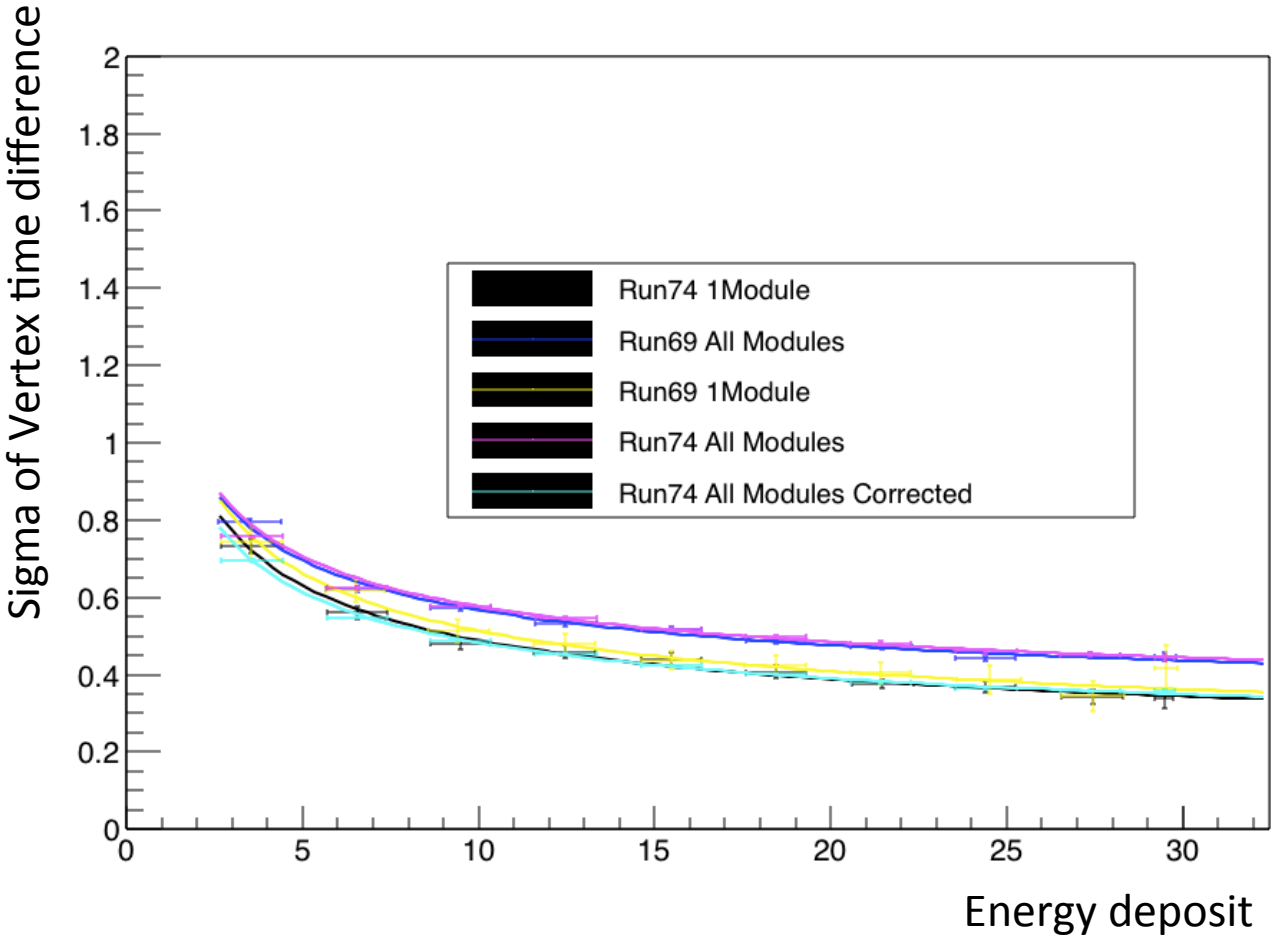
Report_170517

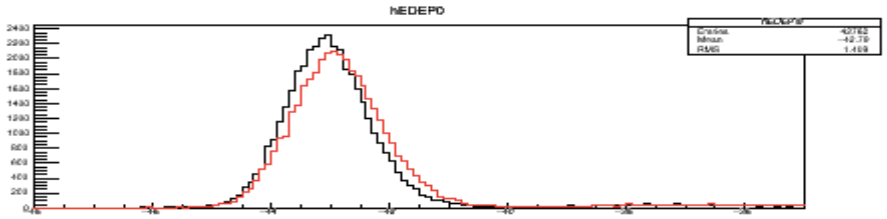
Timing Resolution

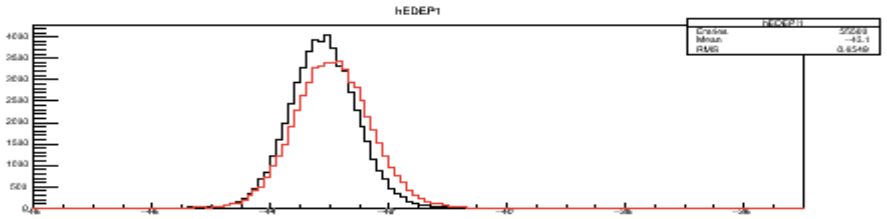
- Module Correction check

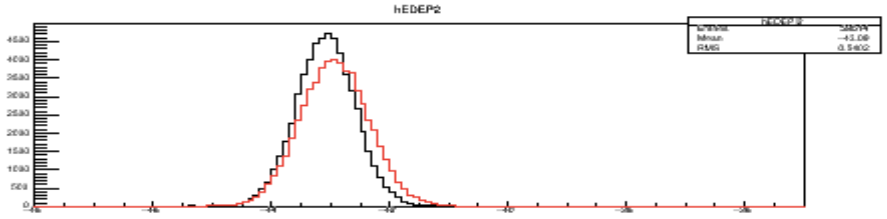


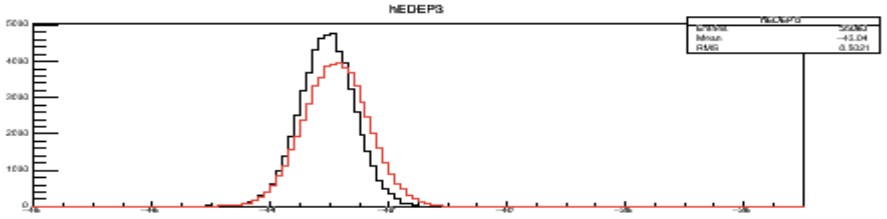
Raw Histograms

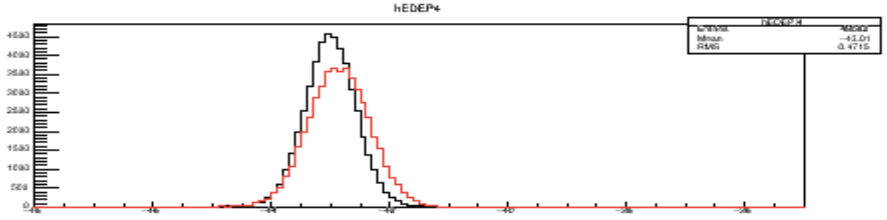
Black : After Correction (Run74)
Red : Before Correction (Run74)

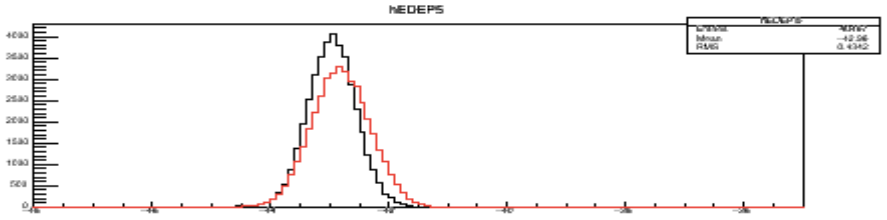


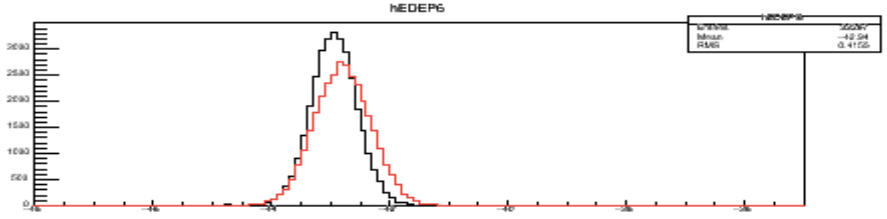


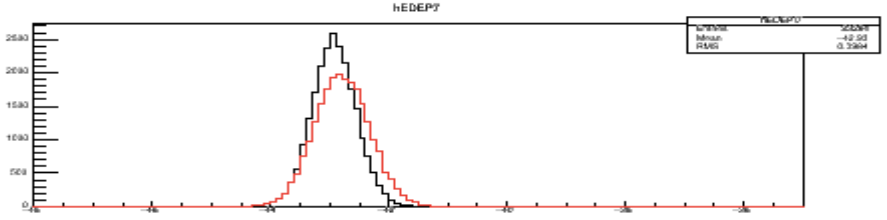


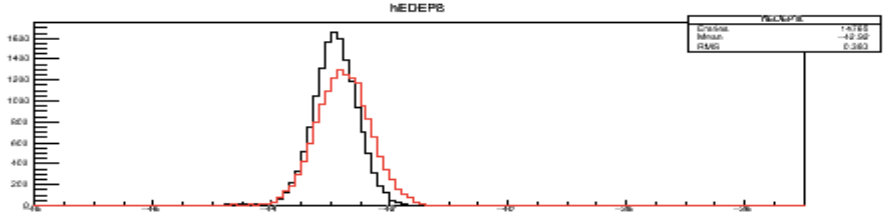


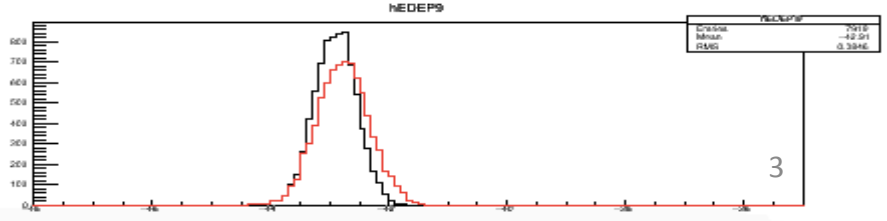




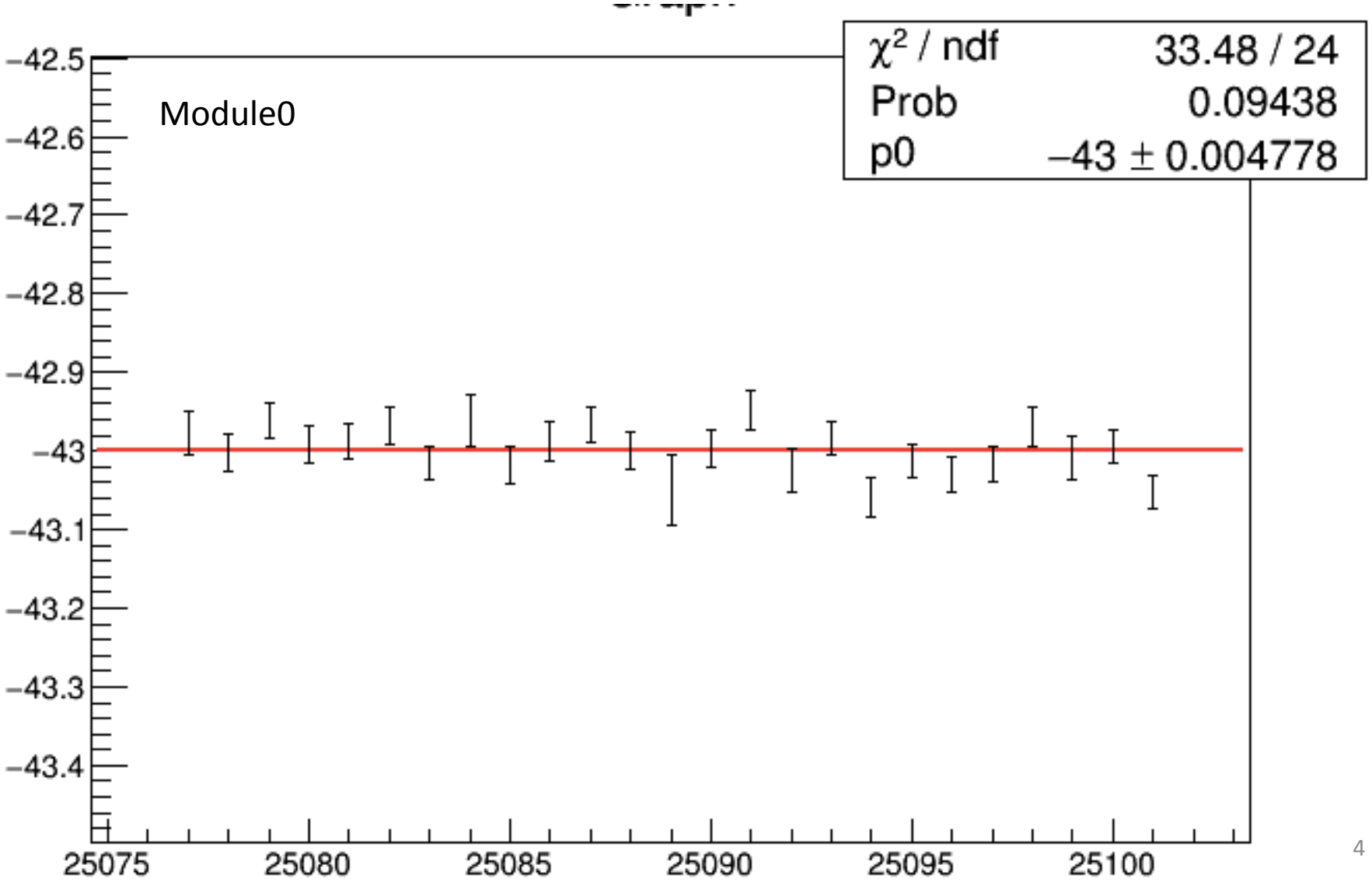








Module stability



Sampling Fraction simulation

- Change thickness of IMB lead sheet to 0.9mm, 0.8mm respectively. (From 1.0mm)
- Check IMB && OMB status

Radiation length check

- Data Selection
  - IMB Hit && OMB Hit
- Check Ratio of Energy deposited

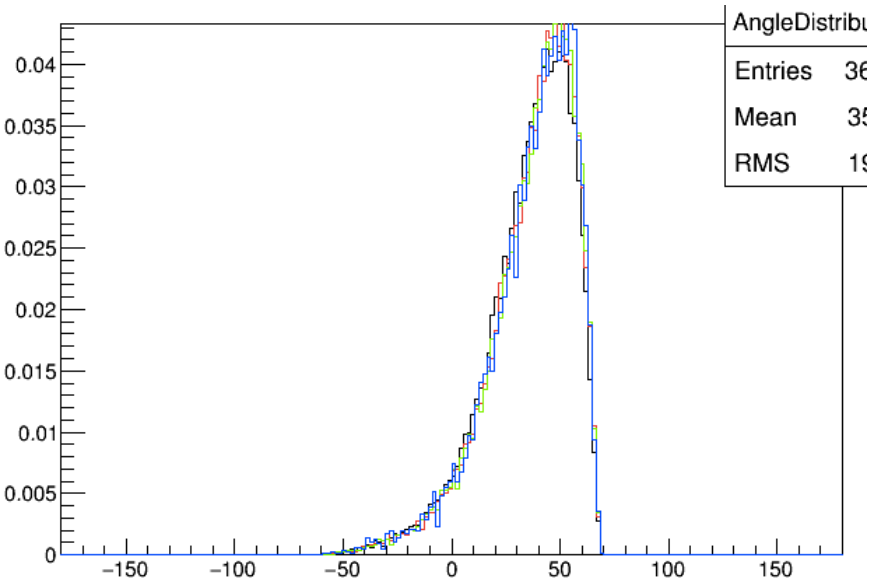
$$\text{Ratio} = \frac{E_{OMB}}{E_{IMB}} = \frac{SAMP_{OUT}}{SAMP_{IN}} \times \frac{E_{INCE}(2^{-(X-x)/X})}{E_{INCE}(1-2^{-(X-x)/X})}$$

Capital X : Radiation Length
Small x : starting point of interaction

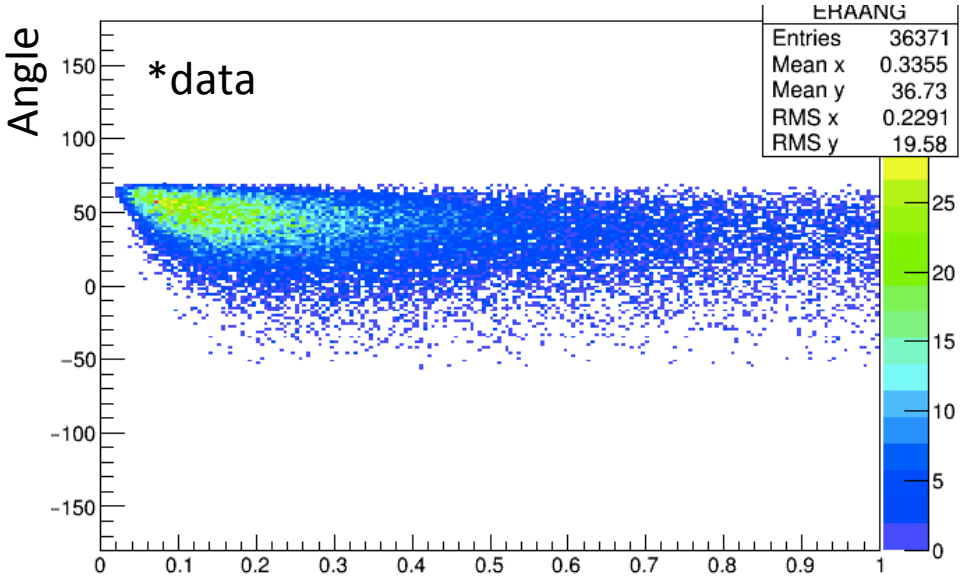
Full deposition is assumed

Distribution of x : exponential with slope X
X is related to thickness of Lead sheet

Angle dependency

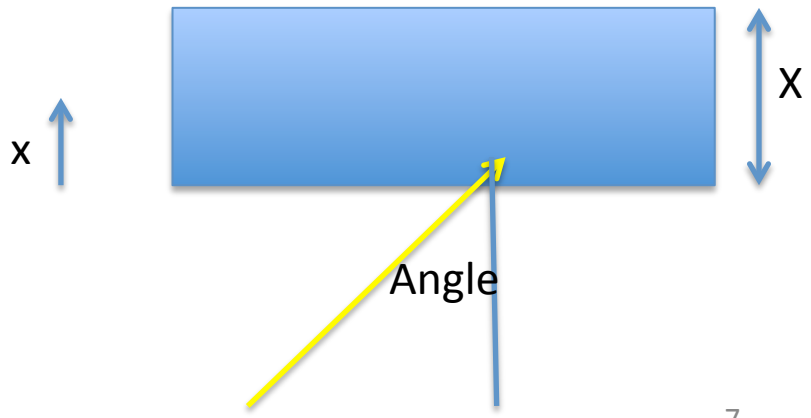


Angle

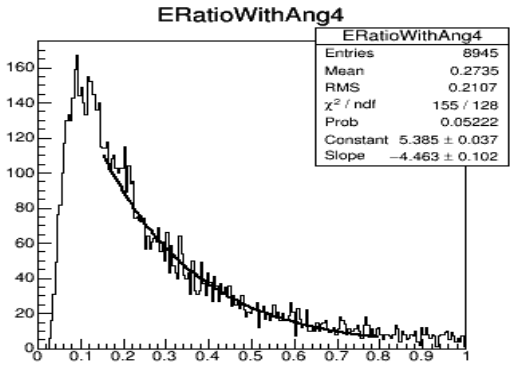


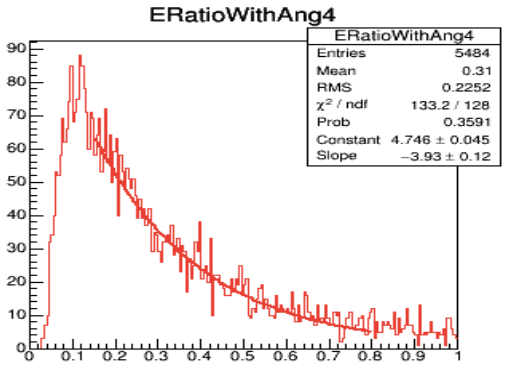
Ratio

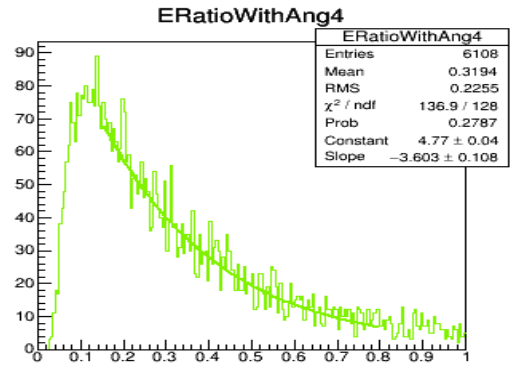
Black : data
Red : Orig MC
Green : 0.9mm MC
Blue : 0.8mm MC

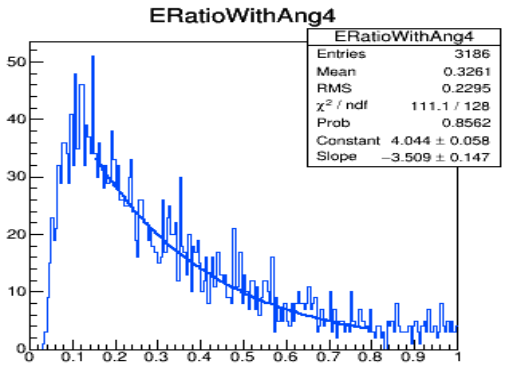


Ratio
With angle selection(48<theta<60)



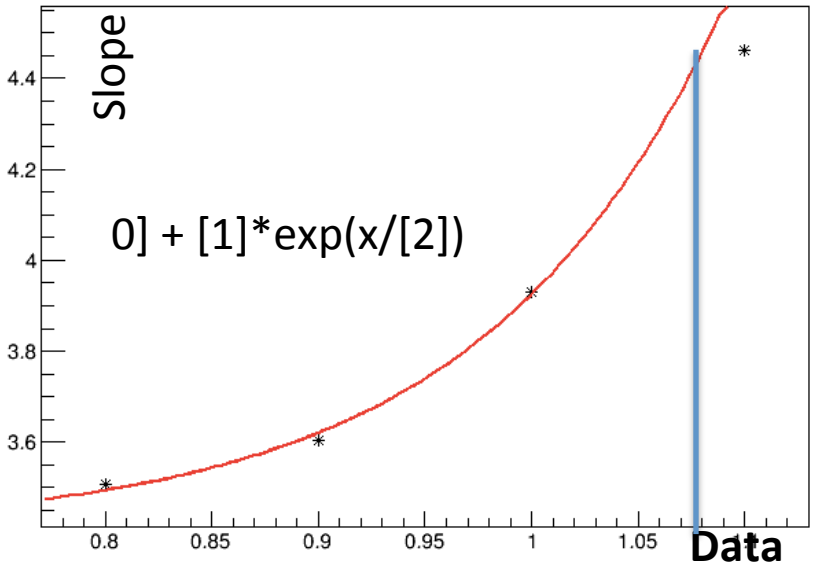






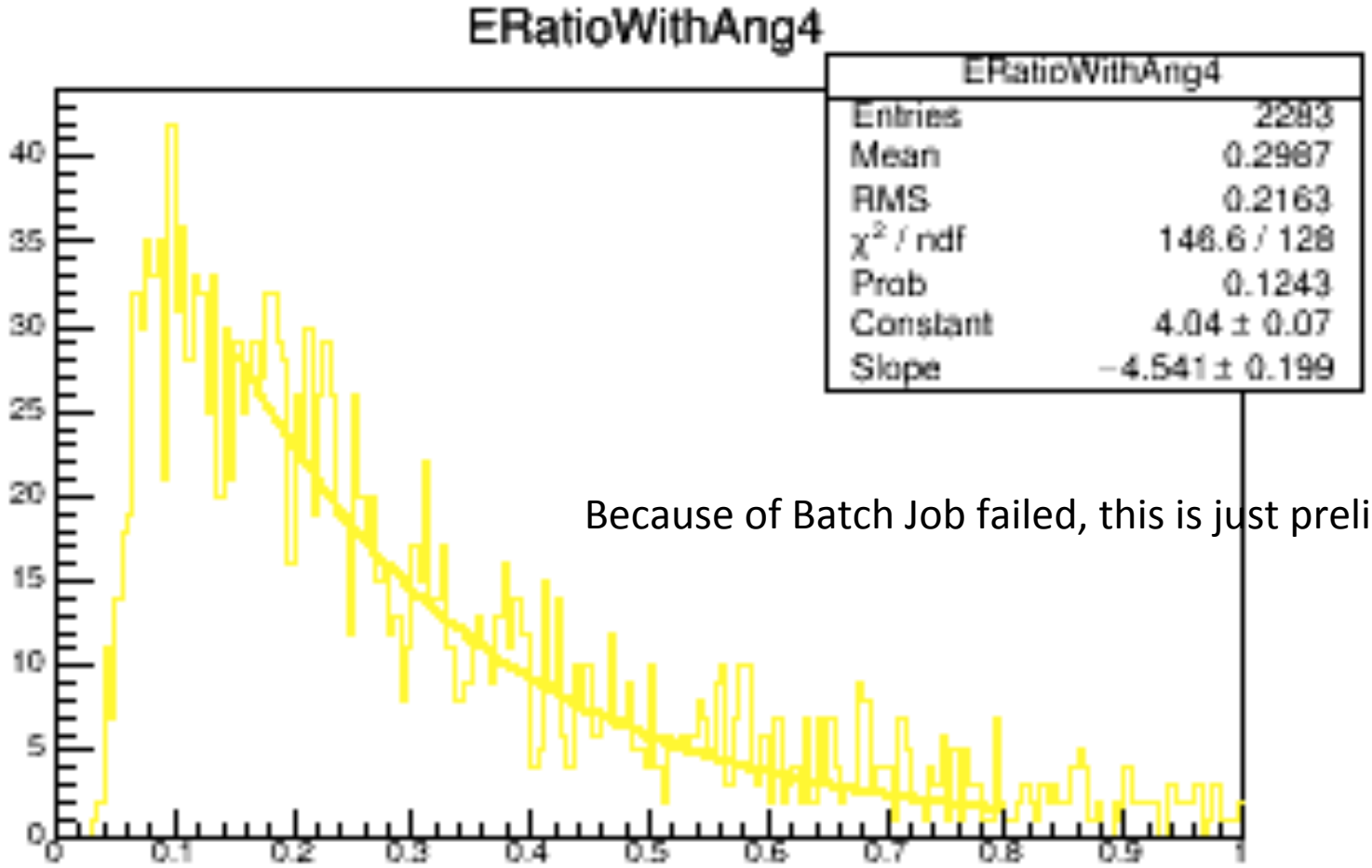
Exponential Fitting

1.07mm?



Thickness of Lead sheet [mm]

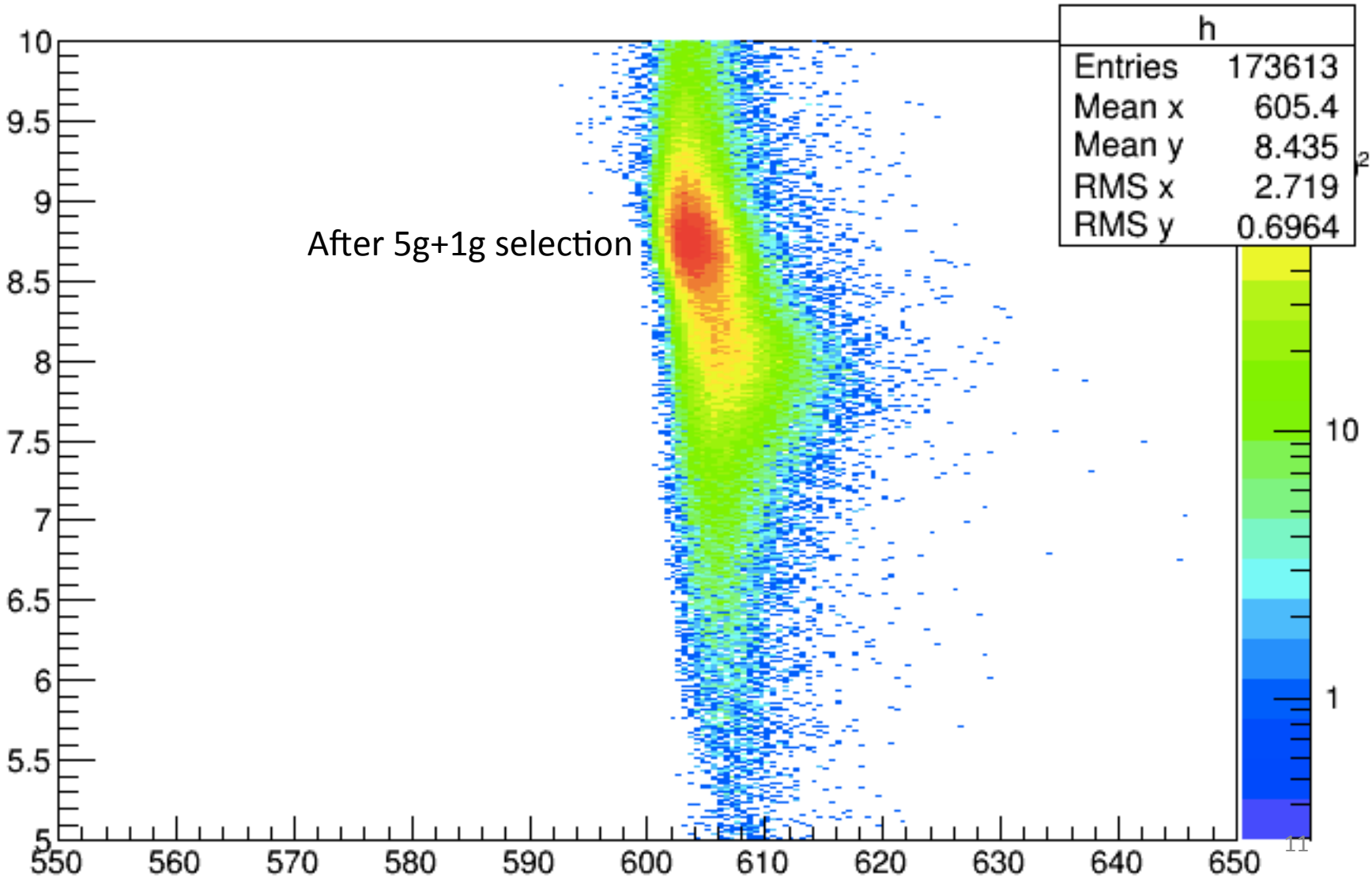
1.1mm case

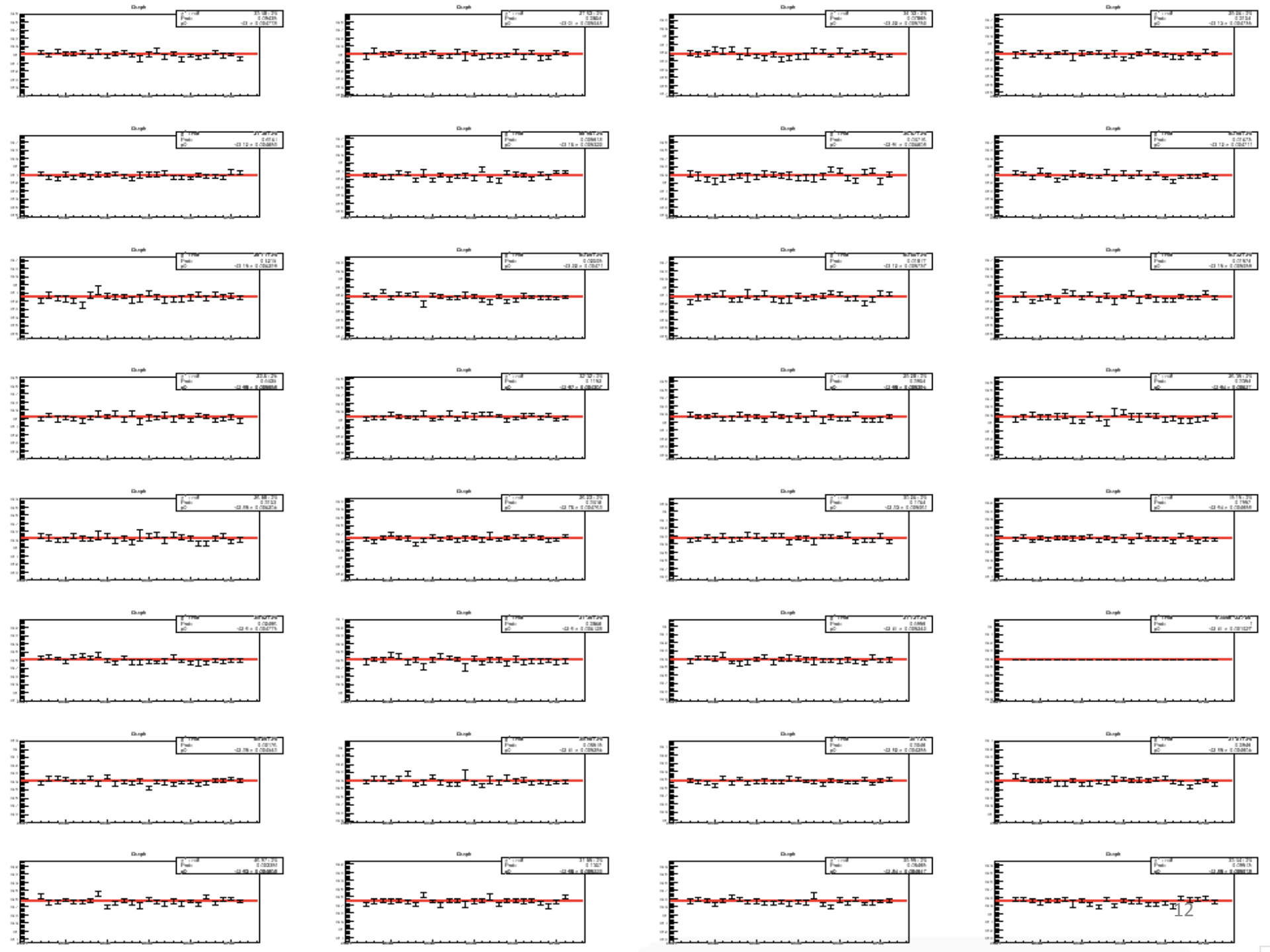


Because of Batch Job failed, this is just preliminary

Raw Distributions

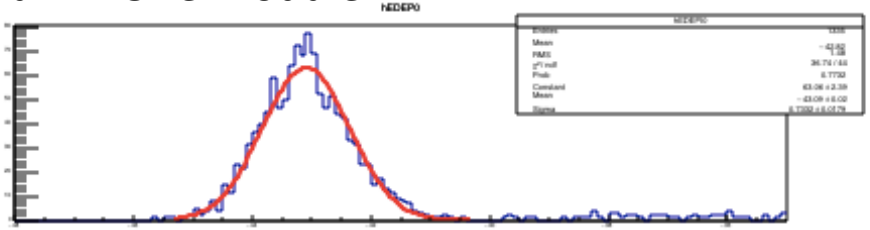
Pedestal vs Pulse Stability

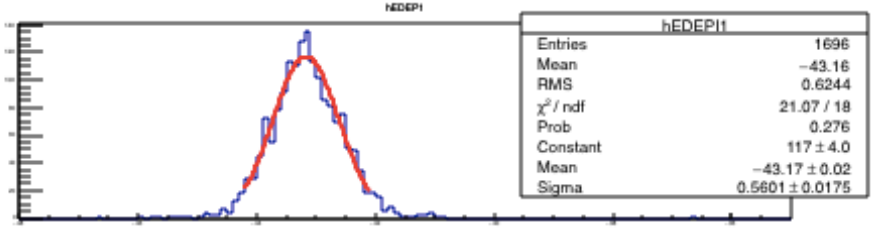


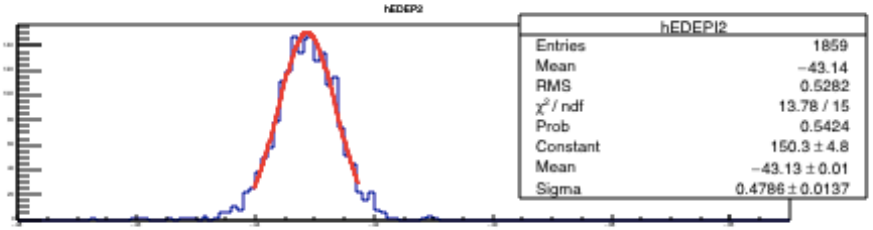


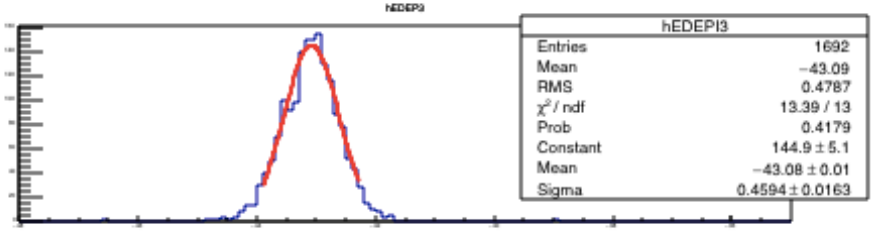
Run74 One Module

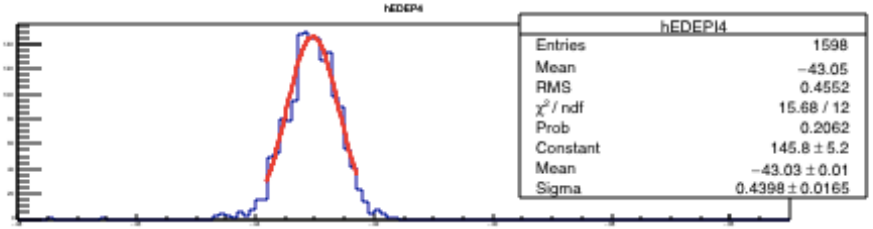
Raw distributions

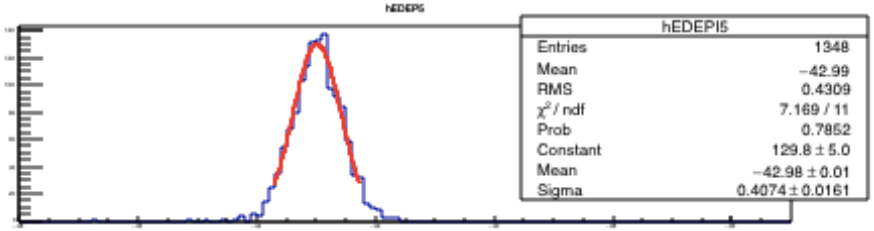


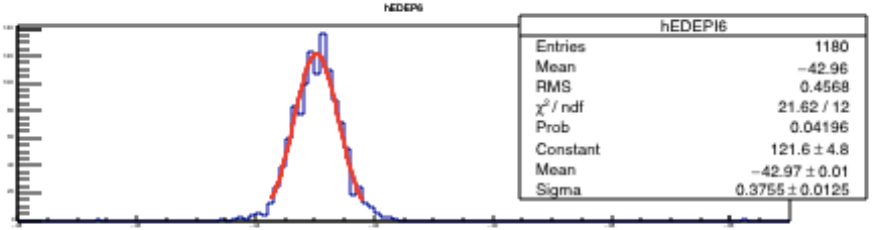


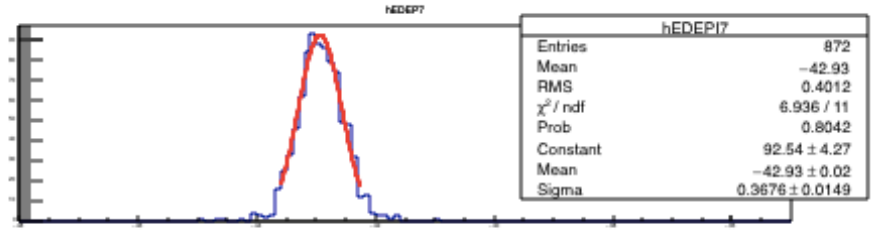


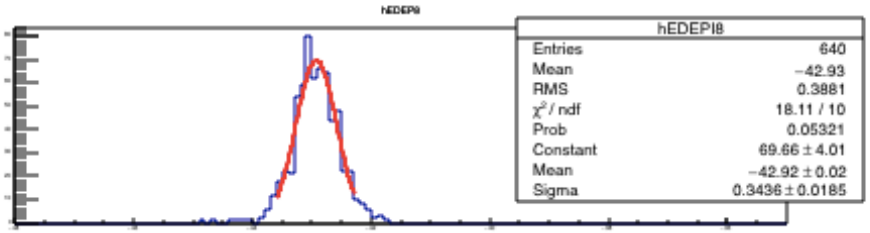


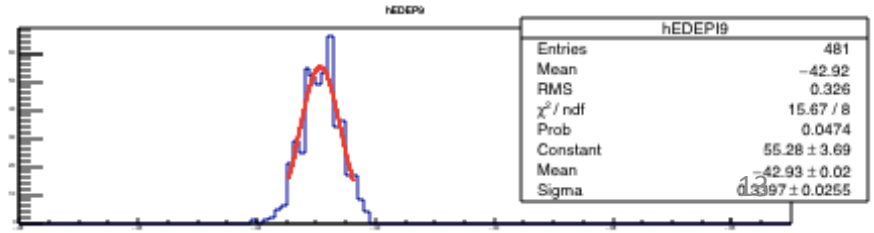






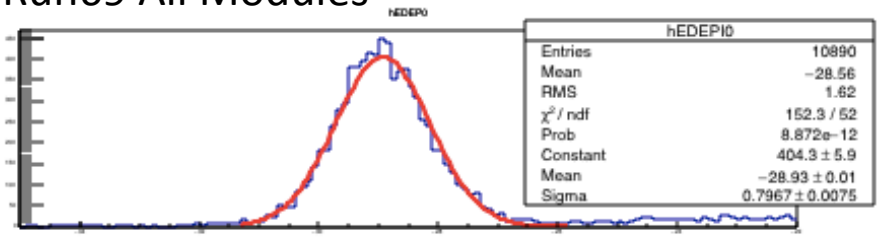


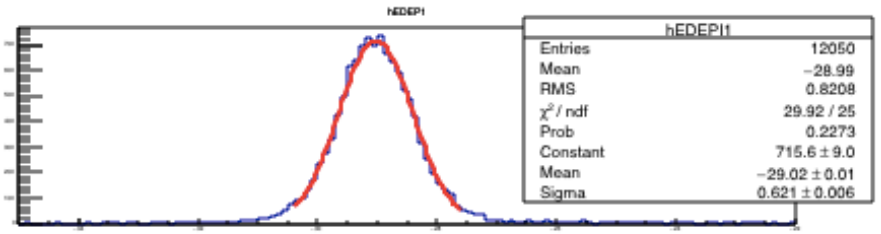


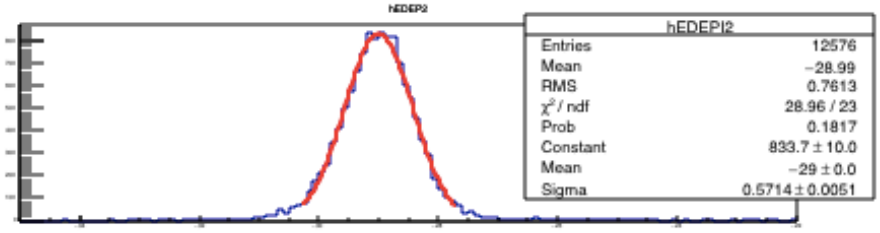


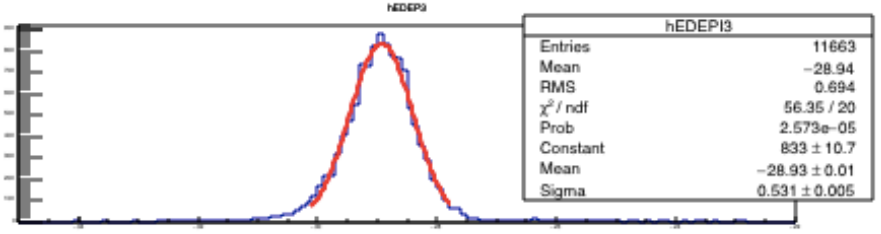
Raw distributions

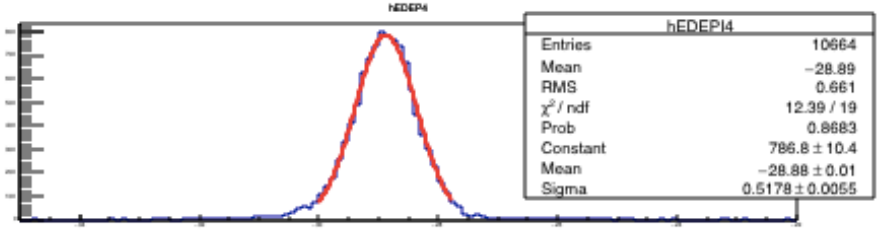
Run69 All Modules

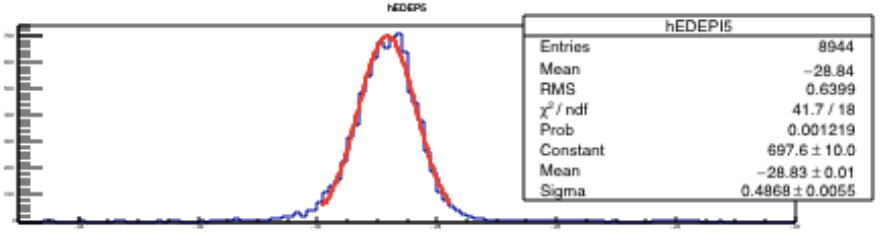


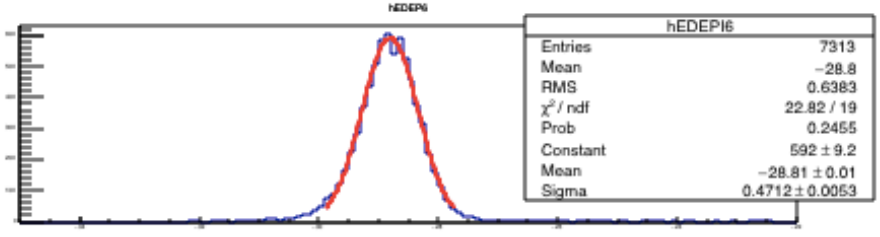


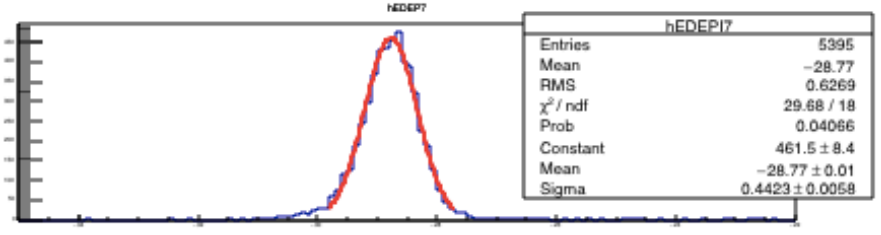


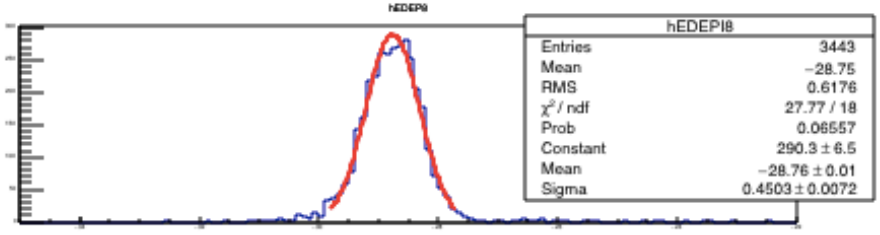


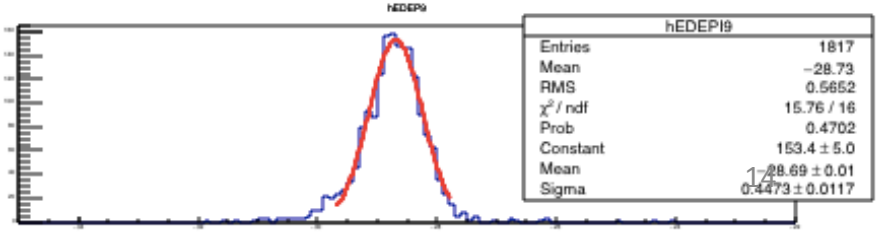






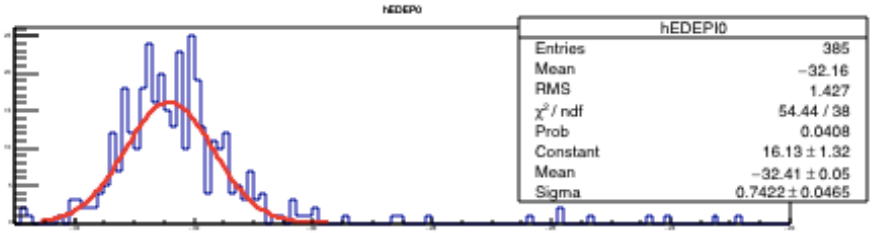


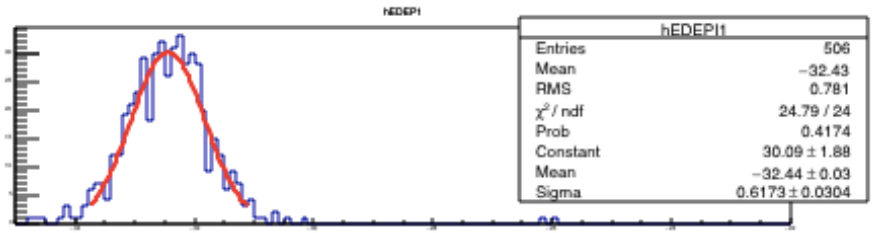


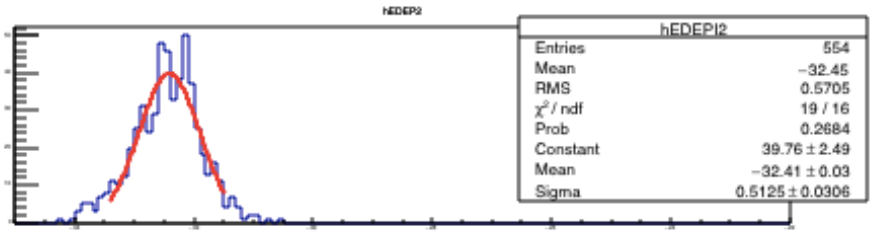


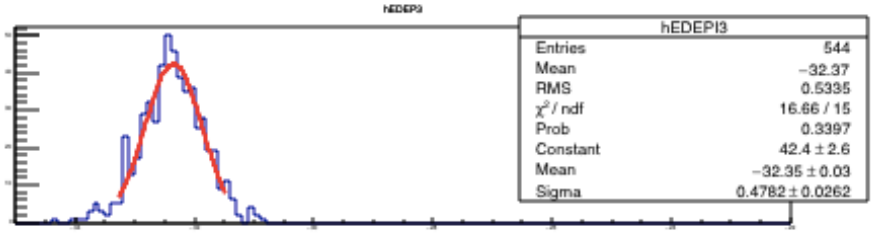
Run69 One Module

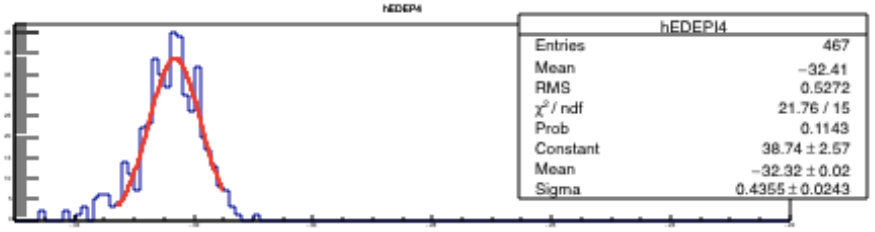
Raw distributions

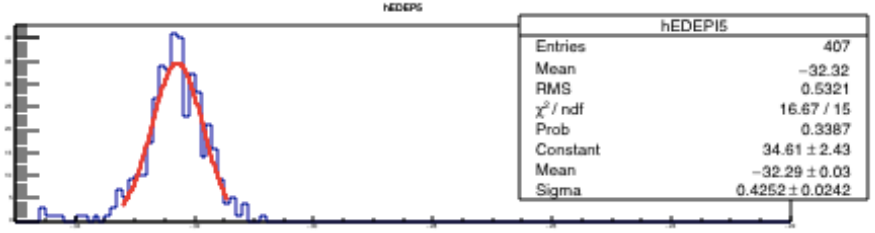


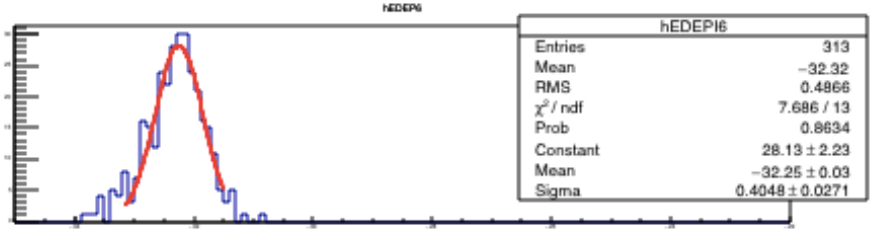


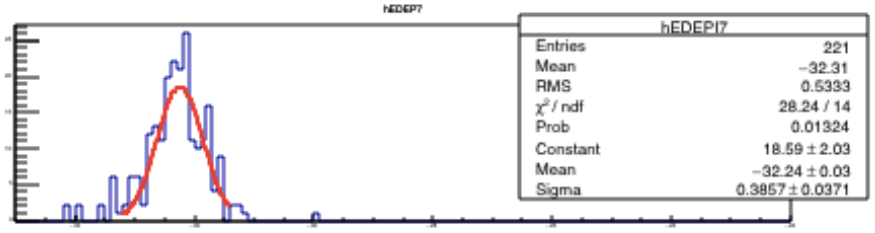


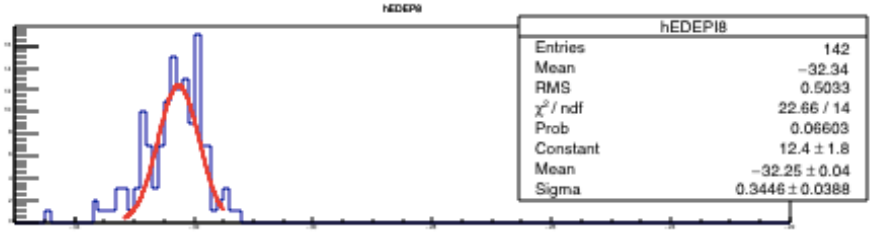


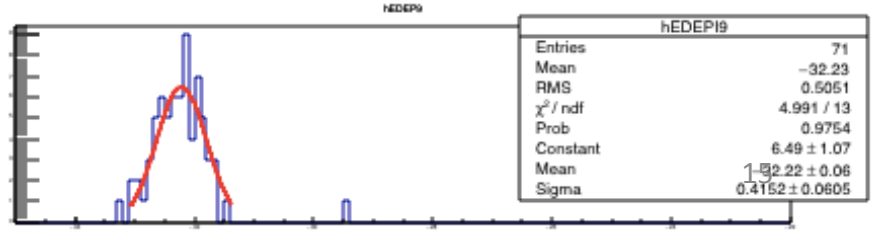






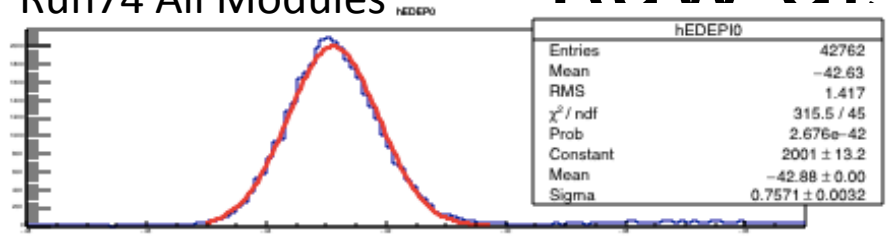


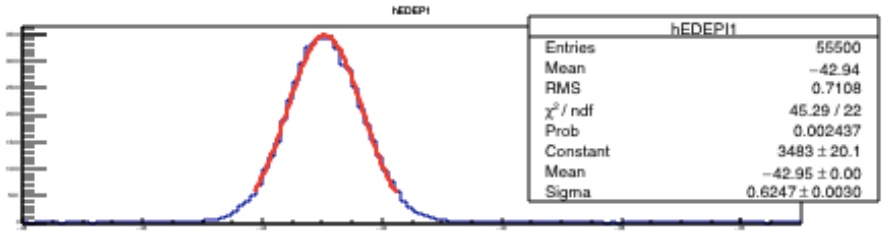


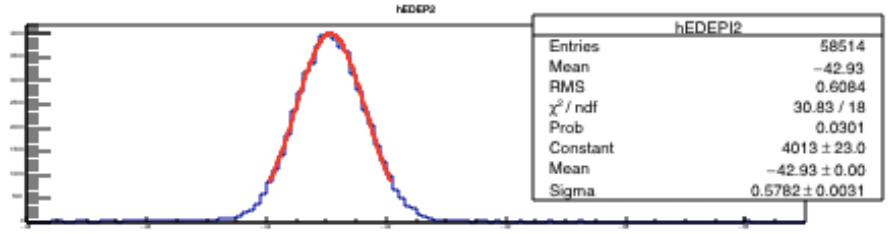


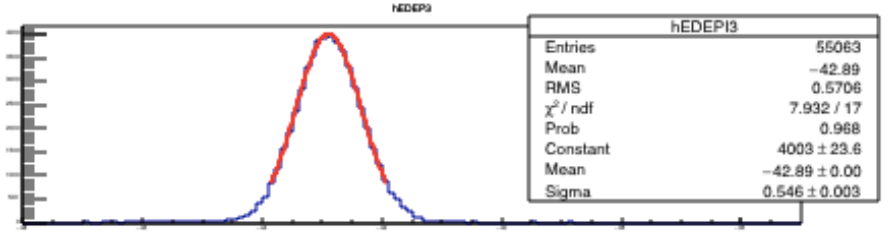
Raw distributions

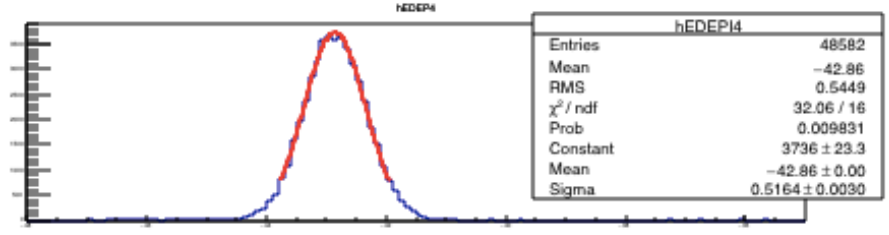
Run74 All Modules

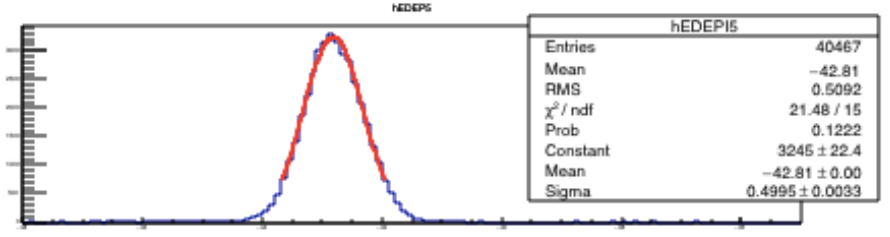


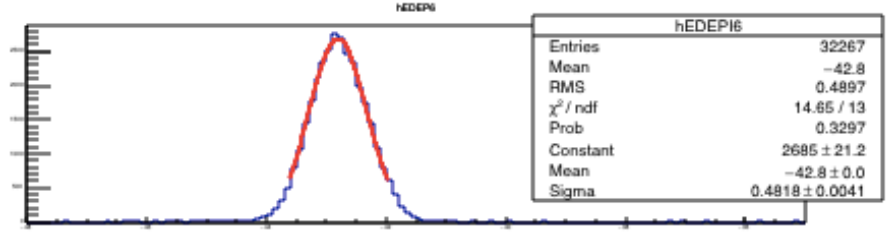


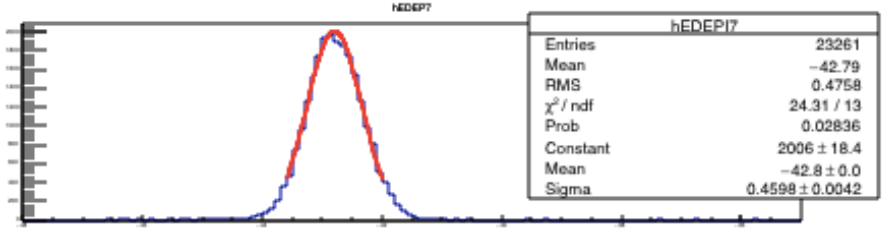


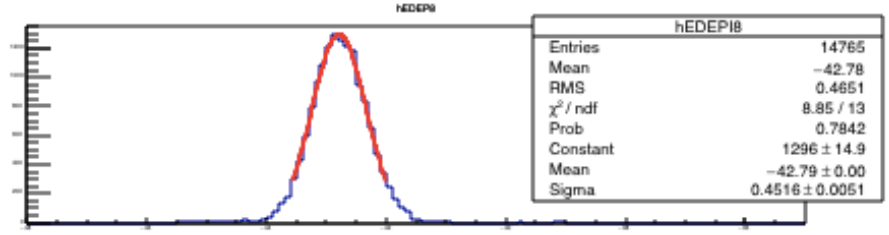


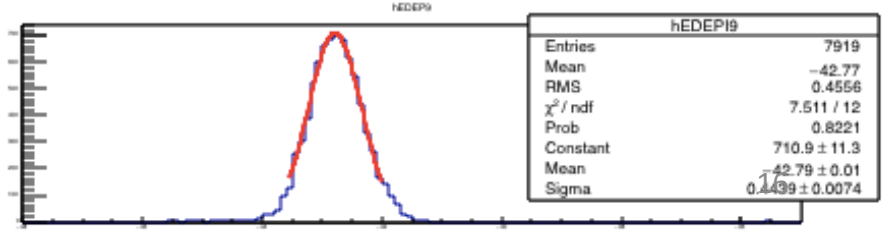








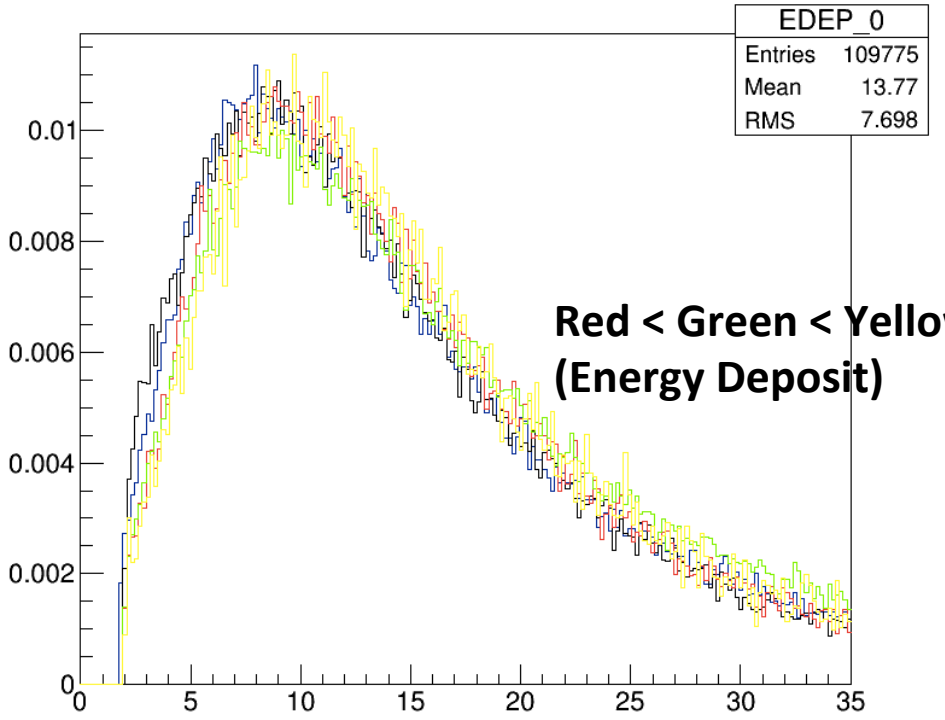




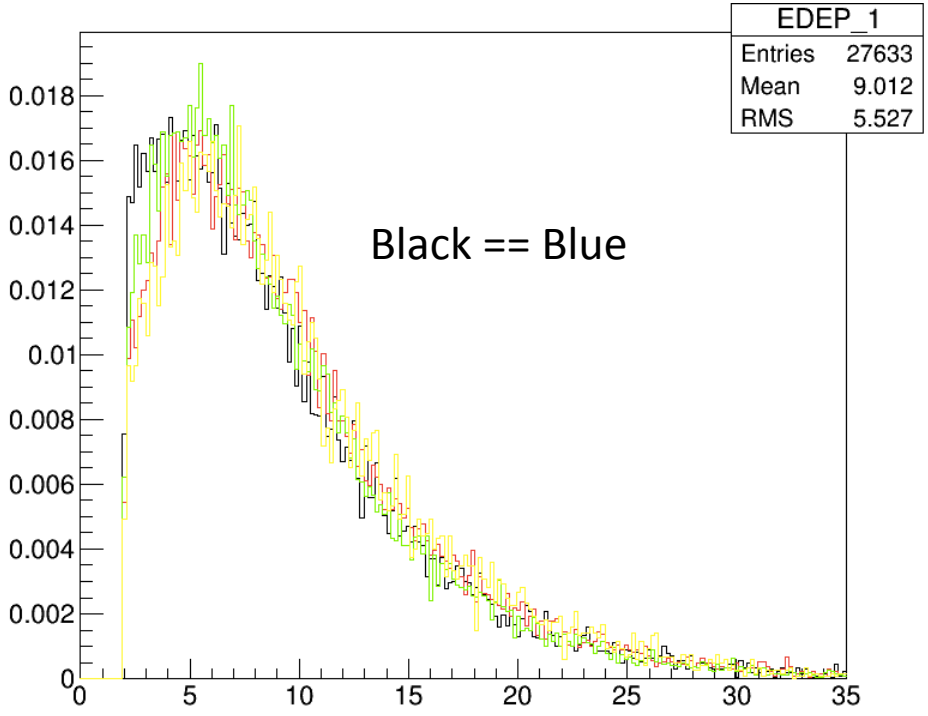
Energy Deposit

Black : Original MC
Blue : 0.9 Scaled Energy
Red : MC with 0.1mm reduction
Green : Original Data
Yellow : MC with 0.2mm reduction

IMB



OMB

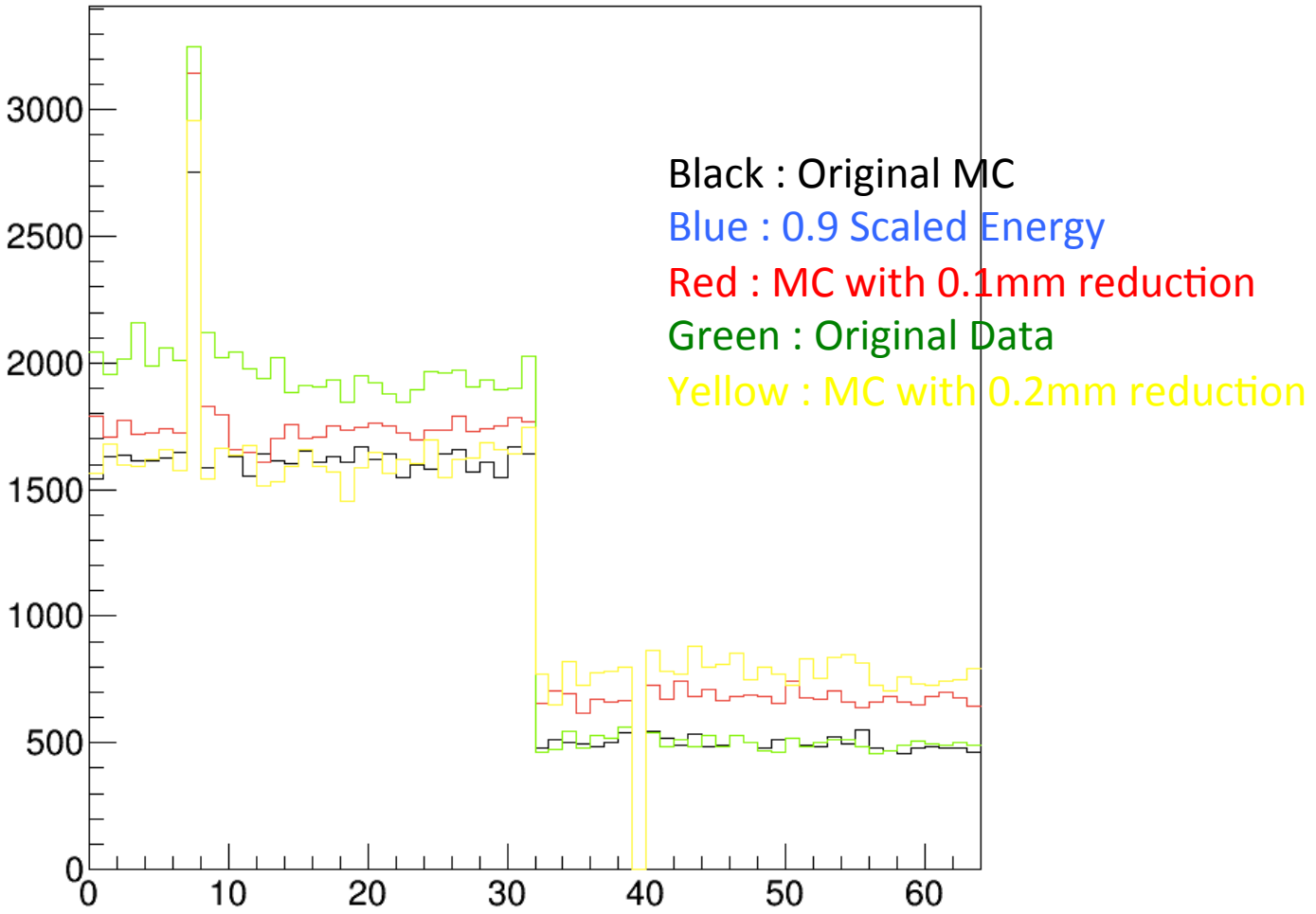


P.O.T. to KL

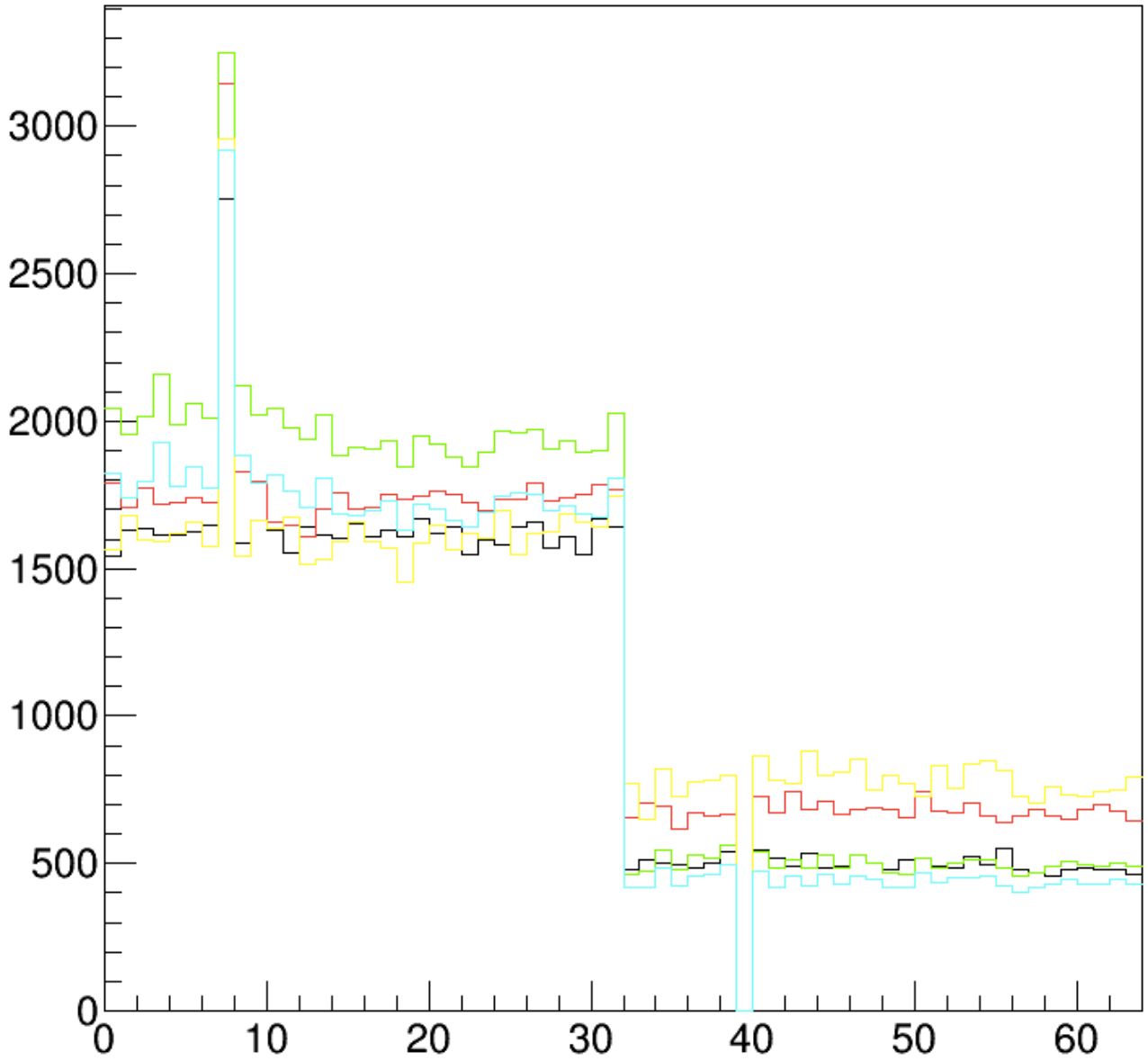
- P.O.T. in Run65 : 1.286e19
- #KLs = 8.146e9 in Min. bias
- #KLs in MC = 1e9
  - KL3pi0 only, Total KL = 1e9 / 0.192 = 5.12e9

After P.O.T. Normalization

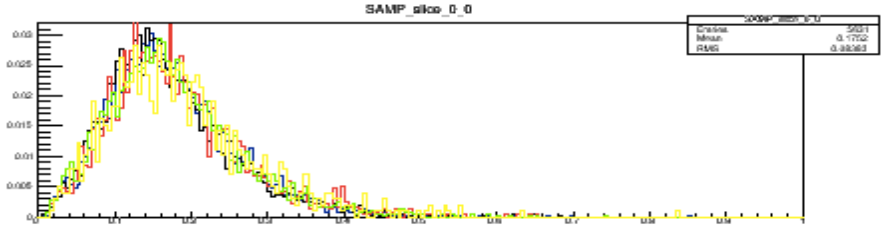
With Hit Requirement (#Hits == 1)

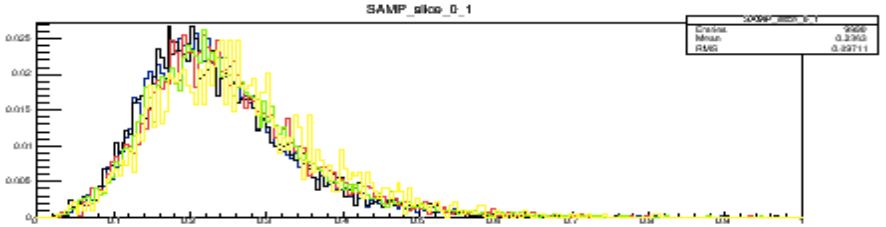


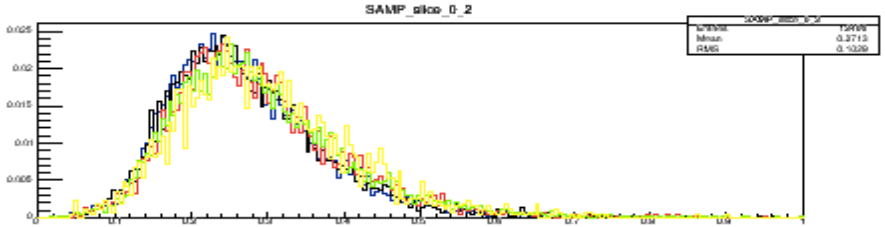
Without Hit Req

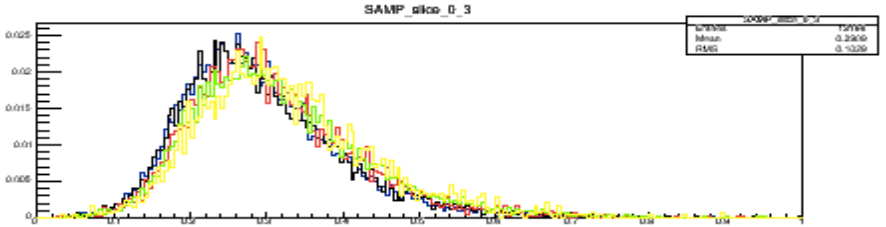


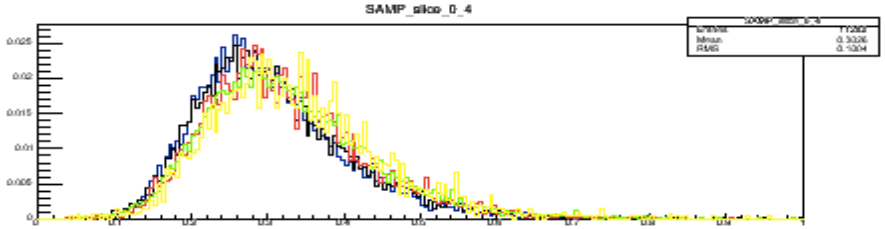
Sampling Fraction (IMB)

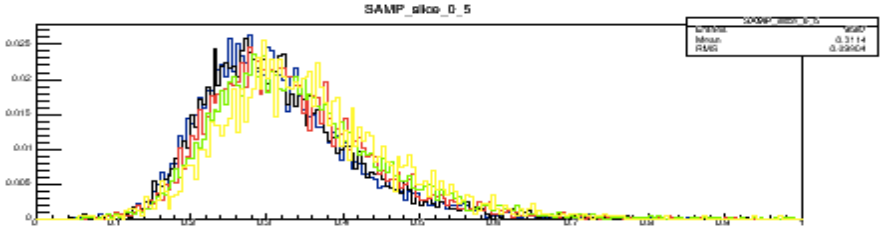


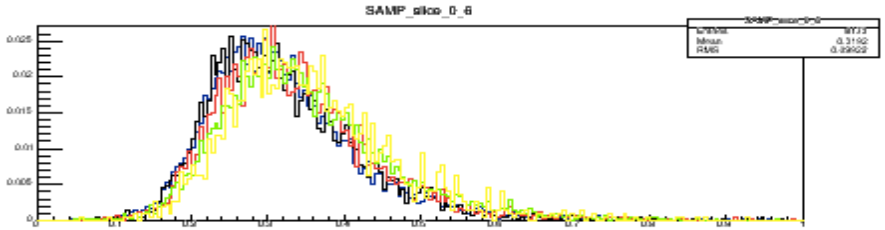


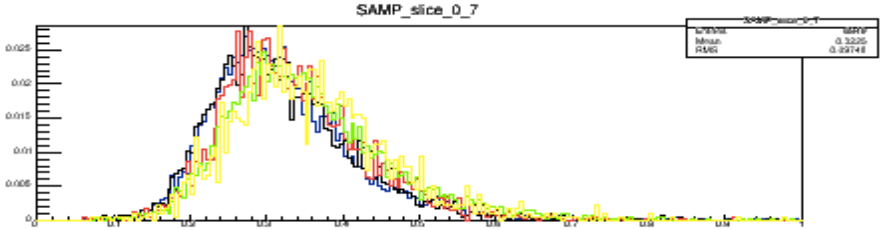


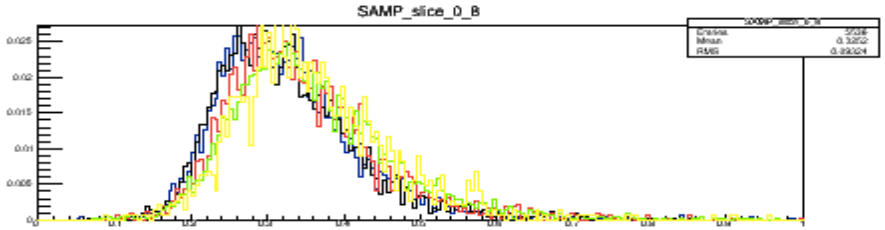


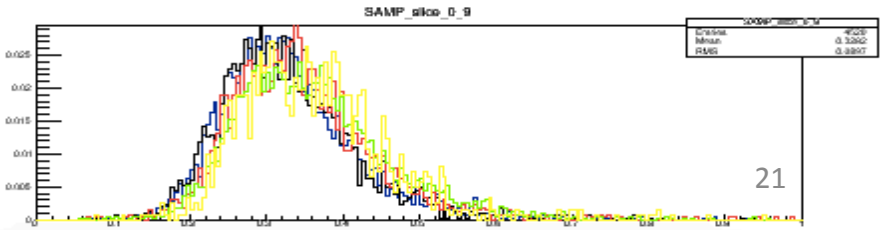




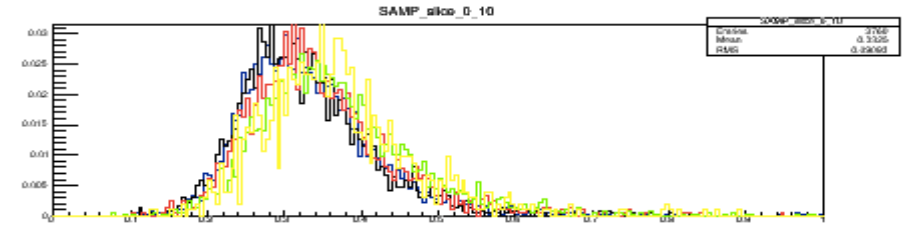


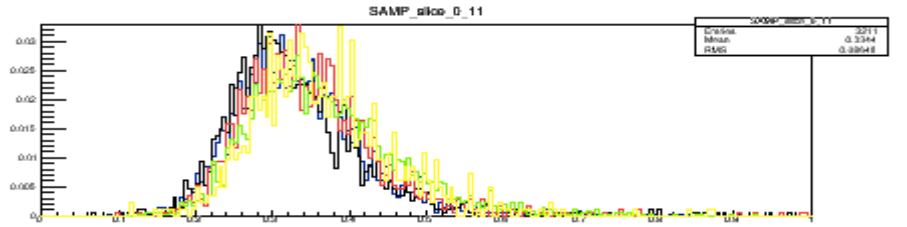


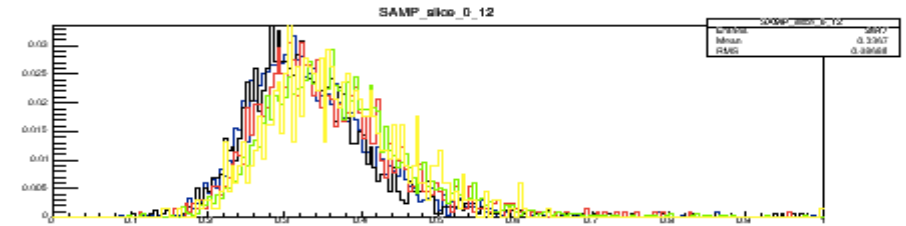


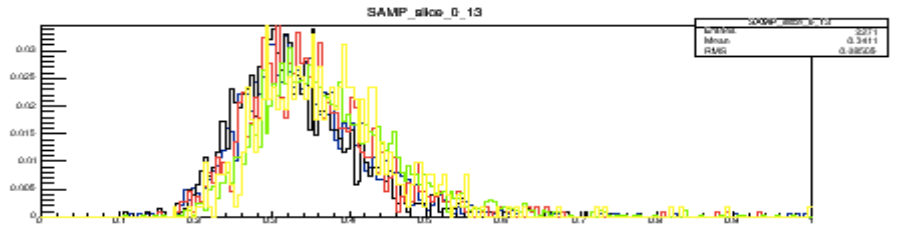


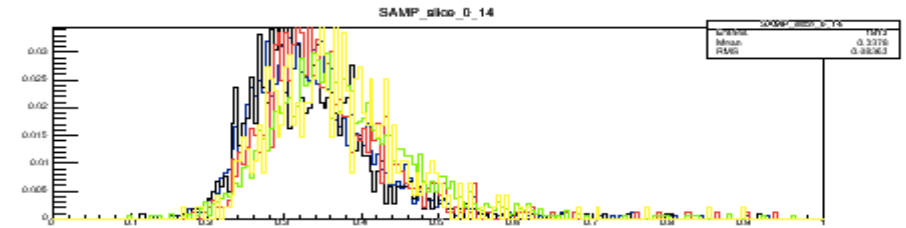
Sampling Fraction (IMB)

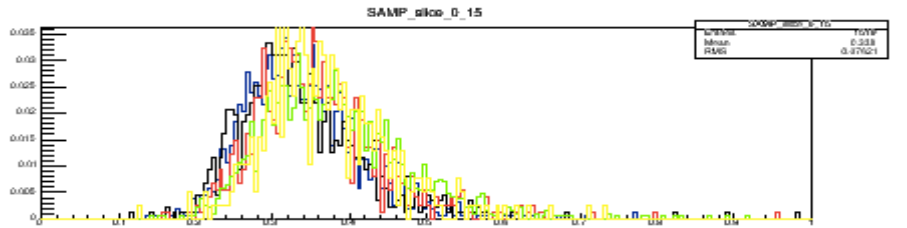


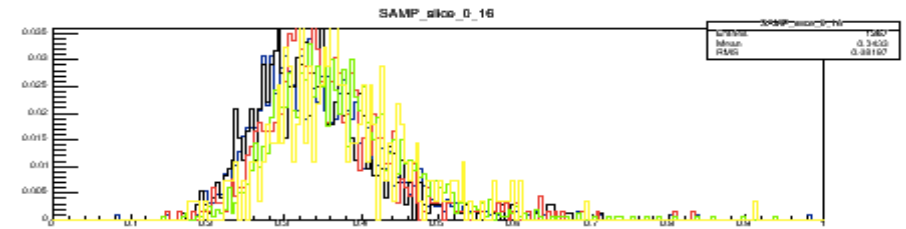


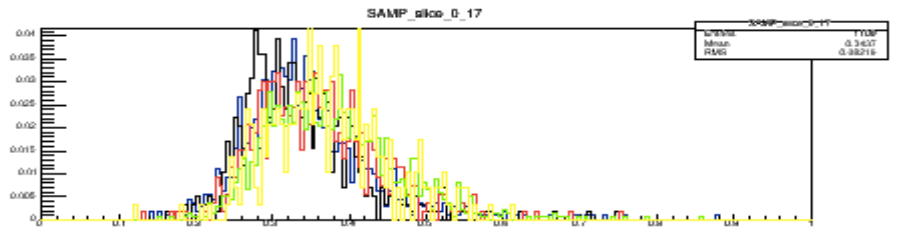


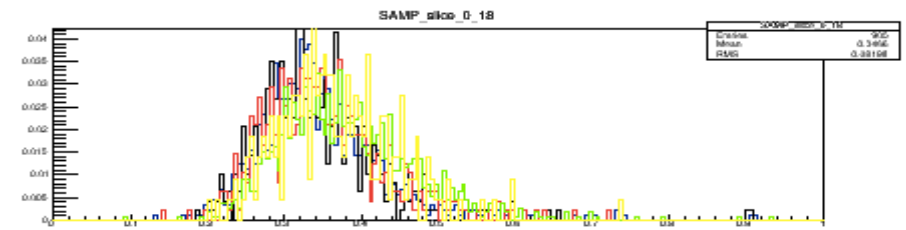


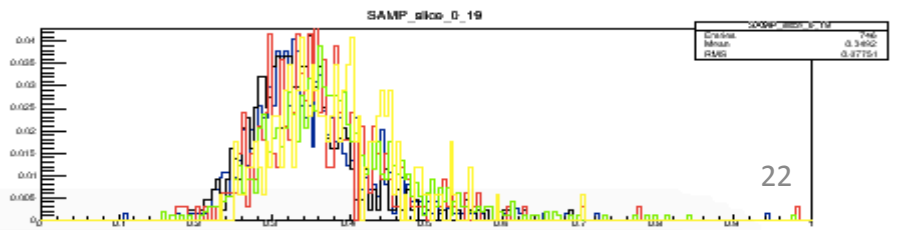




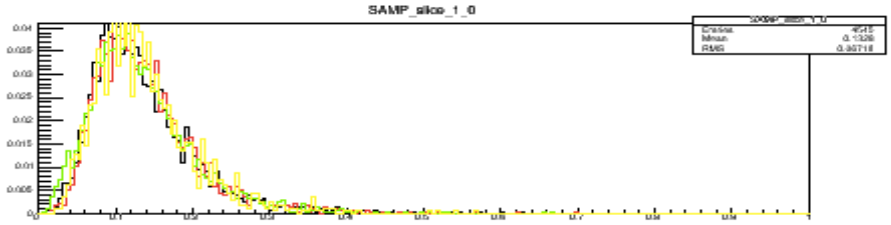


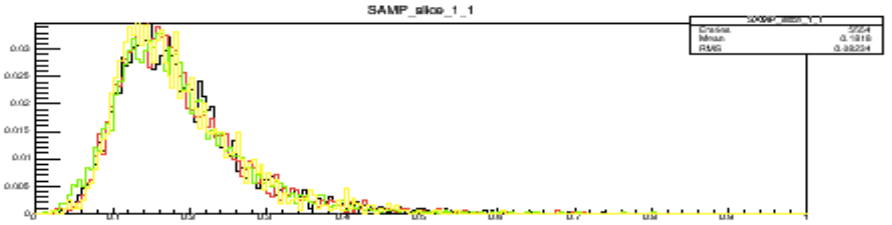


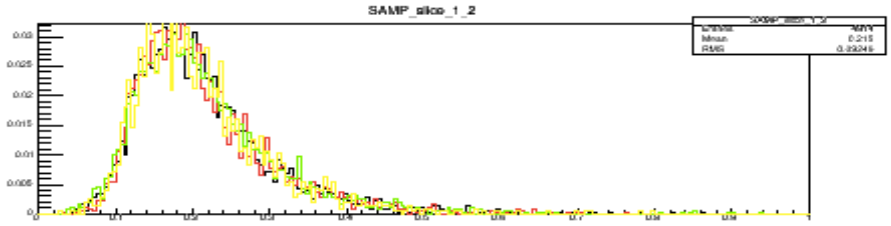


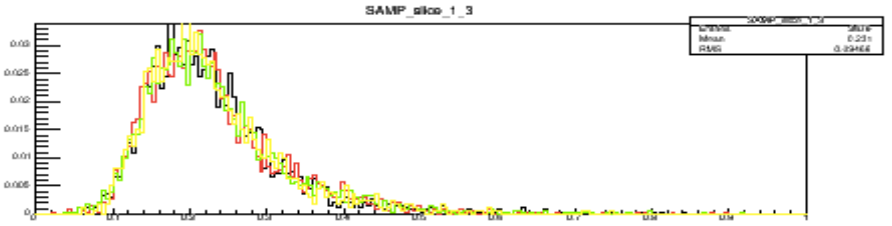


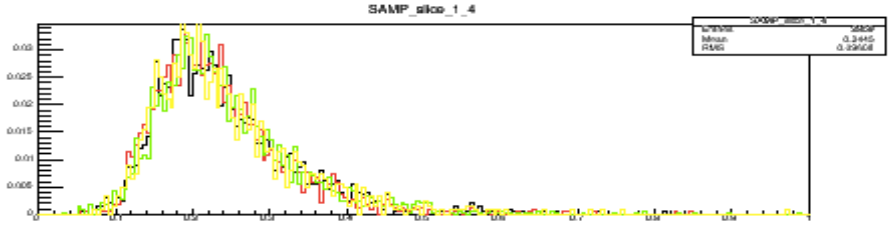
Sampling Fraction (OMB)

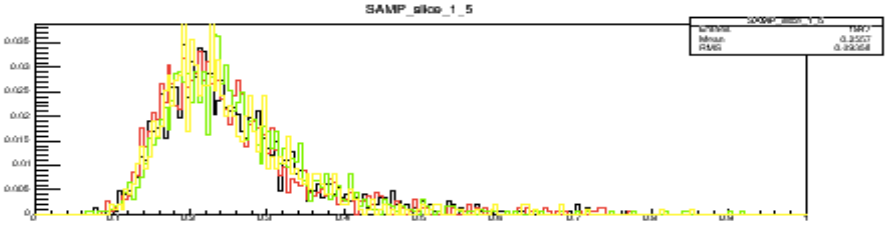


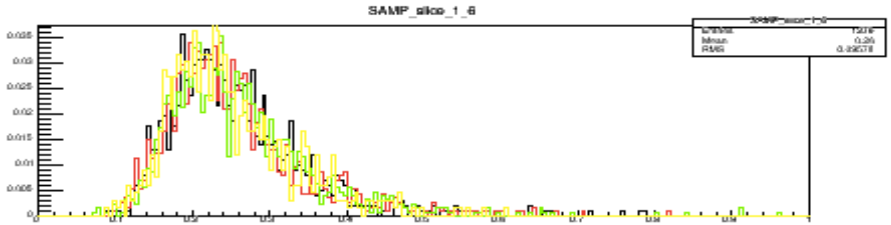


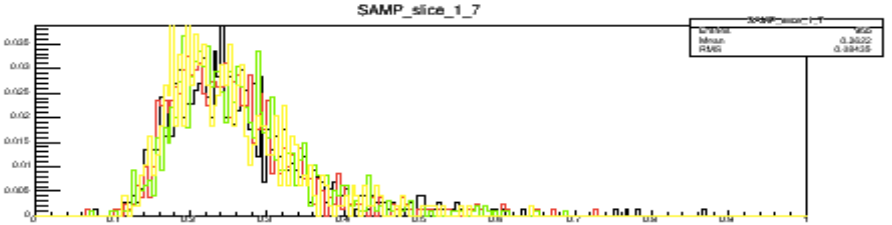


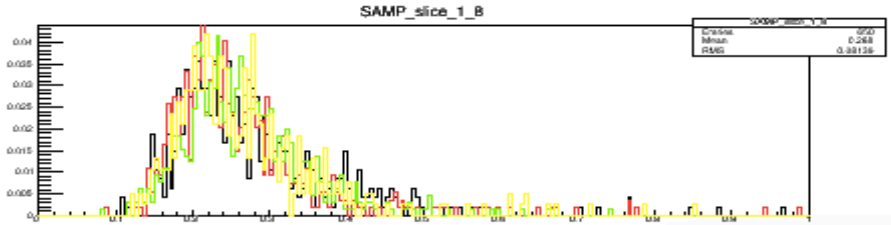


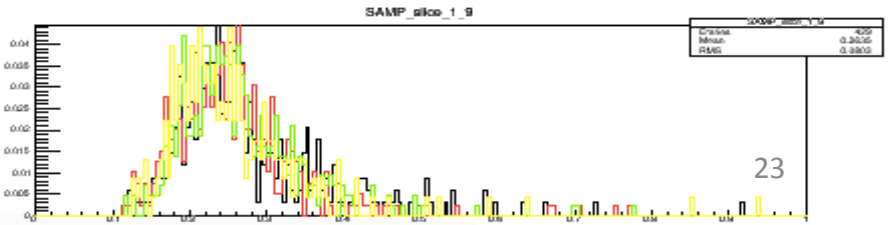












Material	Z	A	$\langle Z/A \rangle$	Nucl.coll. length λ_T {g cm^{-2}}	Nucl.inter. length λ_I {g cm^{-2}}	Rad.len. X_0 {g cm^{-2}}	$dE/dx\|_{\rm min}$ { MeV g^{-1}cm^2}	Density {g cm^{-3}} ({gℓ^{-1}})	Melting point (K)	Boiling point (K)	Refract. index @ Na D
H_2	1	1.008(7)	0.99212	42.8	52.0	63.04	(4.103)	0.071(0.084)	13.81	20.28	1.11[132.]
D_2	1	2.01410177803(8)	0.49650	51.3	71.8	125.97	(2.053)	0.169(0.168)	18.7	23.65	1.11[138.]
He	2	4.002602(2)	0.49967	51.8	71.0	94.32	(1.937)	0.125(0.166)		4.220	1.02[35.0]
Li	3	6.94(2)	0.43221	52.2	71.3	82.78	1.639	0.534	453.6	1615.	
Be	4	9.0121831(5)	0.44384	55.3	77.8	65.19	1.595	1.848	1560.	2744.	
C diamond	6	12.0107(8)	0.49955	59.2	85.8	42.70	1.725	3.520			2.42
C graphite	6	12.0107(8)	0.49955	59.2	85.8	42.70	1.742	2.210			
N_2	7	14.007(2)	0.49976	61.1	89.7	37.99	(1.825)	0.807(1.165)	63.15	77.29	1.20[298.]
O_2	8	15.999(3)	0.50002	61.3	90.2	34.24	(1.801)	1.141(1.332)	54.36	90.20	1.22[271.]
F_2	9	18.998403163(6)	0.47372	65.0	97.4	32.93	(1.676)	1.507(1.580)	53.53	85.03	[195.]
Ne	10	20.1797(6)	0.49555	65.7	99.0	28.93	(1.724)	1.204(0.839)	24.56	27.07	1.09[67.1]
Al	13	26.9815385(7)	0.48181	69.7	107.2	24.01	1.615	2.699	933.5	2792.	
Si	14	28.0855(3)	0.49848	70.2	108.4	21.82	1.664	2.329	1687.	3538.	3.95
Cl_2	17	35.453(2)	0.47951	73.8	115.7	19.28	(1.630)	1.574(2.980)	171.6	239.1	[773.]
Ar	18	39.948(1)	0.45059	75.7	119.7	19.55	(1.519)	1.396(1.662)	83.81	87.26	1.23[281.]
Ti	22	47.867(1)	0.45961	78.8	126.2	16.16	1.477	4.540	1941.	3560.	
Fe	26	55.845(2)	0.46557	81.7	132.1	13.84	1.451	7.874	1811.	3134.	
Cu	29	63.546(3)	0.45636	84.2	137.3	12.86	1.403	8.960	1358.	2835.	
Ge	32	72.630(1)	0.44053	86.9	143.0	12.25	1.370	5.323	1211.	3106.	
Sn	50	118.710(7)	0.42119	98.2	166.7	8.82	1.263	7.310	505.1	2875.	
Xe	54	131.293(6)	0.41129	100.8	172.1	8.48	(1.255)	2.953(5.483)	161.4	165.1	1.39[701.]
W	74	183.84(1)	0.40252	110.4	191.9	6.76	1.145	19.300	3695.	5828.	
Pt	78	195.084(9)	0.39983	112.2	195.7	6.54	1.128	21.450	2042.	4098.	
Au	79	196.966569(5)	0.40108	112.5	196.3	6.46	1.134	19.320	1337.	3129.	
Pb	82	207.2(1)	0.39575	114.1	199.6	6.37	1.122	11.350	600.6	2022.	
U	92	[238.02891(3)]	0.38651	118.6	209.0	6.00	1.081	18.950	1408.	4404.	
Polystyrene ($[C_6H_5CHCH_2]_n$)			0.53768	57.5	81.7	43.79	1.936	1.06			1.59

0.44