Quick look into the calibration of the CU

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Check that the amount of (calibrated) signal produced by the incoming muons is the one we expect

What we expect: **11.2 MeV/ layer**

11.2 * 8 = 89.6 MeV in the calorimeter

Data used: Run 700000460

Software Version

- BeamTest Release: **v3r0907p2**
- TestReport: **v0r0p4**

Some details from the run

- Time of the first trigger: **Sun Jul 16 04:33:04 2006 (GMT)**
- Time of the last trigger: **Sun Jul 16 06:33:05 2006 (GMT)**
- Duration: **7201 seconds**
- Trigger rate: **49 hz**

First approach: Plot CalEnergyRaw (from merit) applying very simple cuts
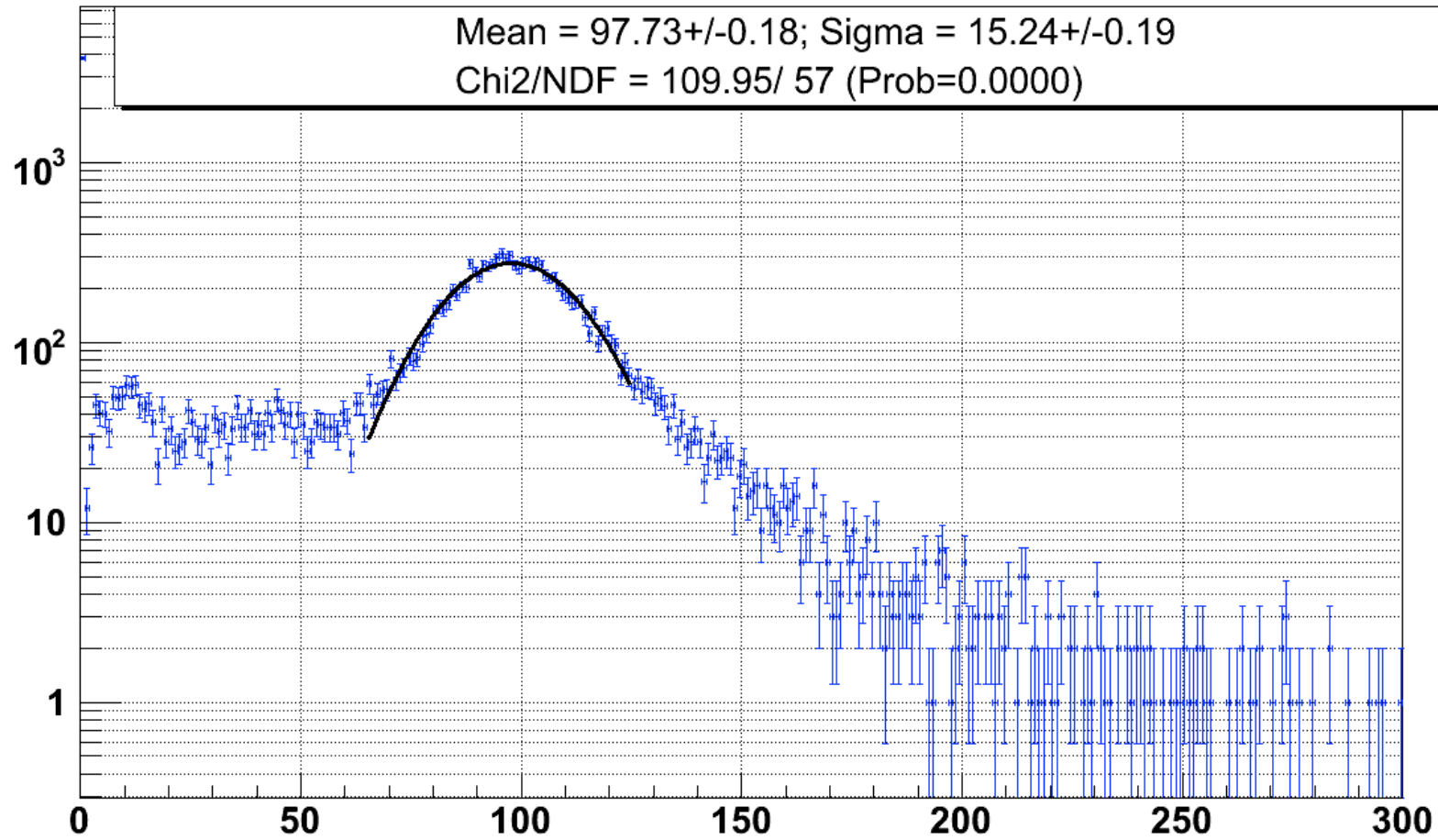
TkrNumTracks == 1
Tkr1Hits > 20
TMath::Abs((acos(Tkr1ZDir)*(180./3.14159))-180.) < 20
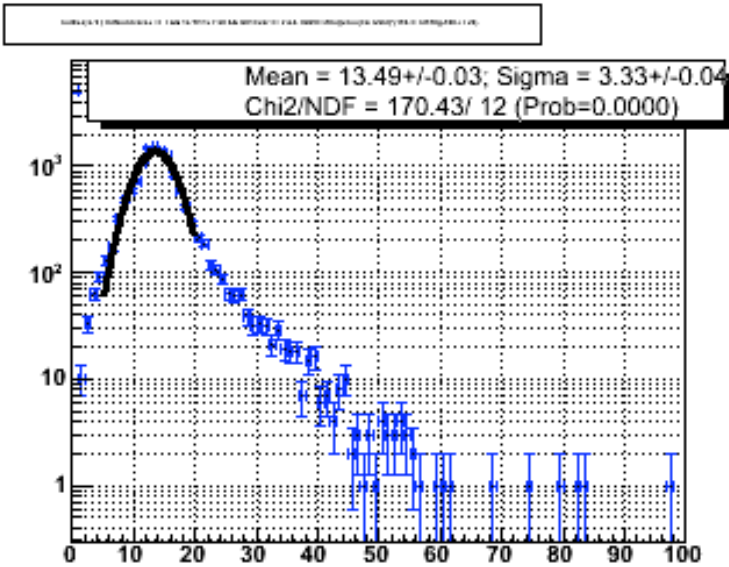GltTower == 2 (3)
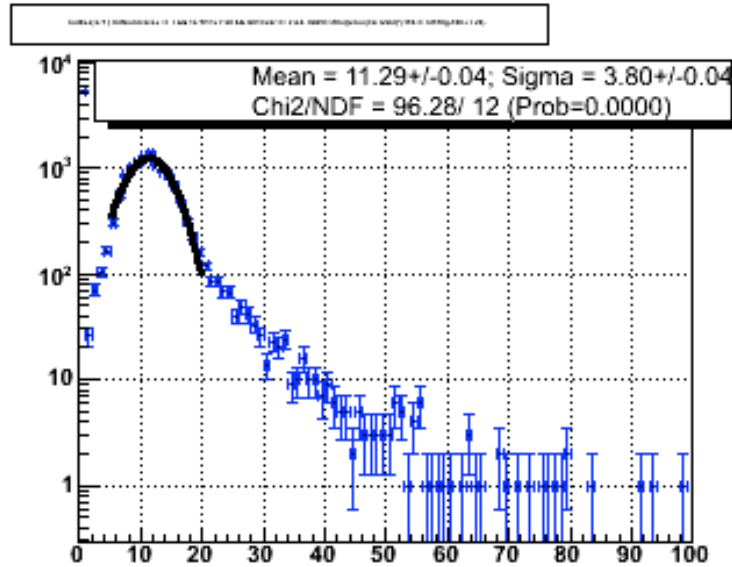
CalEnergyRaw distribution for "cal from Tower 2"

CalEnergyRaw {TkrNumTracks == 1 && Tkr1Hits > 20 && GltTower == 2 && TMath::Abs((acos(Tkr1ZDir)*(180./3.14159))-180.) < 20}
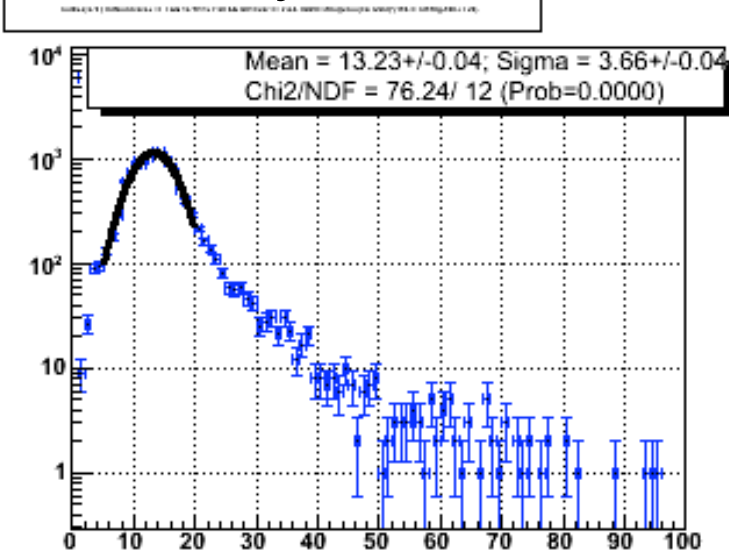
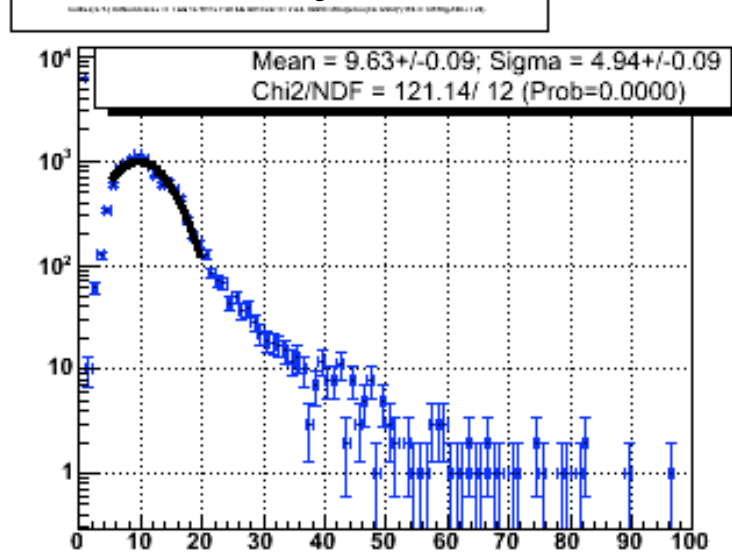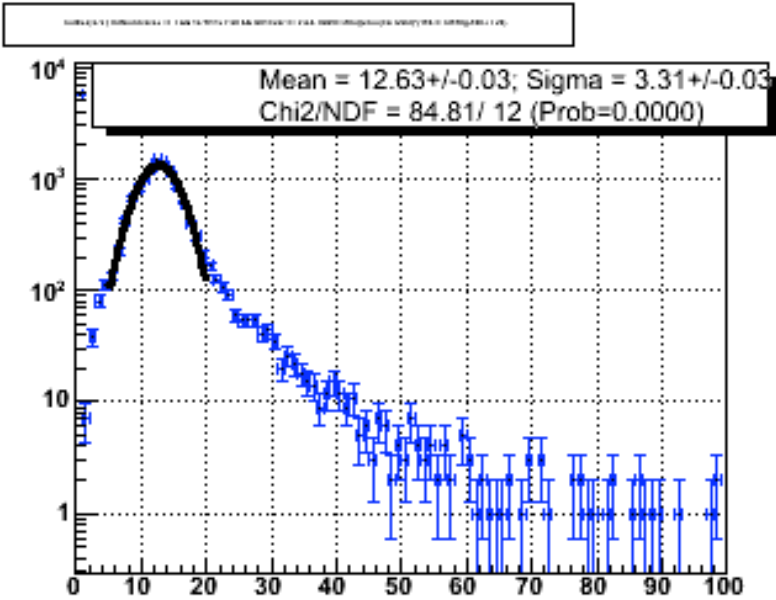Mean = 97.73+/-0.18; Sigma = 15.24+/-0.19
Chi2/NDF = 109.95/ 57 (Prob=0.0000)

CalELayer0

Mean = 13.49+/-0.03; Sigma = 3.33+/-0.04
Chi2/NDF = 170.43/ 12 (Prob=0.0000)

CalELayer1

Mean = 11.29+/-0.04; Sigma = 3.80+/-0.04
Chi2/NDF = 96.28/ 12 (Prob=0.0000)

CalELayer4

Mean = 13.23+/-0.04; Sigma = 3.66+/-0.04
Chi2/NDF = 76.24/ 12 (Prob=0.0000)

CalELayer5

Mean = 9.63+/-0.09; Sigma = 4.94+/-0.09
Chi2/NDF = 121.14/ 12 (Prob=0.0000)

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CalELayer2

Mean = 12.63+/-0.03; Sigma = 3.31+/-0.03
Chi2/NDF = 84.81/ 12 (Prob=0.0000)

CalELayer3

Mean = 10.39+/-0.04; Sigma = 3.66+/-0.04
Chi2/NDF = 404.12/ 12 (Prob=0.0000)

CalELayer6

Mean = 12.25+/-0.04; Sigma = 3.31+/-0.03
Chi2/NDF = 179.25/ 12 (Prob=0.0000)

CalELayer7

Mean = 12.26+/-0.03; Sigma = 3.20+/-0.03
Chi2/NDF = 107.13/ 12 (Prob=0.0000)
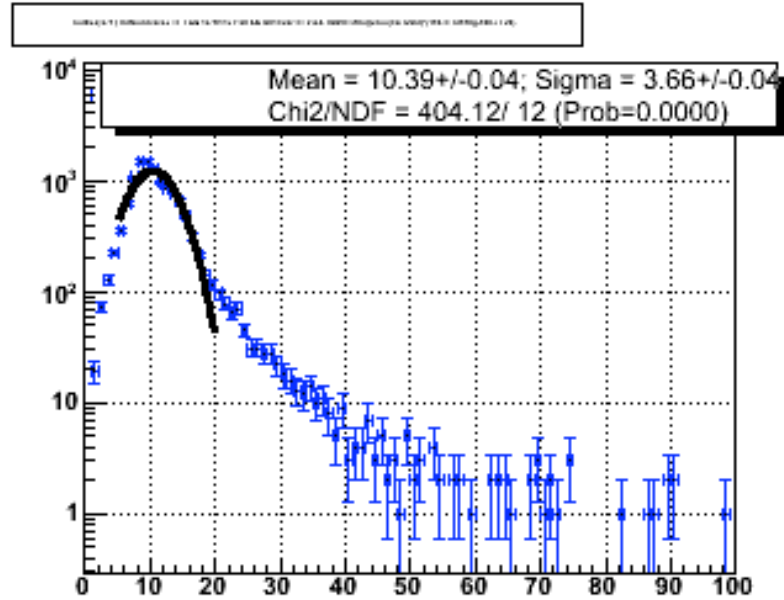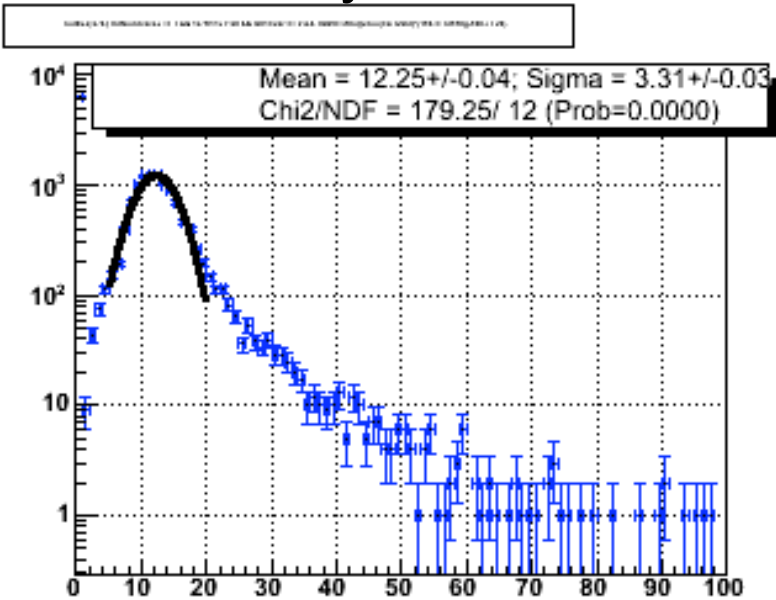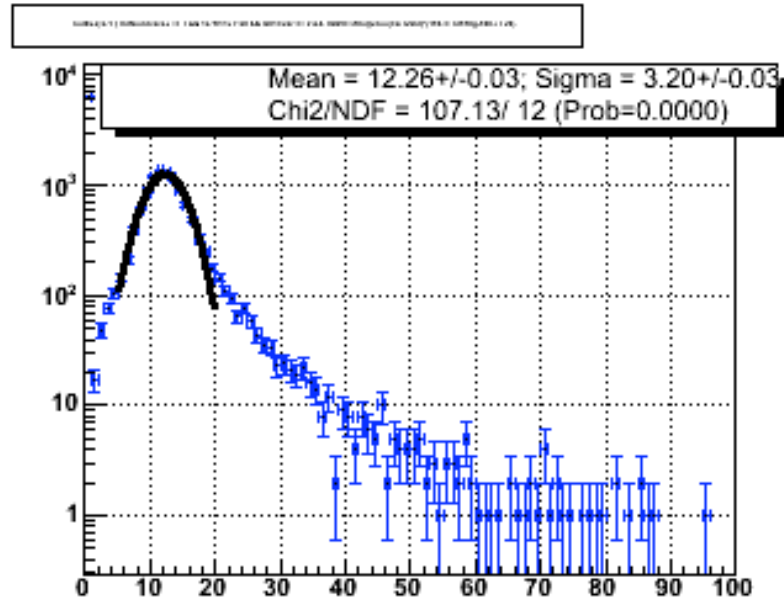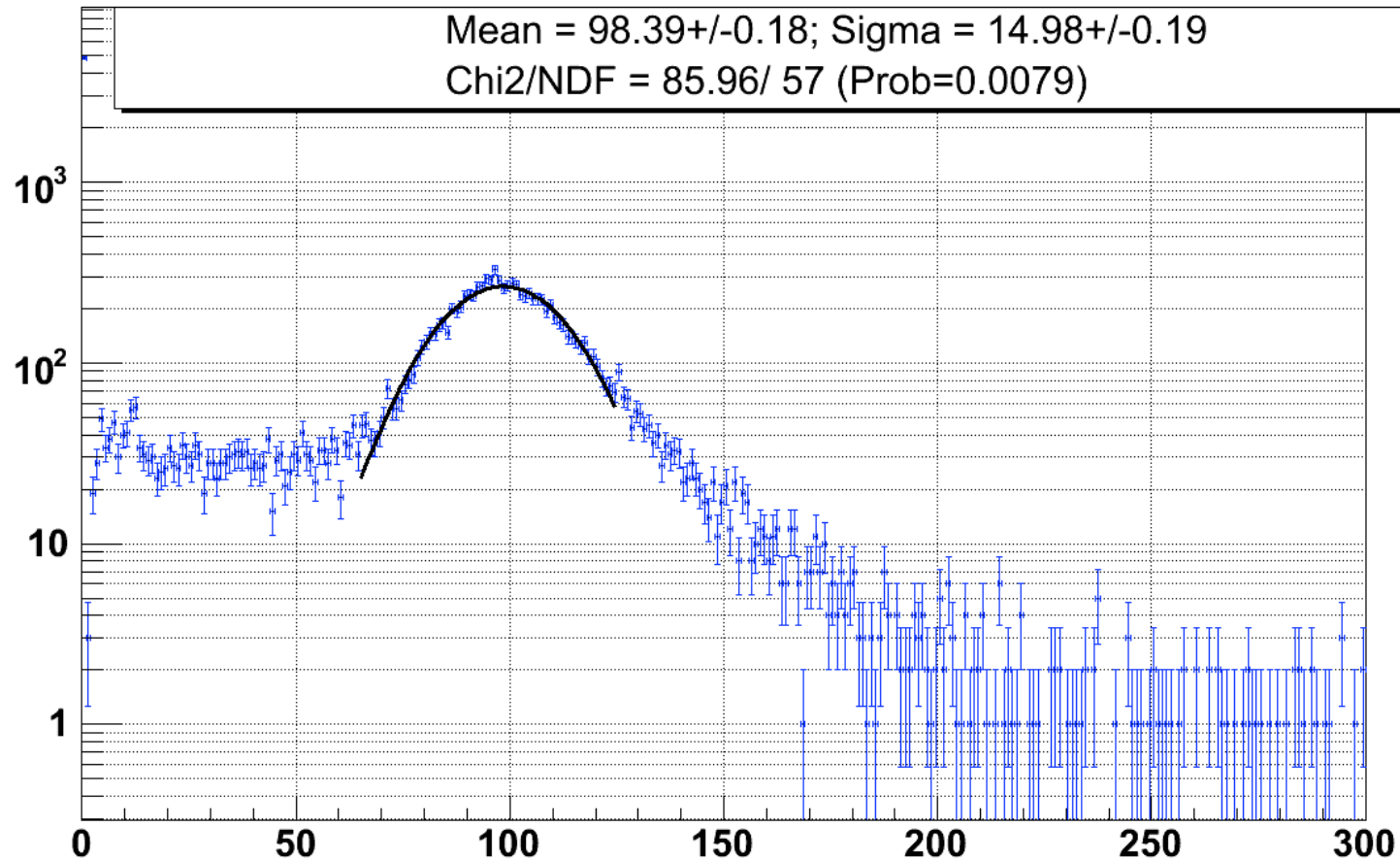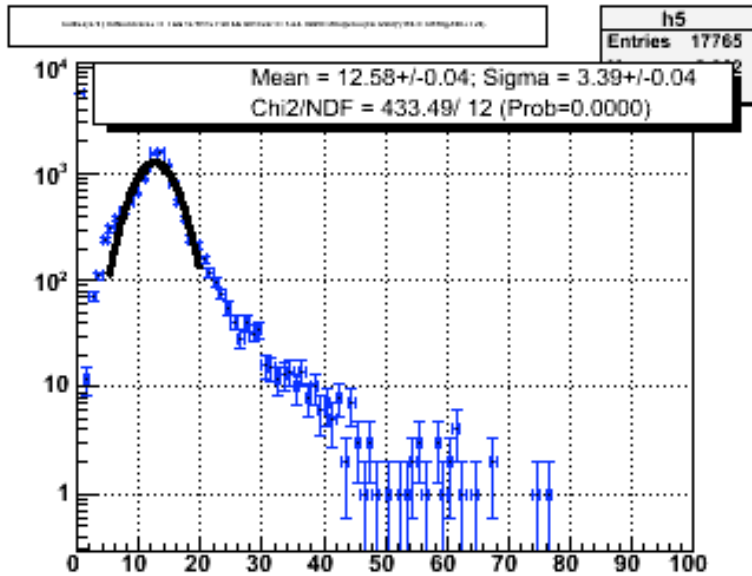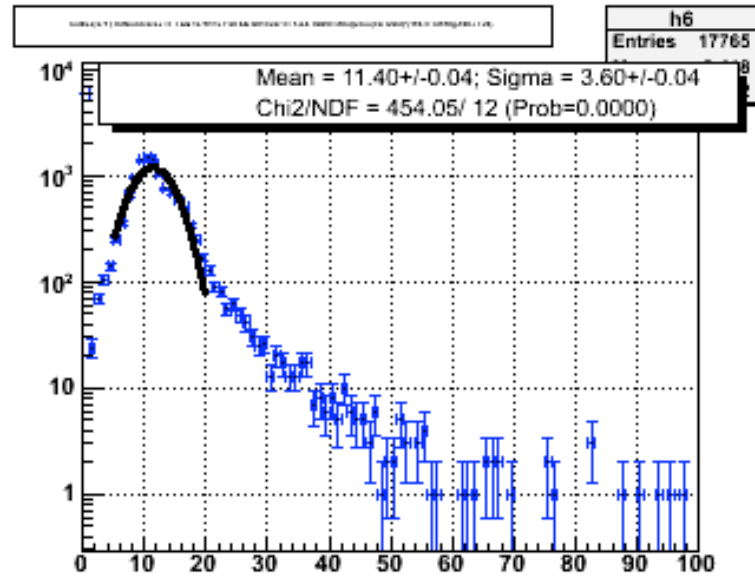
CalEnergyRaw distribution for "cal from Tower 3"

CalEnergyRaw {TkrNumTracks == 1 && Tkr1Hits > 20 && GltTower == 3 && TMath::Abs((acos(Tkr1ZDir)*(180./3.14159))-180.) < 20}
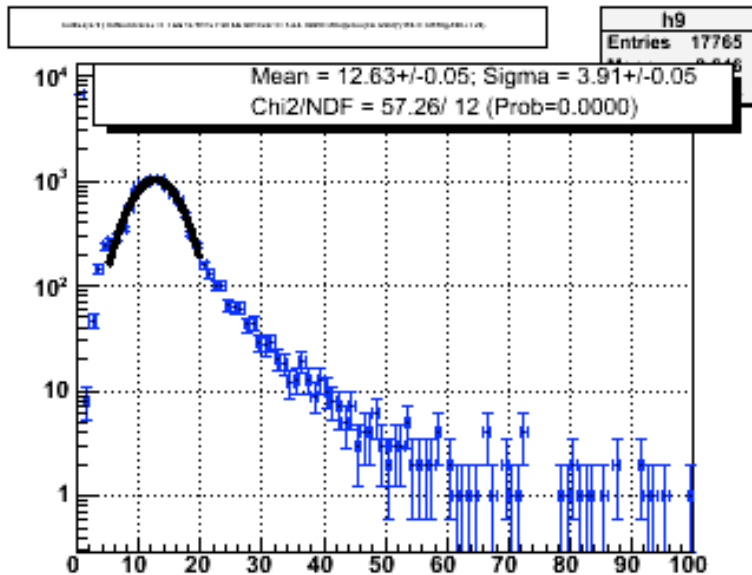
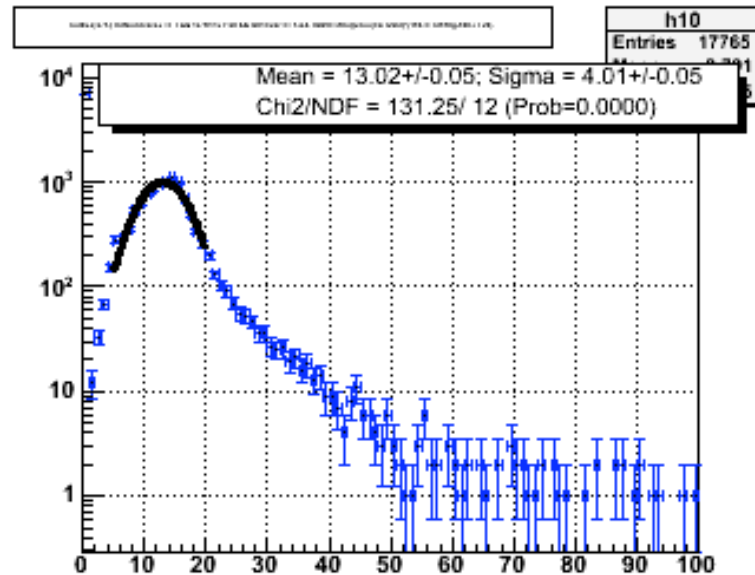Mean = 98.39+/-0.18; Sigma = 14.98+/-0.19
Chi2/NDF = 85.96/ 57 (Prob=0.0079)

CalELayer0

	h5
Entries	17765

Mean = 12.58+/-0.04; Sigma = 3.39+/-0.04
Chi2/NDF = 433.49/ 12 (Prob=0.0000)

CalELayer1

	h6
Entries	17765

Mean = 11.40+/-0.04; Sigma = 3.60+/-0.04
Chi2/NDF = 454.05/ 12 (Prob=0.0000)

CalELayer4

	h9
Entries	17765

Mean = 12.63+/-0.05; Sigma = 3.91+/-0.05
Chi2/NDF = 57.26/ 12 (Prob=0.0000)

CalELayer5

	h10
Entries	17765

Mean = 13.02+/-0.05; Sigma = 4.01+/-0.05
Chi2/NDF = 131.25/ 12 (Prob=0.0000)

CalELayer2

h7
Entries 17765

Mean = 11.21+/-0.03; Sigma = 2.96+/-0.03
Chi2/NDF = 252.44/ 12 (Prob=0.0000)

CalELayer3

h8
Entries 17765

Mean = 12.32+/-0.04; Sigma = 3.46+/-0.04
Chi2/NDF = 88.24/ 12 (Prob=0.0000)

CalELayer6

h11
Entries 17765

Mean = 11.71+/-0.04; Sigma = 3.16+/-0.03
Chi2/NDF = 177.29/ 12 (Prob=0.0000)

CalELayer7

Mean = 11.98+/-0.04; Sigma = 3.63+/-0.04
Chi2/NDF = 113.72/ 12 (Prob=0.0000)

Summary and outlook

The distributions are "compatible" with a correct calibration of the CU

       Plots "seem" to indicate a ~10% overestimation in the calibrated energy

       This first/quick look is certainly not good enough to make accurate statements. Better analysis is needed

Benefit from the experience of people who worked in the past on this business. Apply their algorithms to properly select the muons to be used for each layer