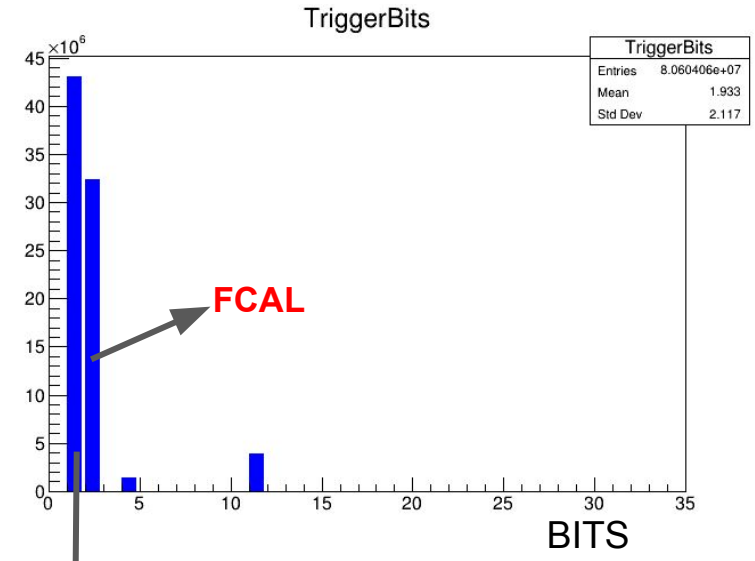
So far,

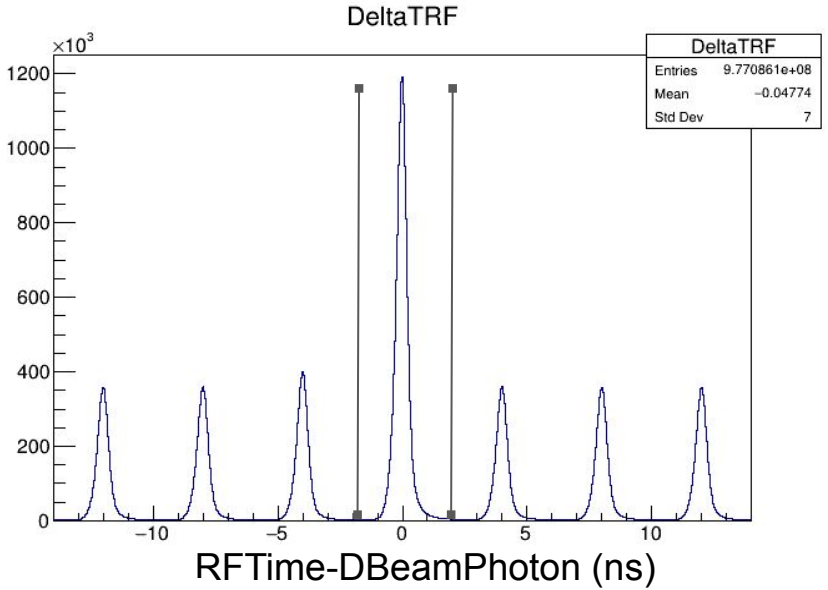
- Fixed the Vertex X, Y, Z. This is different from GlueX Calibration
- The layer 3 has signal to noise ratio of about 0.5 making it hard to fit for the pi0 peak.
- Changing the fit range and fit parameters and also the methods, did converge the gains. Except for a few channels which do not have definitive pi0 distributions.
- Igal saw a shift in pi0 mass and also possibly resolution when he did the calibration after accidental subtraction and also using FCAL/CCAL triggers.
- Repeated the calibration with accidental subtraction and using FCAL triggers.

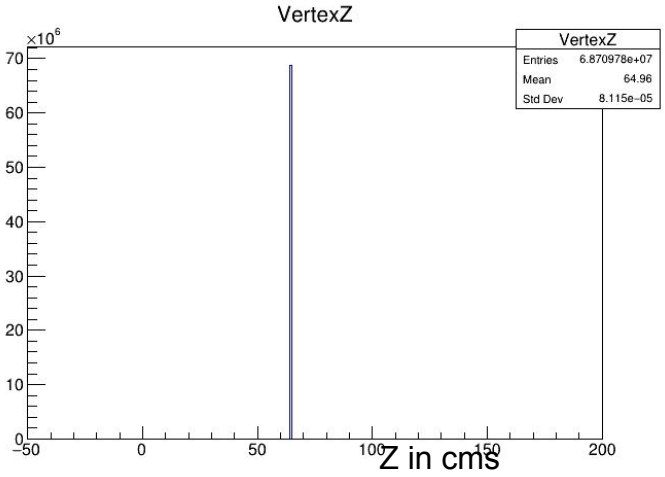
Current calibration conditions

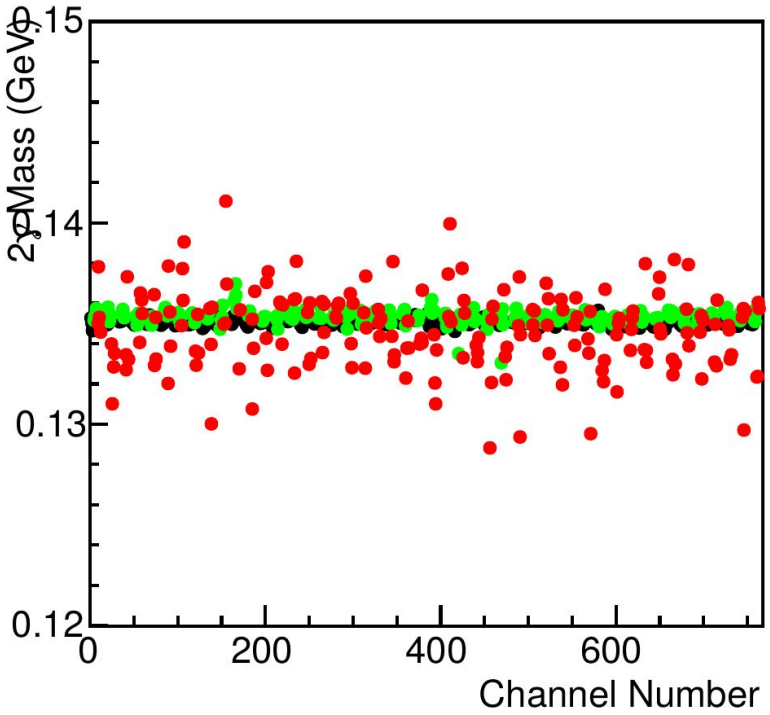
- Fixed the vertex X, Y, Z.
- Used the run range 61378-61956 (He target with CDC On)
- Used the calibration constants from previous study
- Chose events which fall under the condition (fabs(DeltaTRF)<2.004 ns).

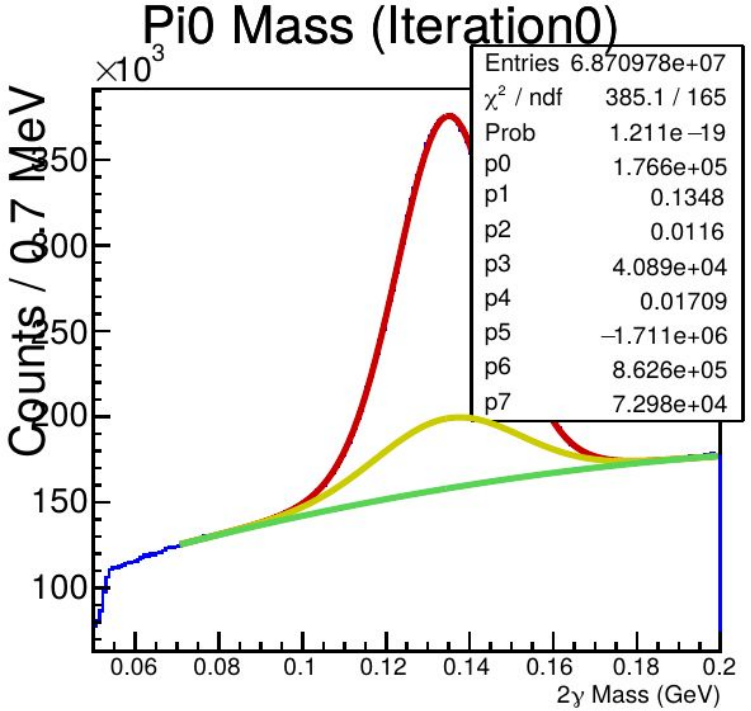
  Did not follow the weight method followed by Igal
- Used FCAL trigger as a condition to process an event.
- Used the new skims ver18 in /cache/halld/RunPeriod-2019-01/calib/
- Has less no.of files (~2400 files) compared to ver17 (~7000 files).


TriggerBits
TriggerBits
Entries 8.060406e+07
Mean 1.933
Std Dev 2.117
×10^6
FCAL
CCAL+FCAL
BITS

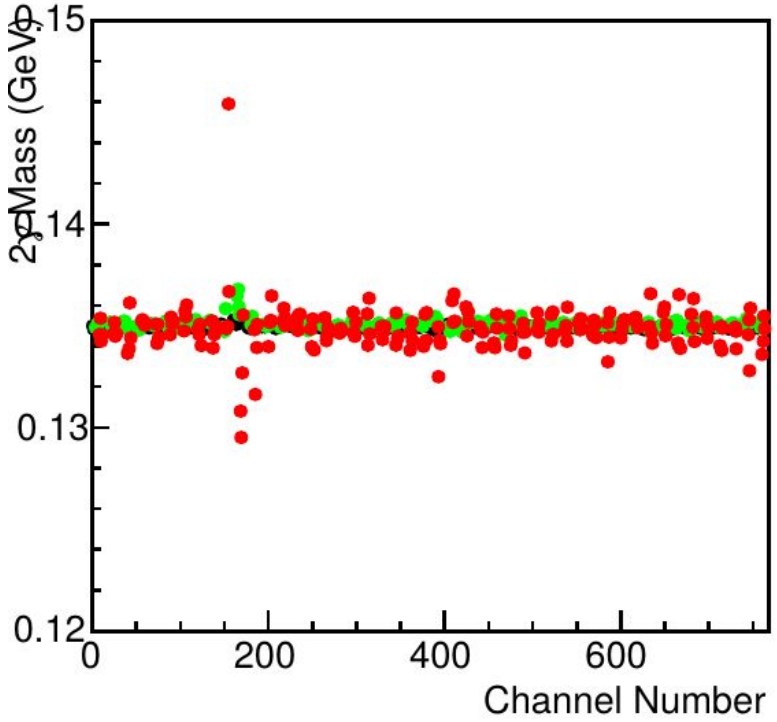

DeltaTRF
DeltaTRF
Entries 9.770861e+08
Mean −0.04774
Std Dev 7
×10^3
RFTime-DBeamPhoton (ns)

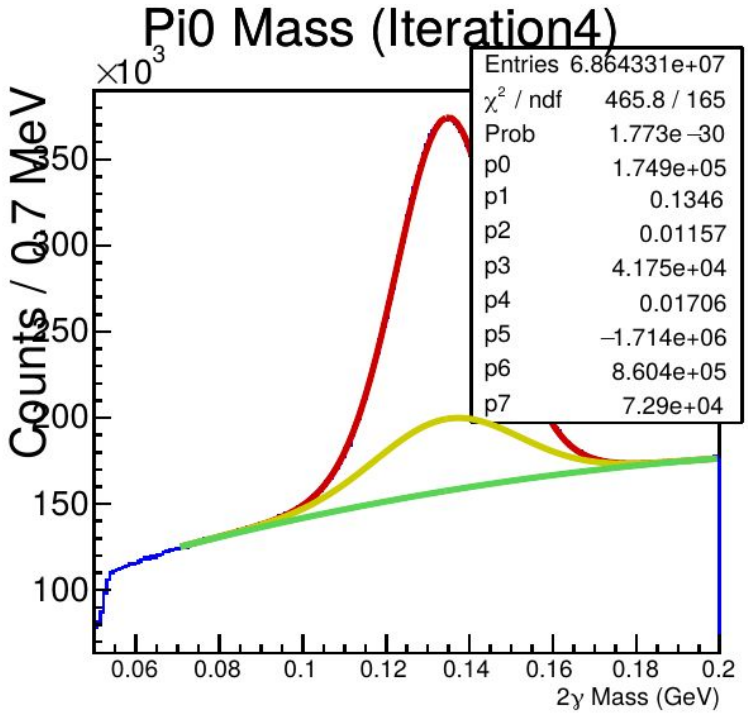

VertexZ
VertexZ
Entries 6.870978e+07
Mean 64.96
Std Dev 8.115e−05
×10^6
Z in cms



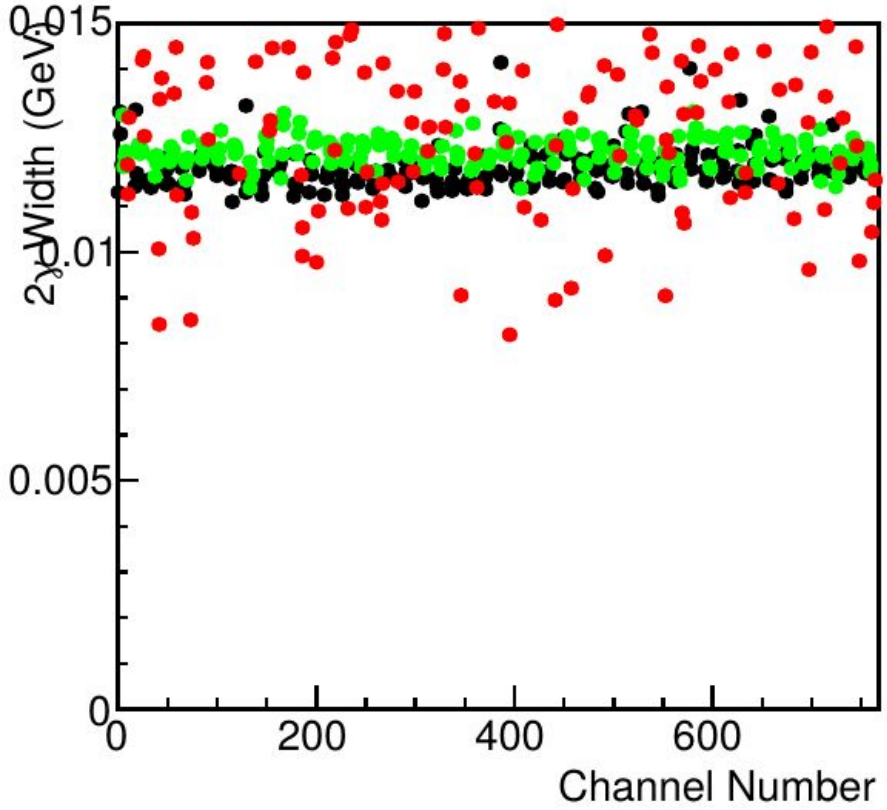


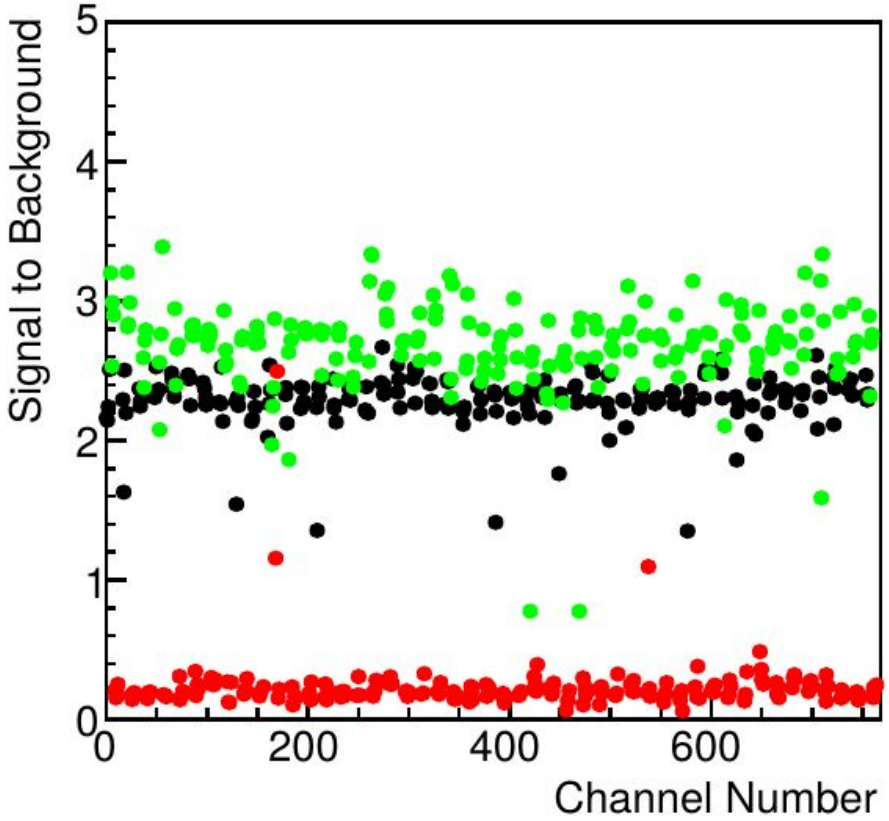
Current calibration results for
Iteration 0



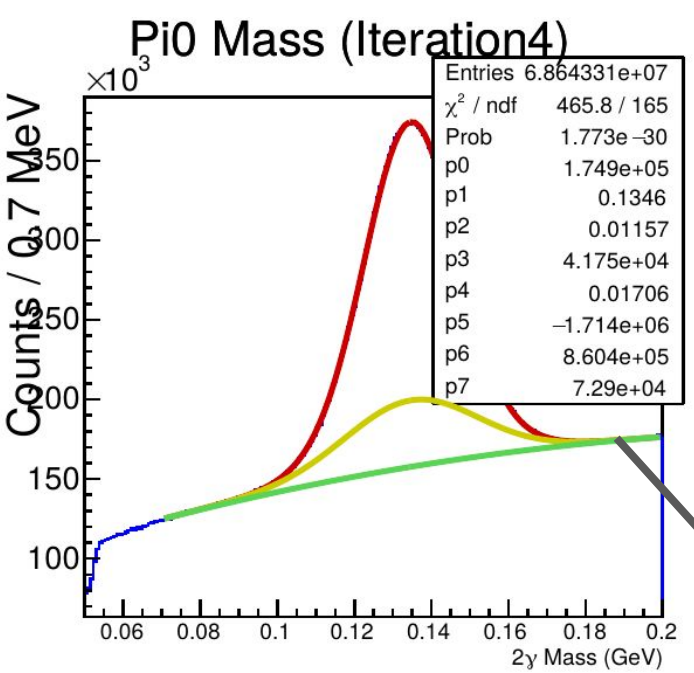


Current calibration results for Iteration 4

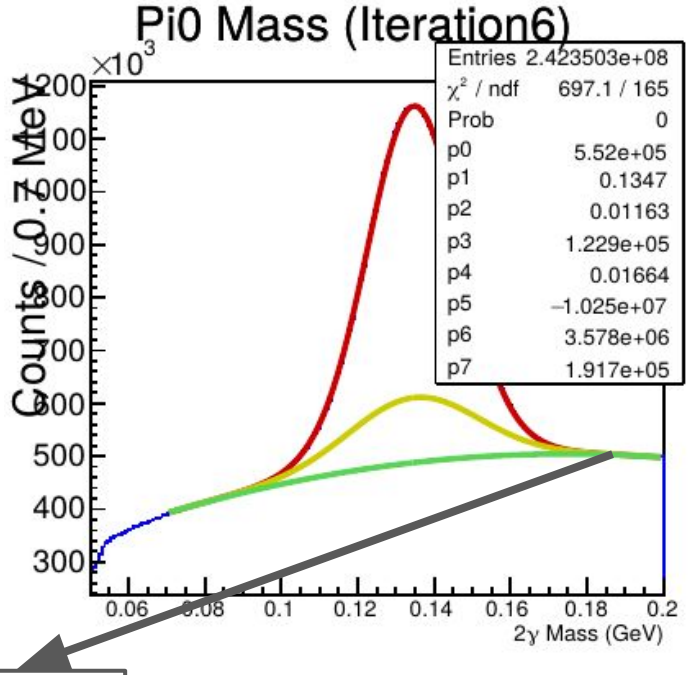




Current calibration results

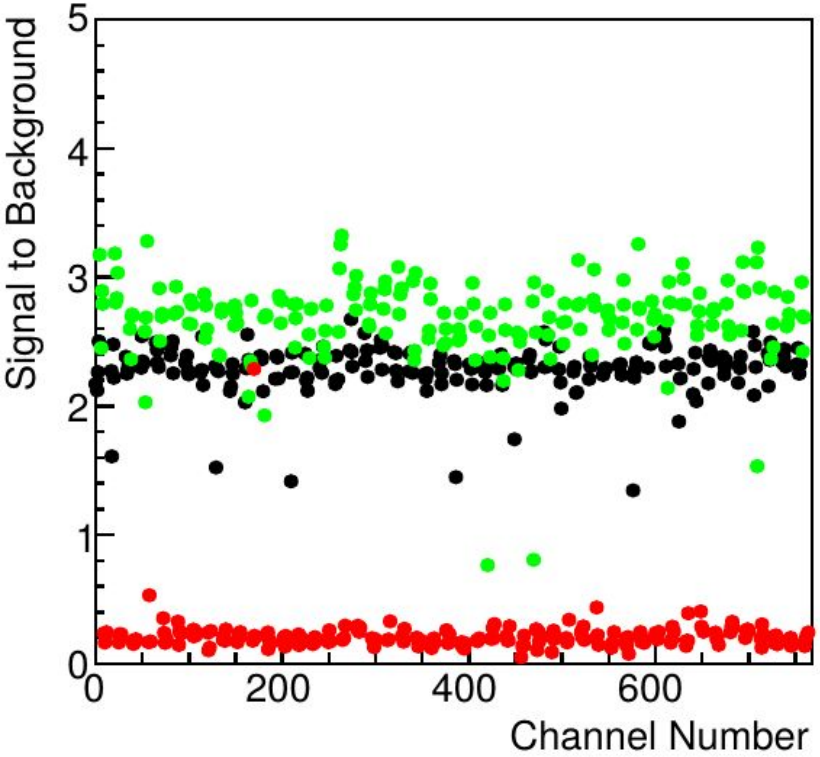


Modified Calibration

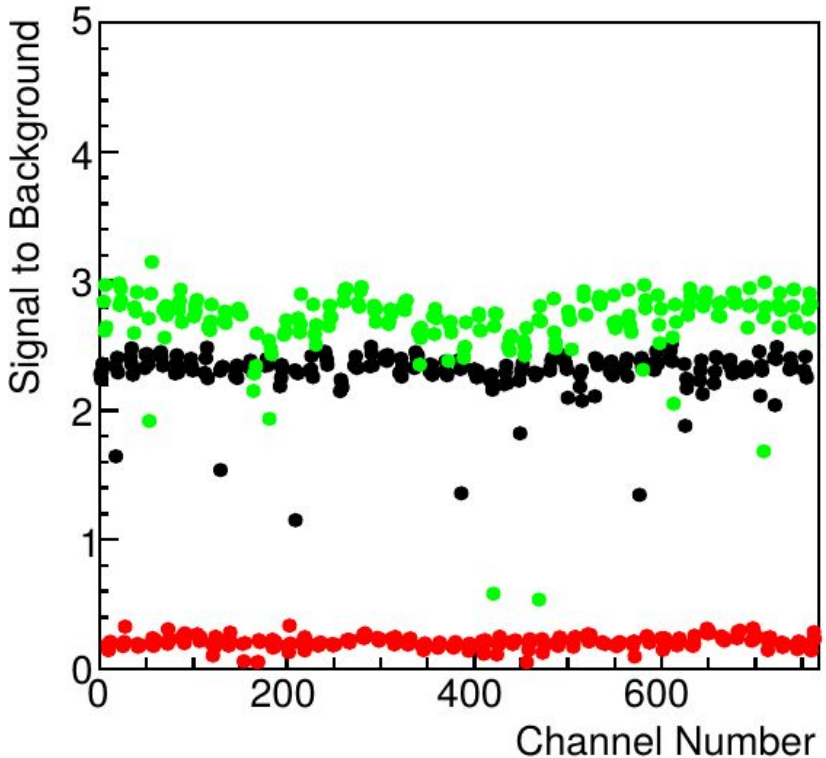


Calibration

Background looks different. Modified calibration may have now more charged pions ?

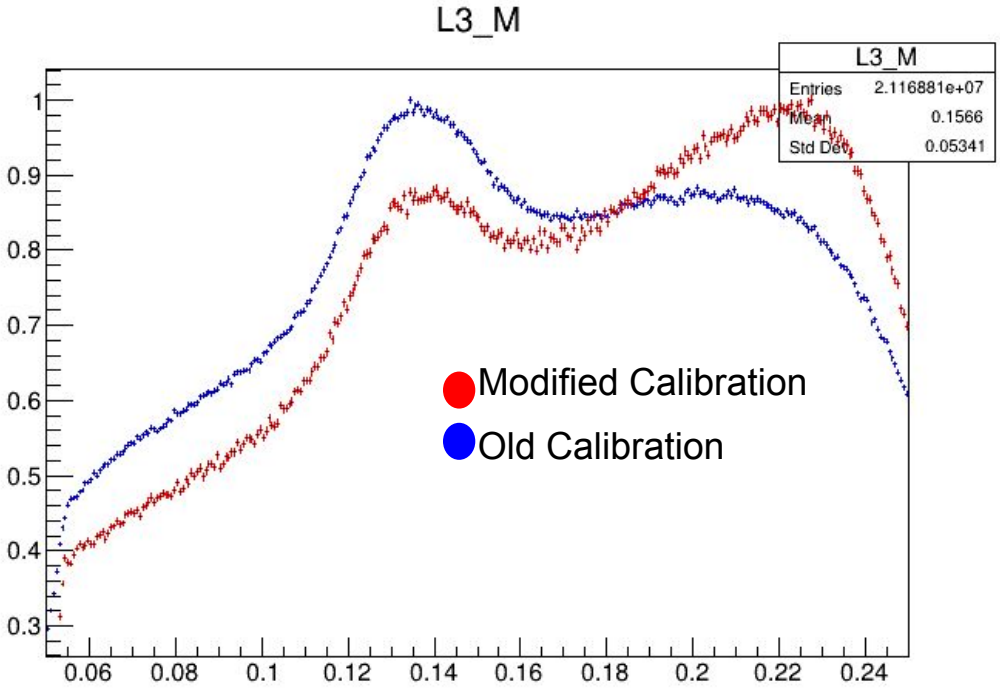


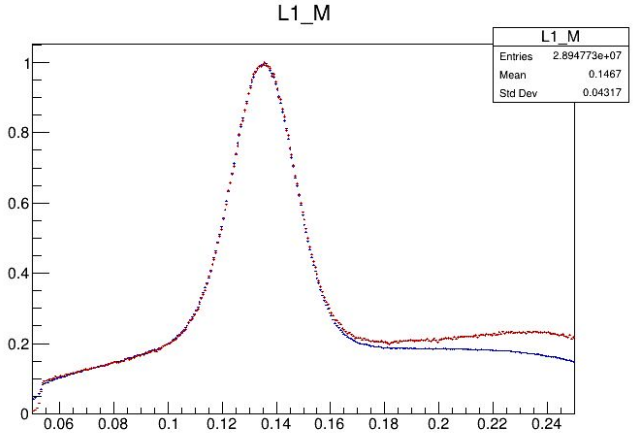
Modified Calibration

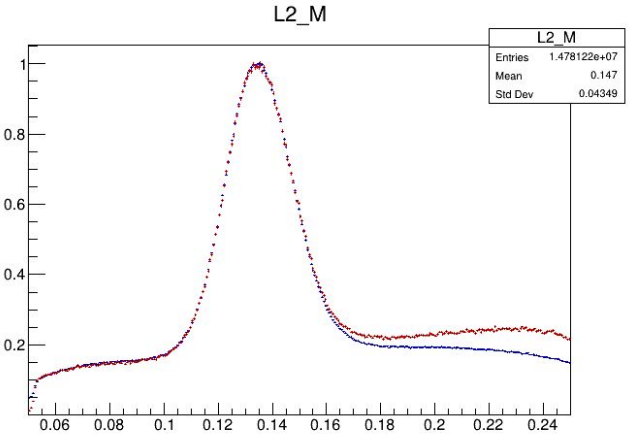


Calibration

Pi0 mass by layer



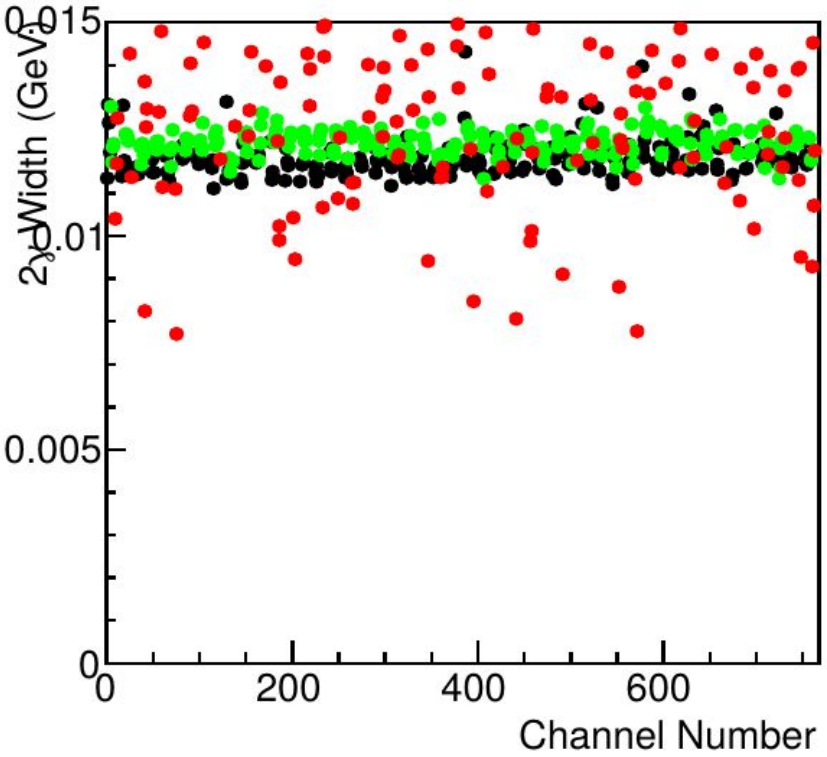


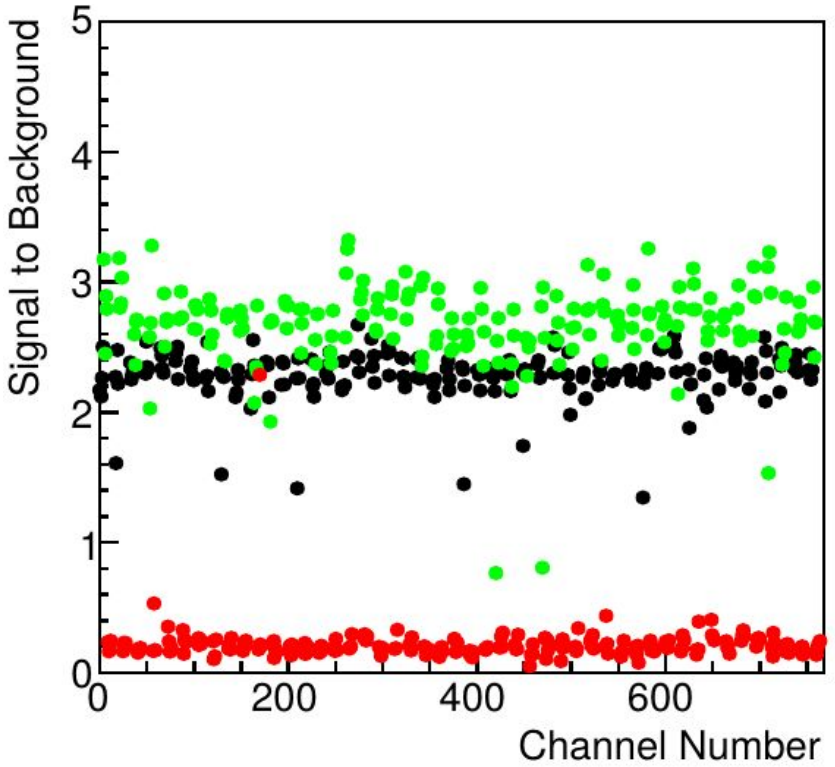


Current Status

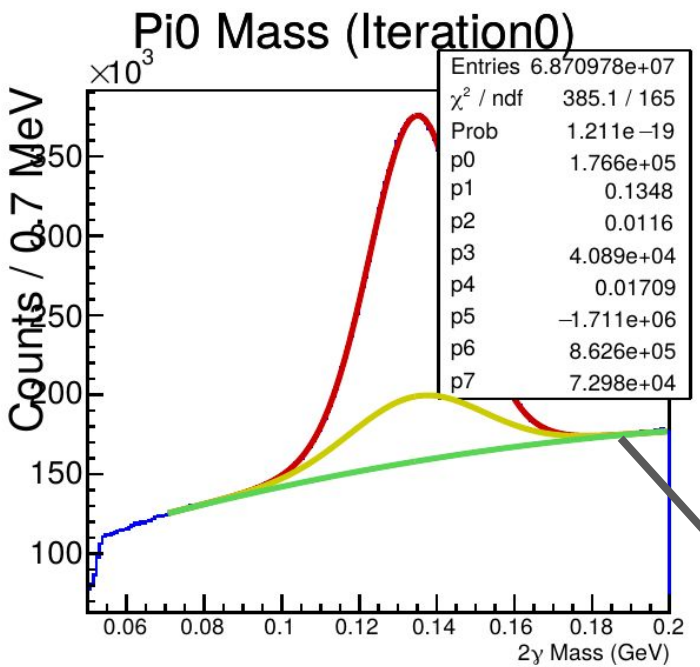
- The layer3 gains may have changed, However the resolution is still poor.
- No major improvement in resolution of the pi0 mass.
- Doing further iterations (Iteration 5) to get the layer3 converged to the right pi0 mass.

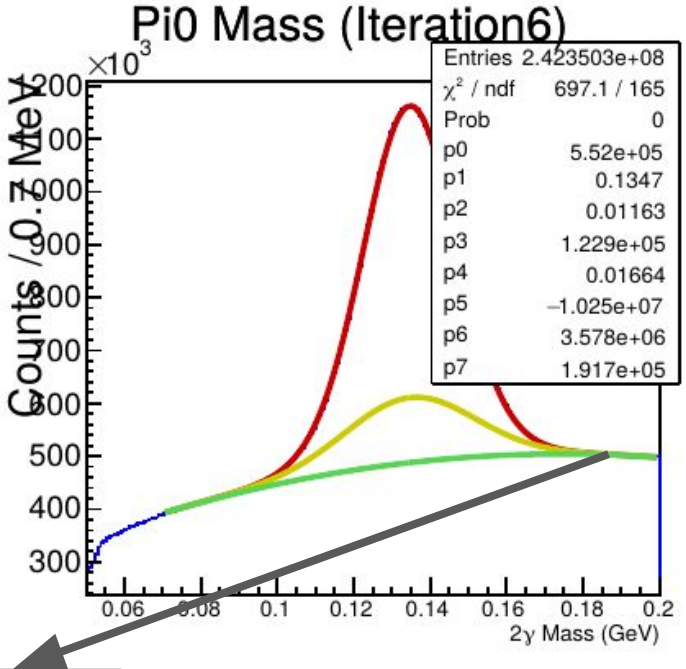
BACKUP





Current calibration results





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