Status of Sample Fraction Study

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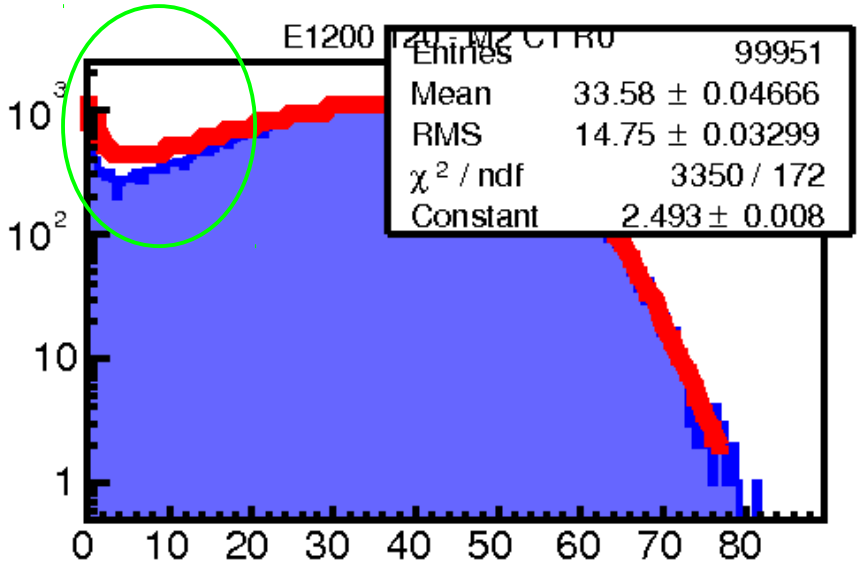
1. Update from the previous report (see Calorimetry meeting on September 25, 2012 for details)

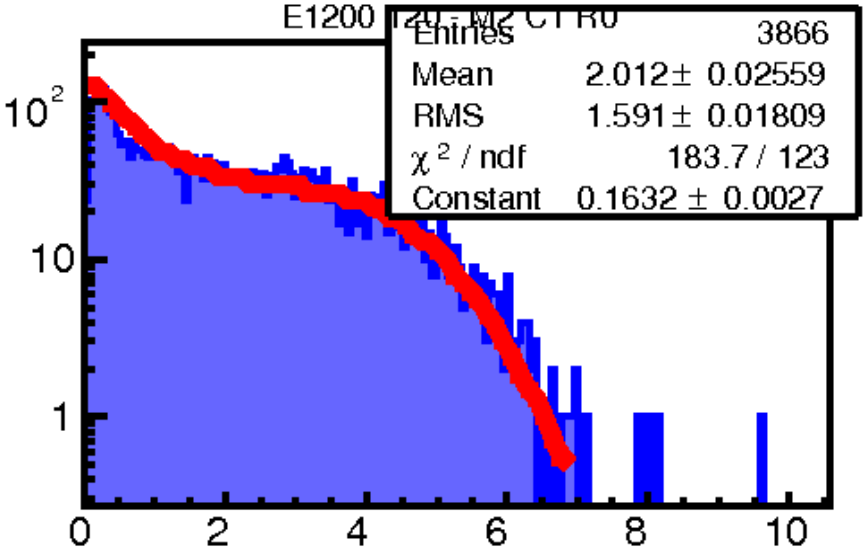
2. High sensitivity on thresholds (272 keV on Etot, and 30 keV on Efibers for every readout cell)

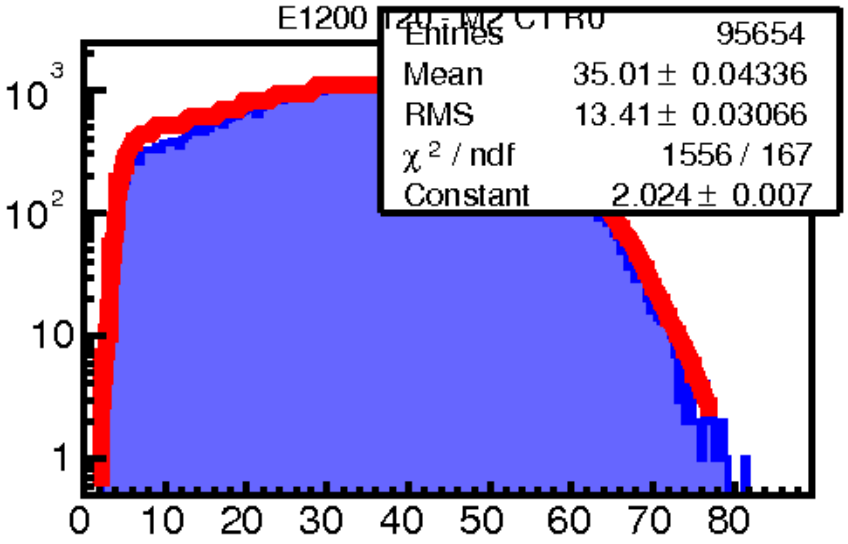
3. Stat-Term coefficient is fixed for whole module as “const/sqrt(10.*SamplFract)”

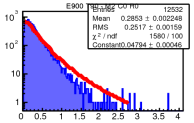
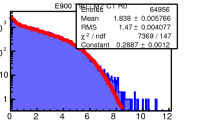
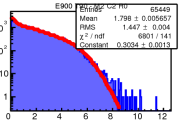
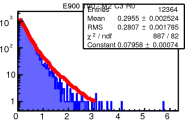
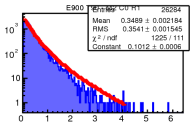
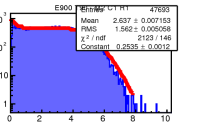
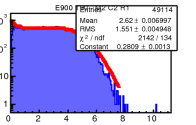
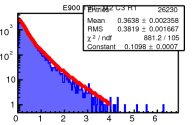
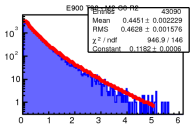
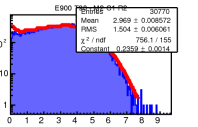
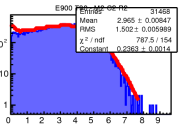
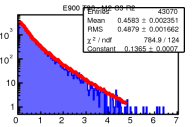
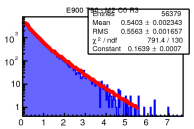
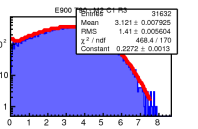
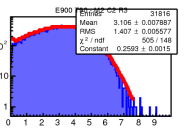
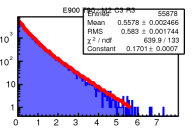
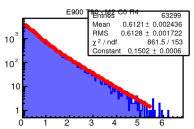
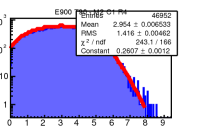
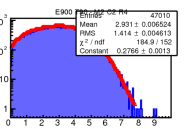
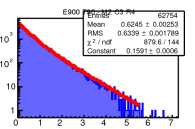
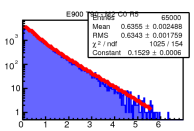
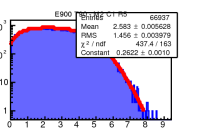
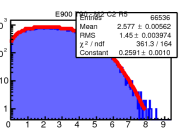
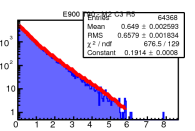
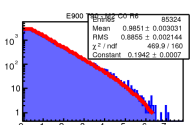
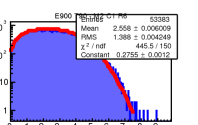
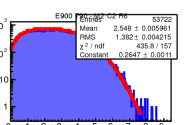
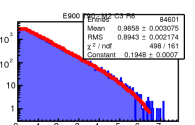
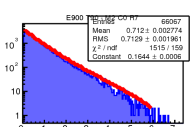
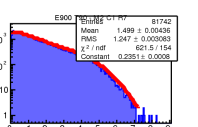
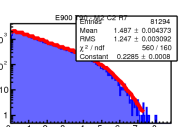
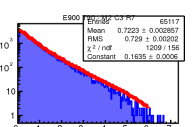
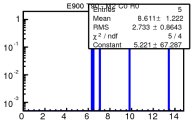
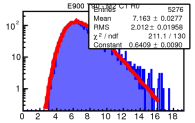
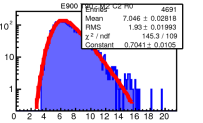
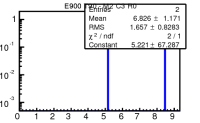
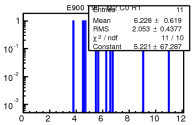
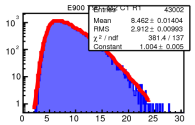
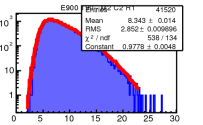
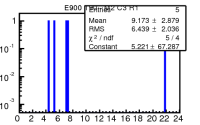
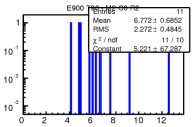
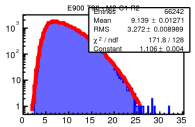
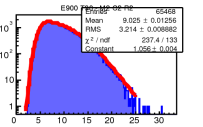
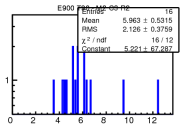
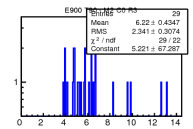
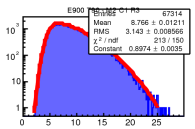
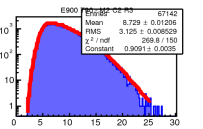
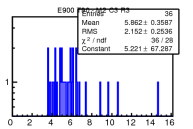
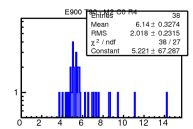
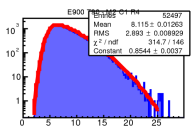
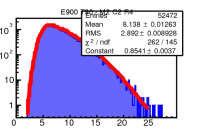
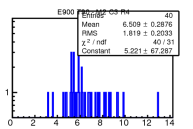
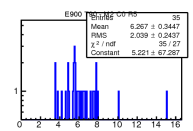
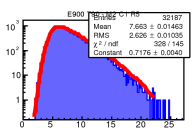
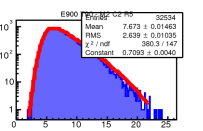
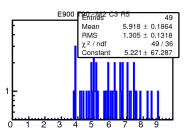
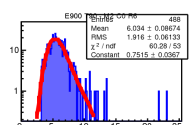
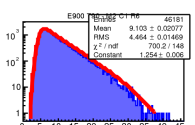
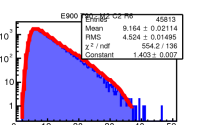
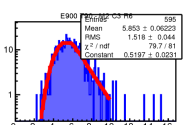
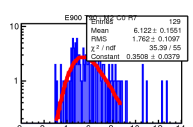
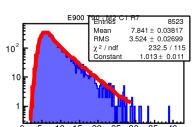
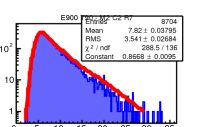
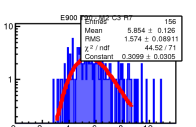
4. Poisson distribution (though it should be Binomial one). Cut on the tail.

5. Split of the statistics (see next slide)

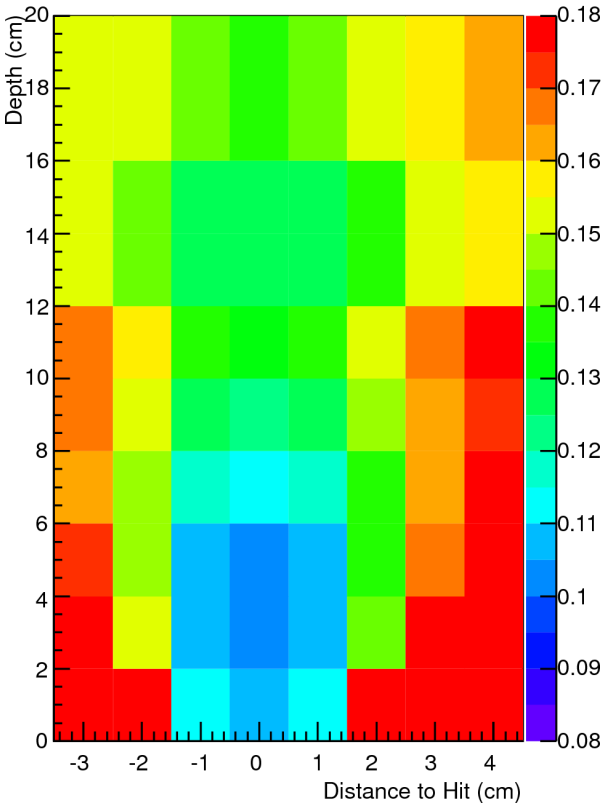

E1200
Entries 99951
Mean 33.58 ± 0.04666
RMS 14.75 ± 0.03299
χ² / ndf 3350 / 172
Constant 2.493 ± 0.008
10³
10²
10
1
0 10 20 30 40 50 60 70 80


E1200
Entries 3866
Mean 2.012 ± 0.02559
RMS 1.591 ± 0.01809
χ² / ndf 183.7 / 123
Constant 0.1632 ± 0.0027
10²
10
1
0 2 4 6 8 10

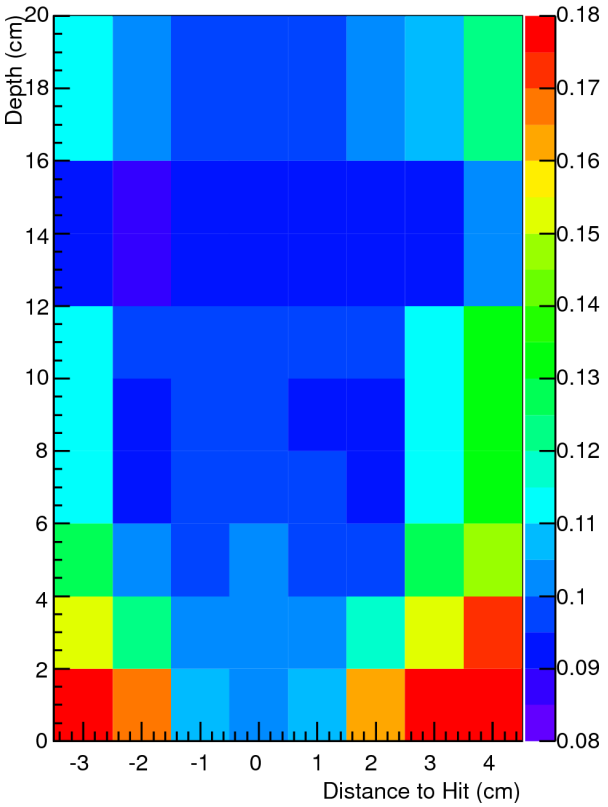

E1200
Entries 95654
Mean 35.01 ± 0.04336
RMS 13.41 ± 0.03066
χ² / ndf 1556 / 167
Constant 2.024 ± 0.007
10³
10²
10
1
0 10 20 30 40 50 60 70 80


E900 FBS_M2 C0 R0
Entries 12532
Mean 0.2853 ± 0.002248
RMS 0.2517 ± 0.00159
χ² / ndf 1580 / 100
Constant0.04794 ± 0.00046

E900 FBS_M2 C1 R0
Entries 64956
Mean 1.838 ± 0.005766
RMS 1.47 ± 0.004077
χ² / ndf 7369 / 147
Constant 0.2887 ± 0.0012

E900 FBS_M2 C2 R0
Entries 65449
Mean 1.798 ± 0.005657
RMS 1.447 ± 0.004
χ² / ndf 6901 / 141
Constant 0.3034 ± 0.0013

E900 FBS_M2 C3 R0
Entries 12364
Mean 0.2955 ± 0.002524
RMS 0.2807 ± 0.001785
χ² / ndf 867 / 82
Constant 0.07958 ± 0.00074

E900 FBS_M2 C0 R1
Entries 28284
Mean 0.3489 ± 0.002184
RMS 0.3541 ± 0.001545
χ² / ndf 1225 / 111
Constant 0.1012 ± 0.0006

E900 FBS_M2 C1 R1
Entries 47693
Mean 2.637 ± 0.007153
RMS 1.562 ± 0.005058
χ² / ndf 2123 / 146
Constant 0.2535 ± 0.0012

E900 FBS_M2 C2 R1
Entries 49114
Mean 2.62 ± 0.006997
RMS 1.551 ± 0.004948
χ² / ndf 2142 / 134
Constant 0.2809 ± 0.0013

E900 FBS_M2 C3 R1
Entries 26230
Mean 0.3638 ± 0.002358
RMS 0.3819 ± 0.001667
χ² / ndf 881.2 / 105
Constant 0.1099 ± 0.0007

E900 FBS_M2 C0 R2
Entries 43090
Mean 0.4451 ± 0.002229
RMS 0.4628 ± 0.001576
χ² / ndf 946.9 / 146
Constant 0.1182 ± 0.0006

E900 FBS_M2 C1 R2
Entries 30770
Mean 2.969 ± 0.008572
RMS 1.504 ± 0.006061
χ² / ndf 756.1 / 155
Constant 0.2359 ± 0.0014

E900 FBS_M2 C2 R2
Entries 31468
Mean 2.965 ± 0.00847
RMS 1.502 ± 0.005989
χ² / ndf 787.5 / 154
Constant 0.2363 ± 0.0014

E900 FBS_M2 C3 R2
Entries 43070
Mean 0.4583 ± 0.002351
RMS 0.4879 ± 0.001662
χ² / ndf 784.9 / 124
Constant 0.1365 ± 0.0007

E900 FBS_M2 C0 R3
Entries 56379
Mean 0.5403 ± 0.002343
RMS 0.5563 ± 0.001657
χ² / ndf 791.4 / 130
Constant 0.1639 ± 0.0007

E900 FBS_M2 C1 R3
Entries 31632
Mean 3.121 ± 0.007925
RMS 1.41 ± 0.005604
χ² / ndf 468.4 / 170
Constant 0.2272 ± 0.0013

E900 FBS_M2 C2 R3
Entries 31816
Mean 3.106 ± 0.007887
RMS 1.407 ± 0.005577
χ² / ndf 505 / 148
Constant 0.2593 ± 0.0015

E900 FBS_M2 C3 R3
Entries 55878
Mean 0.5578 ± 0.002466
RMS 0.583 ± 0.001744
χ² / ndf 639.9 / 133
Constant 0.1701 ± 0.0007

E900 FBS_M2 C0 R4
Entries 53299
Mean 0.6121 ± 0.002436
RMS 0.6128 ± 0.001722
χ² / ndf 861.5 / 153
Constant 0.1502 ± 0.0006

E900 FBS_M2 C1 R4
Entries 46952
Mean 2.954 ± 0.008533
RMS 1.416 ± 0.00462
χ² / ndf 243.1 / 166
Constant 0.2607 ± 0.0012

E900 FBS_M2 C2 R4
Entries 47010
Mean 2.931 ± 0.008524
RMS 1.414 ± 0.004613
χ² / ndf 184.9 / 152
Constant 0.2766 ± 0.0013

E900 FBS_M2 C3 R4
Entries 62754
Mean 0.6245 ± 0.00253
RMS 0.6339 ± 0.001789
χ² / ndf 879.6 / 144
Constant 0.1591 ± 0.0006

E900 FBS_M2 C0 R5
Entries 65000
Mean 0.6355 ± 0.002488
RMS 0.6343 ± 0.001759
χ² / ndf 1025 / 154
Constant 0.1529 ± 0.0006

E900 FBS_M2 C1 R5
Entries 66937
Mean 2.583 ± 0.005628
RMS 1.456 ± 0.003979
χ² / ndf 437.4 / 163
Constant 0.2622 ± 0.0010

E900 FBS_M2 C2 R5
Entries 66536
Mean 2.577 ± 0.00562
RMS 1.45 ± 0.003974
χ² / ndf 361.3 / 164
Constant 0.2591 ± 0.0010

E900 FBS_M2 C3 R5
Entries 64368
Mean 0.649 ± 0.002593
RMS 0.6579 ± 0.001834
χ² / ndf 676.5 / 129
Constant 0.1914 ± 0.0008

E900 FBS_M2 C0 R6
Entries 85324
Mean 0.9851 ± 0.003031
RMS 0.8855 ± 0.002144
χ² / ndf 469.9 / 160
Constant 0.1942 ± 0.0007

E900 FBS_M2 C1 R6
Entries 53383
Mean 2.558 ± 0.006009
RMS 1.388 ± 0.004249
χ² / ndf 445.5 / 150
Constant 0.2755 ± 0.0012

E900 FBS_M2 C2 R6
Entries 53722
Mean 2.548 ± 0.005961
RMS 1.382 ± 0.004215
χ² / ndf 435.8 / 157
Constant 0.2647 ± 0.0011

E900 FBS_M2 C3 R6
Entries 84601
Mean 0.9858 ± 0.003075
RMS 0.8943 ± 0.002174
χ² / ndf 498 / 161
Constant 0.1948 ± 0.0007

E900 FBS_M2 C0 R7
Entries 66067
Mean 0.712 ± 0.002774
RMS 0.7129 ± 0.001961
χ² / ndf 1515 / 159
Constant 0.1644 ± 0.0006

E900 FBS_M2 C1 R7
Entries 81742
Mean 1.499 ± 0.00436
RMS 1.247 ± 0.003083
χ² / ndf 621.5 / 154
Constant 0.2351 ± 0.0008

E900 FBS_M2 C2 R7
Entries 81294
Mean 1.487 ± 0.004373
RMS 1.247 ± 0.003092
χ² / ndf 560 / 160
Constant 0.2285 ± 0.0008

E900 FBS_M2 C3 R7
Entries 65117
Mean 0.7223 ± 0.002857
RMS 0.729 ± 0.00202
χ² / ndf 1209 / 156
Constant 0.1635 ± 0.0006

E900 FBS_M2 C0 R0
Entries 5
Mean 8.611± 1.222
RMS 2.733 ± 0.8643
χ² / ndf 5 / 4
Constant 5.221 ± 67.287

E900 FBS_M2 C1 R0
Entries 5276
Mean 7.163 ± 0.0277
RMS 2.012 ± 0.01958
χ² / ndf 211.1 / 130
Constant 0.6409 ± 0.0090

E900 FBS_M2 C2 R0
Entries 4691
Mean 7.046 ± 0.02818
RMS 1.93 ± 0.01993
χ² / ndf 145.2 / 109
Constant 0.7041 ± 0.0105

E900 FBS_M2 C3 R0
Entries 2
Mean 6.826 ± 1.171
RMS 1.657 ± 0.8283
χ² / ndf 2 / 1
Constant 5.221 ± 67.287

E900 FBS_M2 C0 R1
Entries 11
Mean 6.228 ± 0.619
RMS 2.053 ± 0.4377
χ² / ndf 11 / 10
Constant 5.221 ± 67.287

E900 FBS_M2 C1 R1
Entries 43002
Mean 8.462 ± 0.01404
RMS 2.912 ± 0.00993
χ² / ndf 381.4 / 137
Constant 1.004 ± 0.005

E900 FBS_M2 C2 R1
Entries 41520
Mean 8.343 ± 0.014
RMS 2.852 ± 0.00899
χ² / ndf 538 / 134
Constant 0.9778 ± 0.0048

E900 FBS_M2 C3 R1
Entries 5
Mean 9.173 ± 2.879
RMS 6.439 ± 2.036
χ² / ndf 5 / 4
Constant 5.221 ± 67.287

E900 FBS_M2 C0 R2
Entries 11
Mean 6.772 ± 0.6852
RMS 2.272 ± 0.4845
χ² / ndf 11 / 10
Constant 5.221 ± 67.287

E900 FBS_M2 C1 R2
Entries 66242
Mean 9.139 ± 0.01271
RMS 3.272 ± 0.008989
χ² / ndf 171.8 / 128
Constant 1.106 ± 0.004

E900 FBS_M2 C2 R2
Entries 65468
Mean 9.025 ± 0.01256
RMS 3.214 ± 0.008882
χ² / ndf 237.4 / 133
Constant 1.056 ± 0.004

E900 FBS_M2 C3 R2
Entries 16
Mean 5.963 ± 0.5315
RMS 2.126 ± 0.3759
χ² / ndf 16 / 12
Constant 5.221 ± 67.287

E900 FBS_M2 C0 R3
Entries 29
Mean 6.22 ± 0.4347
RMS 2.341 ± 0.3074
χ² / ndf 29 / 22
Constant 5.221 ± 67.287

E900 FBS_M2 C1 R3
Entries 67314
Mean 8.766 ± 0.01211
RMS 3.143 ± 0.008566
χ² / ndf 213 / 150
Constant 0.8974 ± 0.0035

E900 FBS_M2 C2 R3
Entries 67142
Mean 8.729 ± 0.01206
RMS 3.125 ± 0.008529
χ² / ndf 269.8 / 150
Constant 0.9091 ± 0.0035

E900 FBS_M2 C3 R3
Entries 36
Mean 5.862 ± 0.3587
RMS 2.152 ± 0.2536
χ² / ndf 36 / 28
Constant 5.221 ± 67.287

E900 FBS_M2 C0 R4
Entries 38
Mean 6.14 ± 0.3274
RMS 2.018 ± 0.2315
χ² / ndf 38 / 27
Constant 5.221 ± 67.287

E900 FBS_M2 C1 R4
Entries 52497
Mean 8.115 ± 0.01263
RMS 2.893 ± 0.008929
χ² / ndf 314.7 / 146
Constant 0.8544 ± 0.0037

E900 FBS_M2 C2 R4
Entries 52472
Mean 8.138 ± 0.01263
RMS 2.892 ± 0.008928
χ² / ndf 262 / 145
Constant 0.8541 ± 0.0037

E900 FBS_M2 C3 R4
Entries 40
Mean 6.509 ± 0.2876
RMS 1.819 ± 0.2033
χ² / ndf 40 / 31
Constant 5.221 ± 67.287

E900 FBS_M2 C0 R5
Entries 35
Mean 6.267 ± 0.3447
RMS 2.039 ± 0.2437
χ² / ndf 35 / 27
Constant 5.221 ± 67.287

E900 FBS_M2 C1 R5
Entries 32187
Mean 7.663 ± 0.01463
RMS 2.626 ± 0.01035
χ² / ndf 328 / 145
Constant 0.7176 ± 0.0040

E900 FBS_M2 C2 R5
Entries 32534
Mean 7.673 ± 0.01463
RMS 2.639 ± 0.01035
χ² / ndf 380.3 / 147
Constant 0.7093 ± 0.0040

E900 FBS_M2 C3 R5
Entries 49
Mean 5.918 ± 0.1864
RMS 1.305 ± 0.1318
χ² / ndf 49 / 36
Constant 5.221 ± 67.287

E900 FBS_M2 C0 R6
Entries 488
Mean 6.034 ± 0.06674
RMS 1.916 ± 0.04133
χ² / ndf 60.28 / 53
Constant 0.7515 ± 0.0067

E900 FBS_M2 C1 R6
Entries 46181
Mean 9.103 ± 0.02077
RMS 4.464 ± 0.01469
χ² / ndf 700.2 / 148
Constant 1.254 ± 0.006

E900 FBS_M2 C2 R6
Entries 45813
Mean 9.164 ± 0.02114
RMS 4.524 ± 0.01495
χ² / ndf 554.2 / 136
Constant 1.403 ± 0.007

E900 FBS_M2 C3 R6
Entries 595
Mean 5.853 ± 0.06223
RMS 1.518 ± 0.044
χ² / ndf 79.7 / 81
Constant 0.5197 ± 0.0231

E900 FBS_M2 C0 R7
Entries 129
Mean 6.122 ± 0.1551
RMS 1.762 ± 0.1097
χ² / ndf 35.39 / 55
Constant 0.3508 ± 0.0379

E900 FBS_M2 C1 R7
Entries 8523
Mean 7.841 ± 0.03817
RMS 3.524 ± 0.02699
χ² / ndf 232.5 / 115
Constant 1.013 ± 0.011

E900 FBS_M2 C2 R7
Entries 8704
Mean 7.82 ± 0.03795
RMS 3.541 ± 0.02684
χ² / ndf 288.5 / 136
Constant 0.8668 ± 0.0095

E900 FBS_M2 C3 R7
Entries 156
Mean 5.854 ± 0.126
RMS 1.574 ± 0.08911
χ² / ndf 44.52 / 71
Constant 0.3099 ± 0.0305

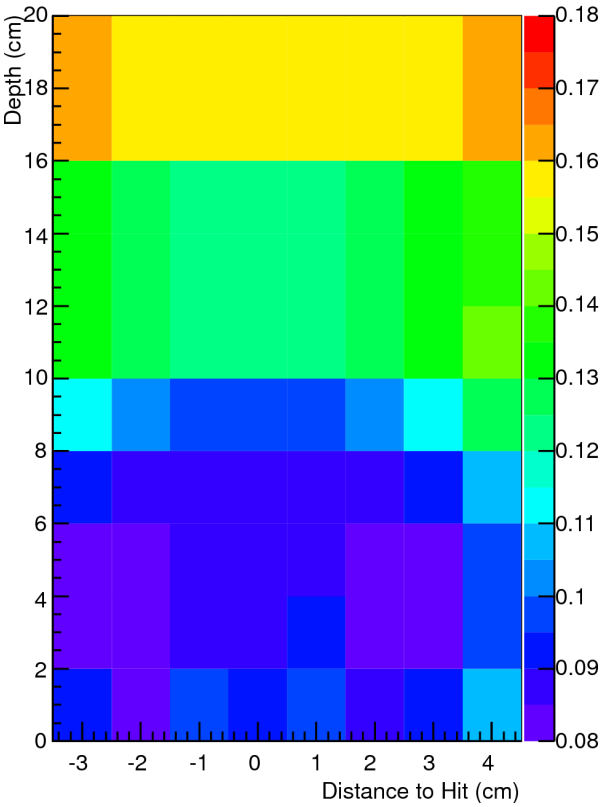
Sampl Fraction: E100 T80

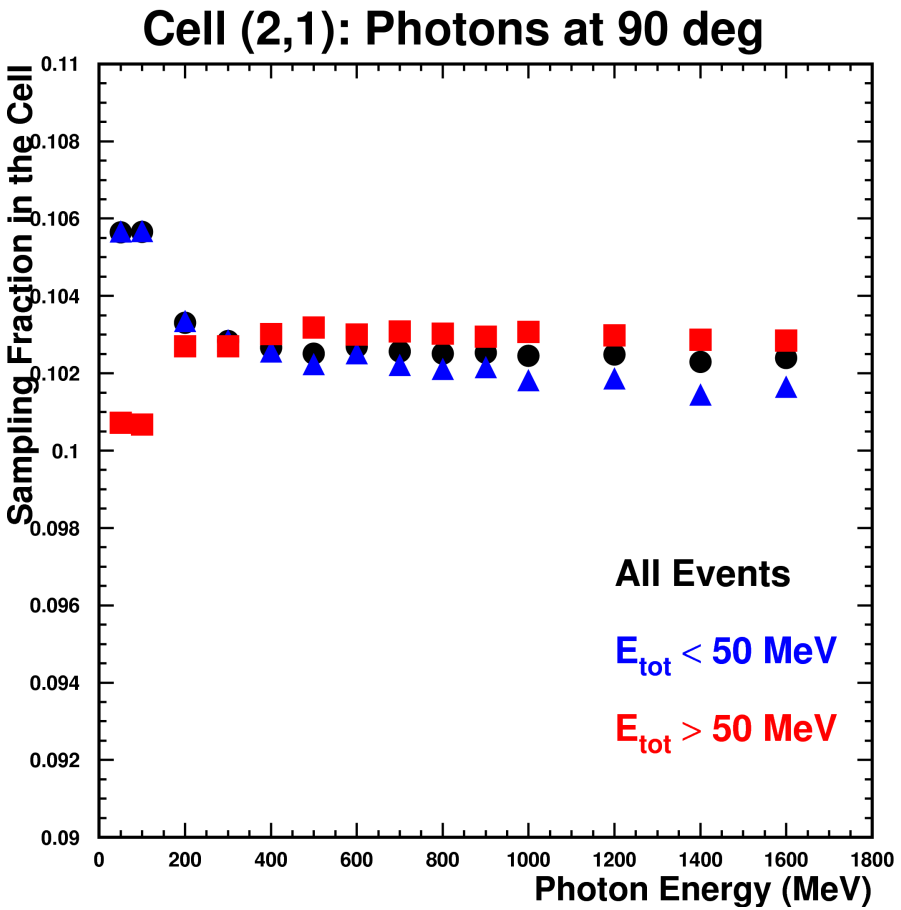


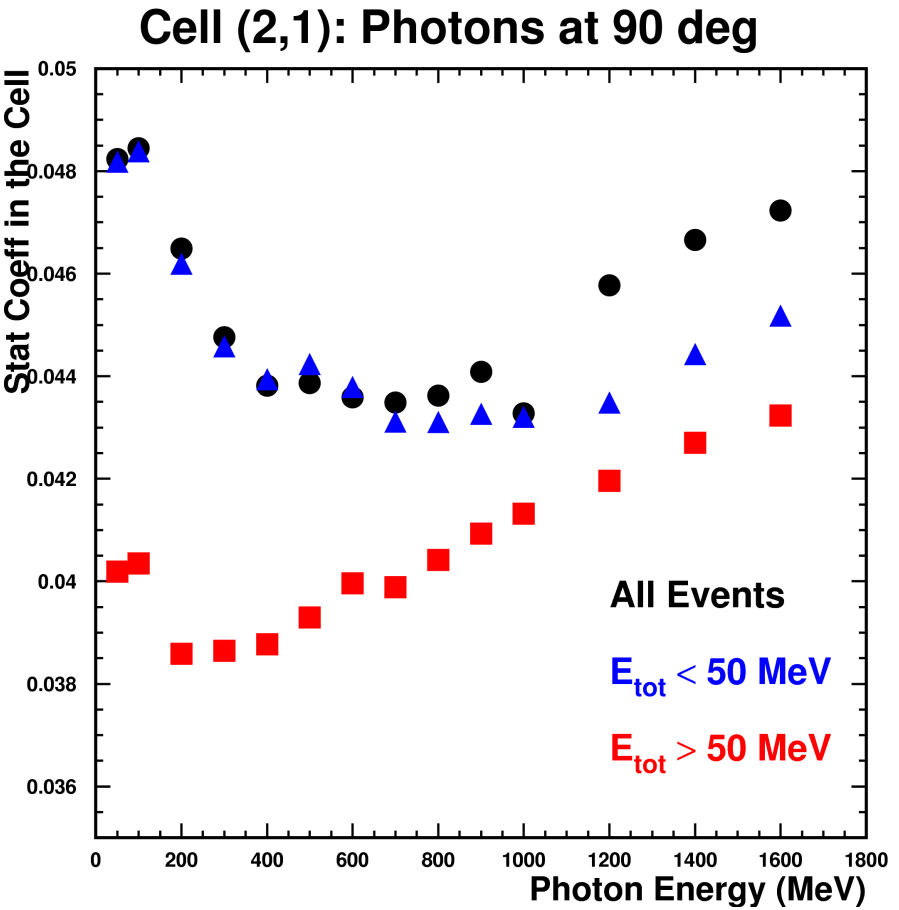
Sampl Fraction: E800 T80

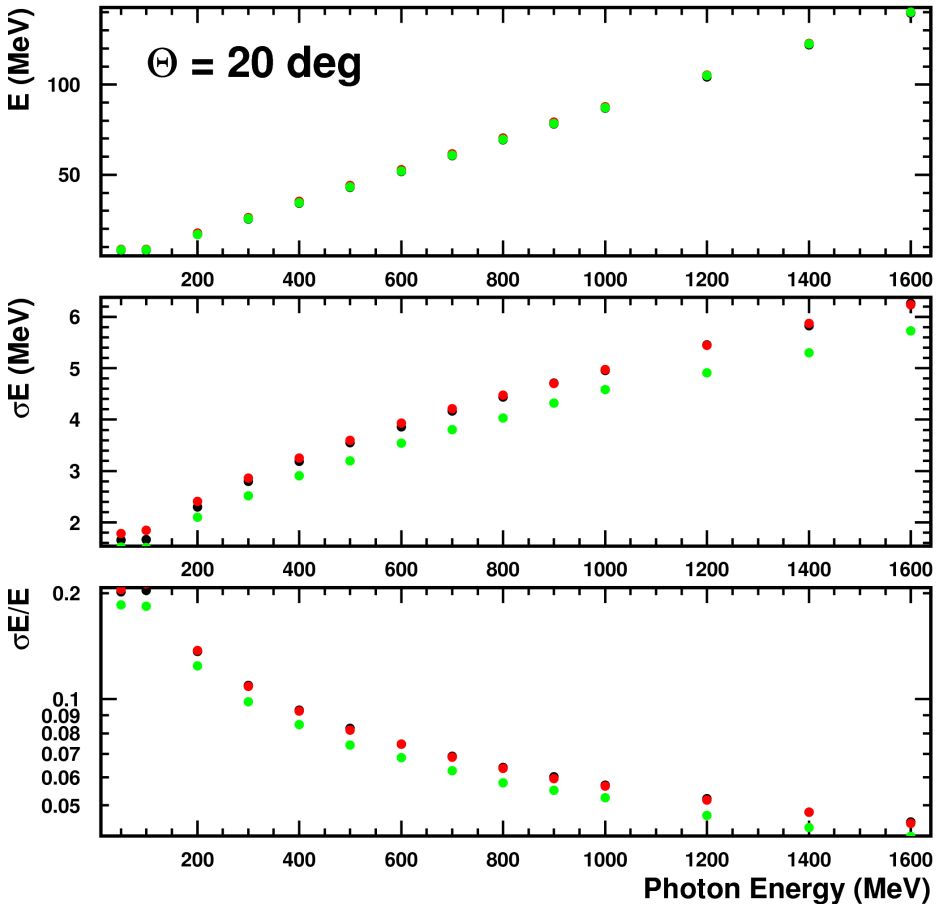


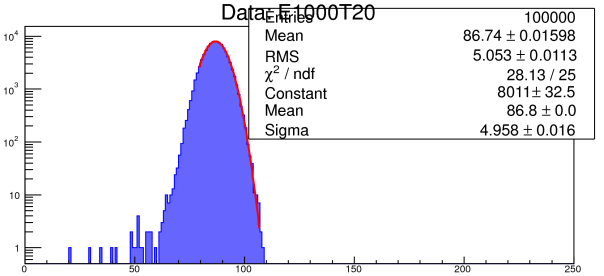
Sampl Fraction: E1200 T20

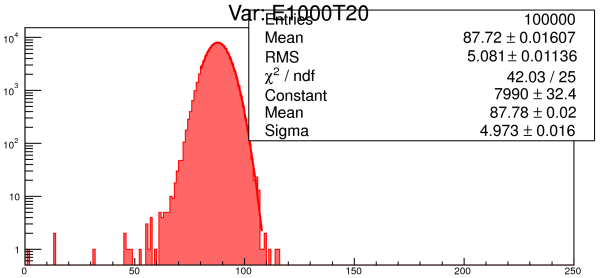


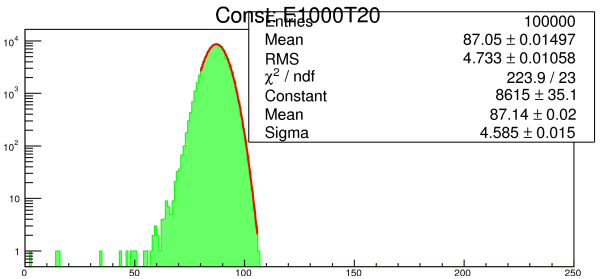

Cell (2,1): Photons at 90 deg
Sampling Fraction in the Cell
Photon Energy (MeV)
All Events
E_tot < 50 MeV
E_tot > 50 MeV

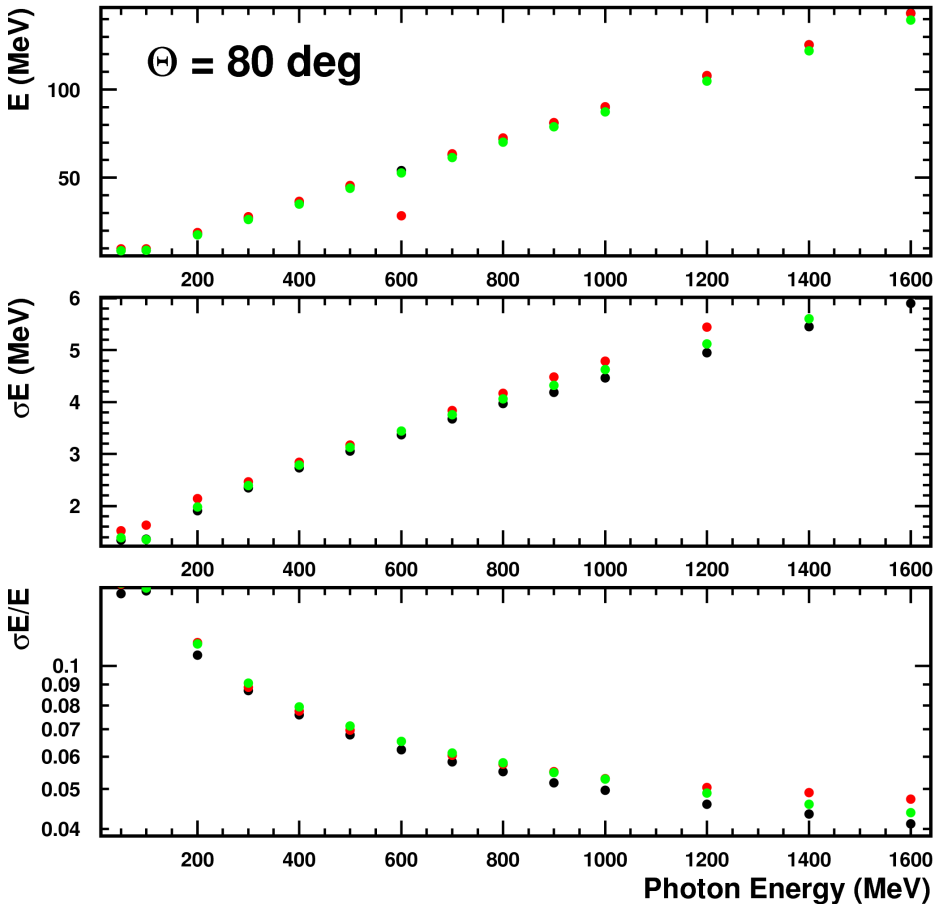

Cell (2,1): Photons at 90 deg
Stat Coeff in the Cell
Photon Energy (MeV)
All Events
E_tot < 50 MeV
E_tot > 50 MeV

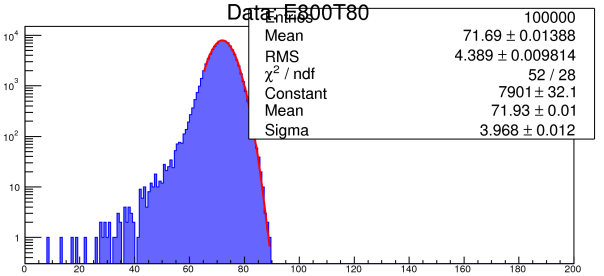

Θ = 20 deg
E (MeV)
σE (MeV)
σE/E
Photon Energy (MeV)

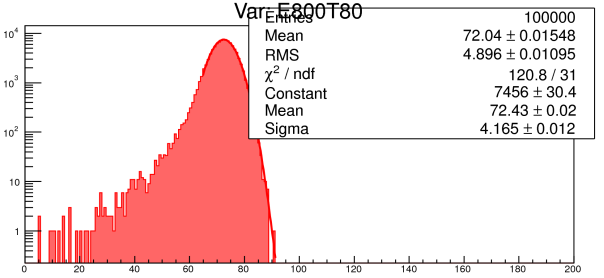

Data: E1000T20
Entries 100000
Mean 86.74 ± 0.01598
RMS 5.053 ± 0.0113
χ² / ndf 28.13 / 25
Constant 8011 ± 32.5
Mean 86.8 ± 0.0
Sigma 4.958 ± 0.016

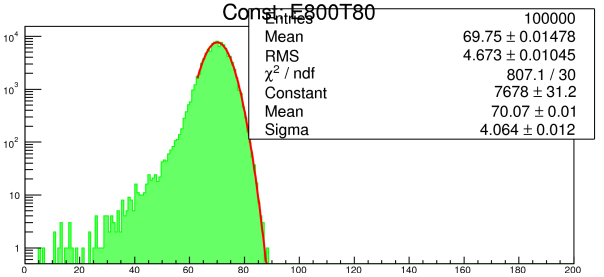

Var: E1000T20
Entries 100000
Mean 87.72 ± 0.01607
RMS 5.081 ± 0.01136
χ² / ndf 42.03 / 25
Constant 7990 ± 32.4
Mean 87.78 ± 0.02
Sigma 4.973 ± 0.016


Const: E1000T20
Entries 100000
Mean 87.05 ± 0.01497
RMS 4.733 ± 0.01058
χ² / ndf 223.9 / 23
Constant 8615 ± 35.1
Mean 87.14 ± 0.02
Sigma 4.585 ± 0.015


Θ = 80 deg
E (MeV)
σE (MeV)
σE/E
Photon Energy (MeV)


Data: E800T80
Entries 100000
Mean 71.69 ± 0.01388
RMS 4.389 ± 0.009814
χ² / ndf 52 / 28
Constant 7901 ± 32.1
Mean 71.93 ± 0.01
Sigma 3.968 ± 0.012


Var: E800T80
Entries 100000
Mean 72.04 ± 0.01548
RMS 4.896 ± 0.01095
χ² / ndf 120.8 / 31
Constant 7456 ± 30.4
Mean 72.43 ± 0.02
Sigma 4.165 ± 0.012


Const: E800T80
Entries 100000
Mean 69.75 ± 0.01478
RMS 4.673 ± 0.01045
χ² / ndf 807.1 / 30
Constant 7678 ± 31.2
Mean 70.07 ± 0.01
Sigma 4.064 ± 0.012