고려대학교
KOREA UNIVERSITY

Hadron & Nuclear Physics Lab

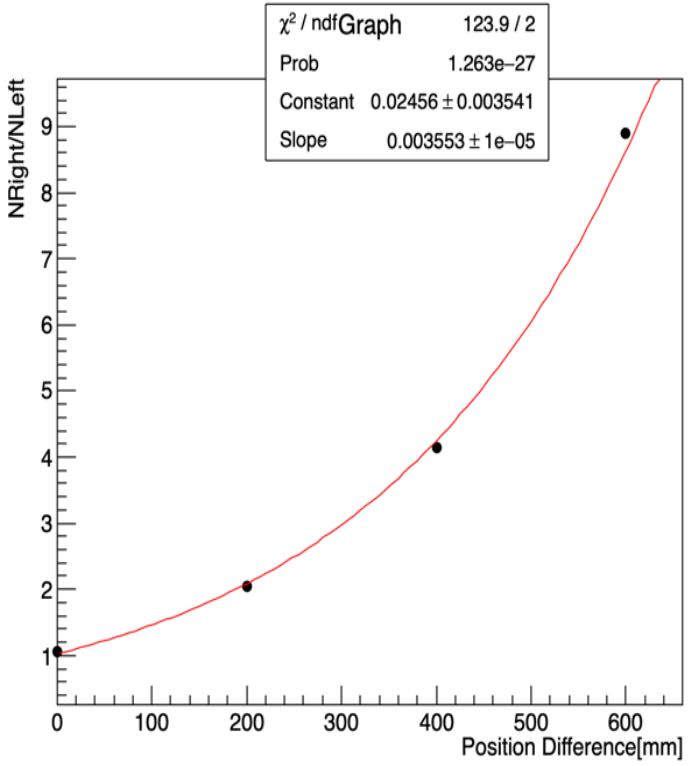
Hanul Meeting

Feb 19, 2019

G4 Model

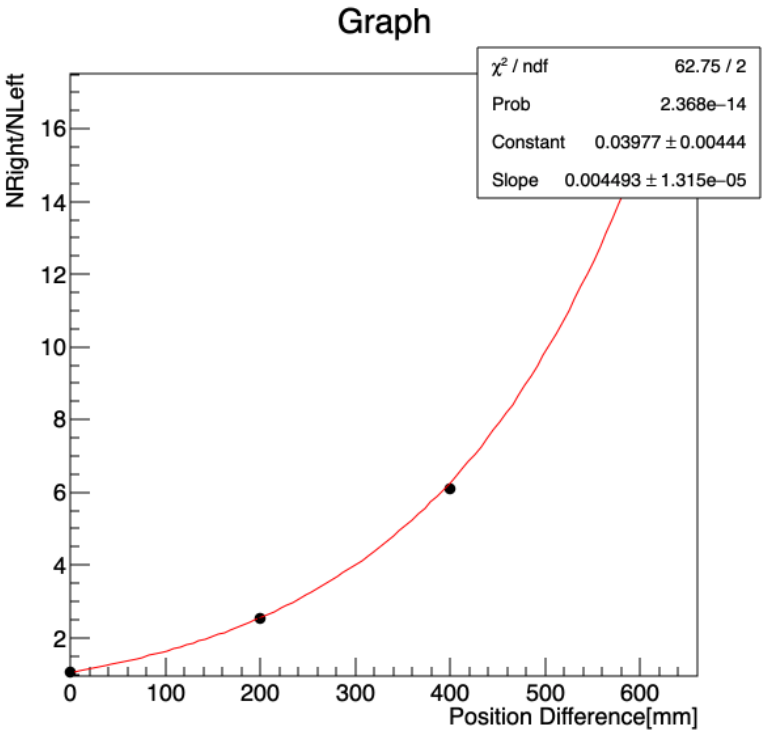
- Scintilation property is set to EJ 230
- 4 sides of Scintillator is covered by Al mylar and black sheet(without gap)
- 2 mppc sides have black sheet only.
- Q.E. of mppc is not considered.
- Due to the scintillation model of G4, timming cannot be measured.(Decays exponentially, without rising time.)
- Number of reflection is constrained up to 200.
- G4 Model is symmetric.

G4 Attenuation result



- Attenuation length is set to 1200 mm.
- Size of the error bar is very small
- Effective attenuation length is 281 mm.(Due to reflectivity?)

Attenuation length → 600 mm



- Effective attenuation length decreased to 220 mm.
- Attenuation seems to be dominated by reflectivity.
- By adding gap between scintillator and mylar, dependence might be reduced.

Other works

- Simmulate with shorter/ ∞ attenuation
- MPPC callibration @KU with RooFit
- Hososcope@ KU: ~20,000 cosmic evt are expected to be taken by this week.

Backup

Path length and #Rfl of 120 cm simulation.

At Center

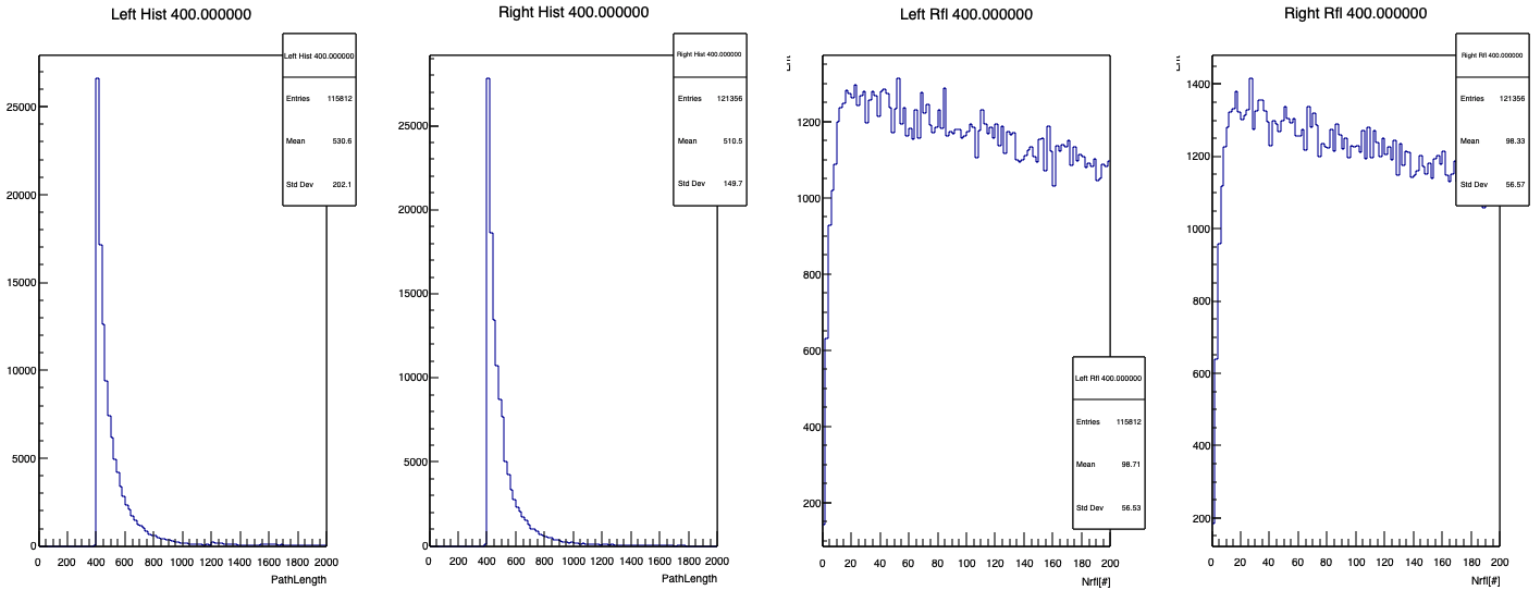
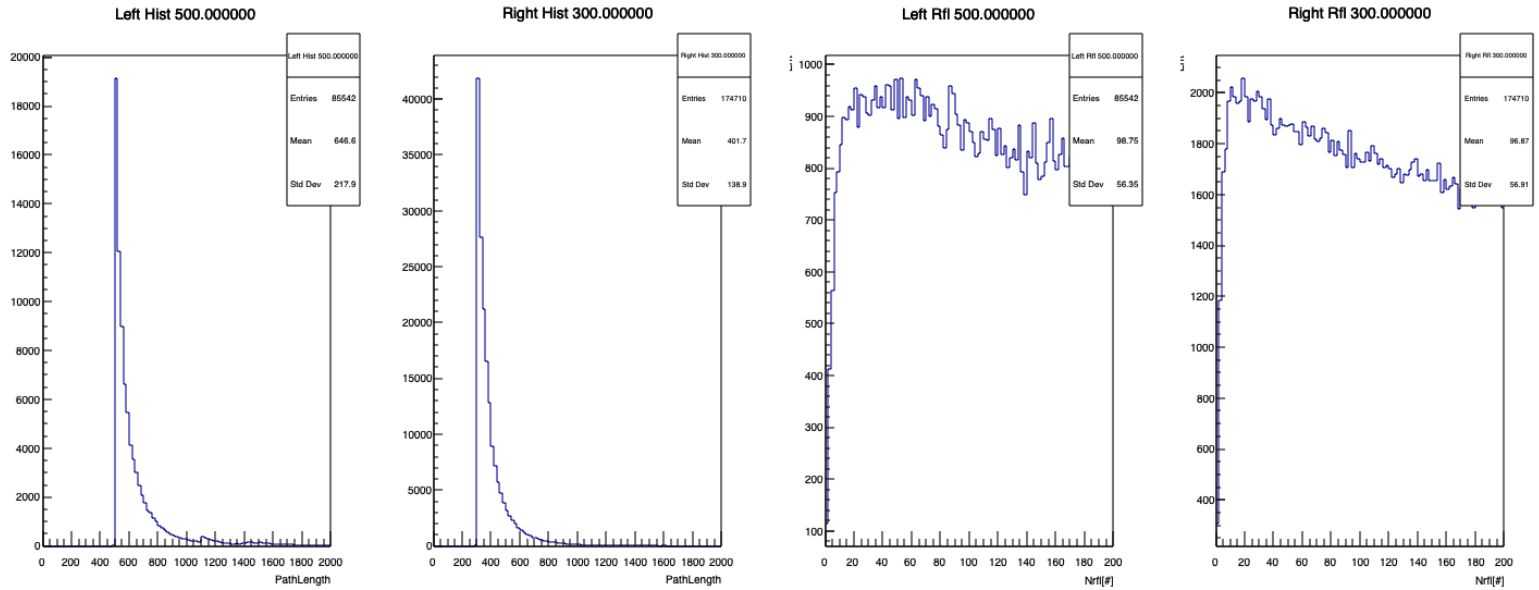
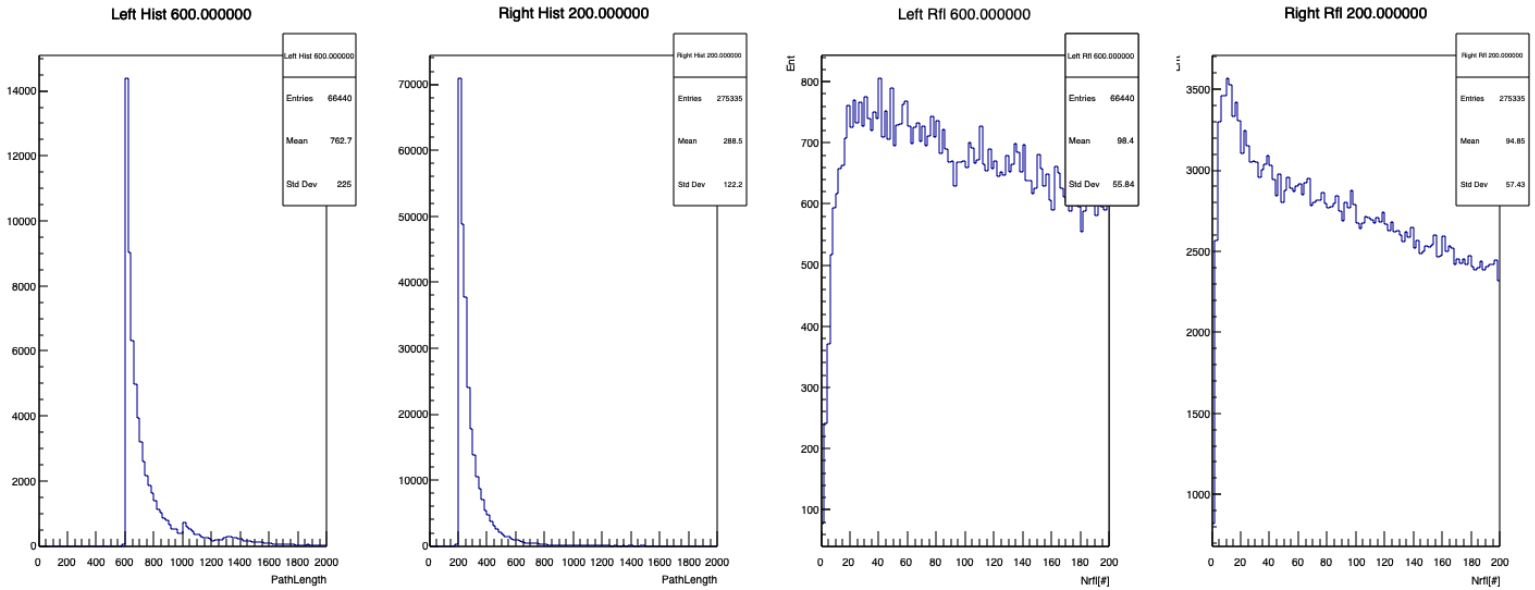


Figure: #Rfl constraint should be increased

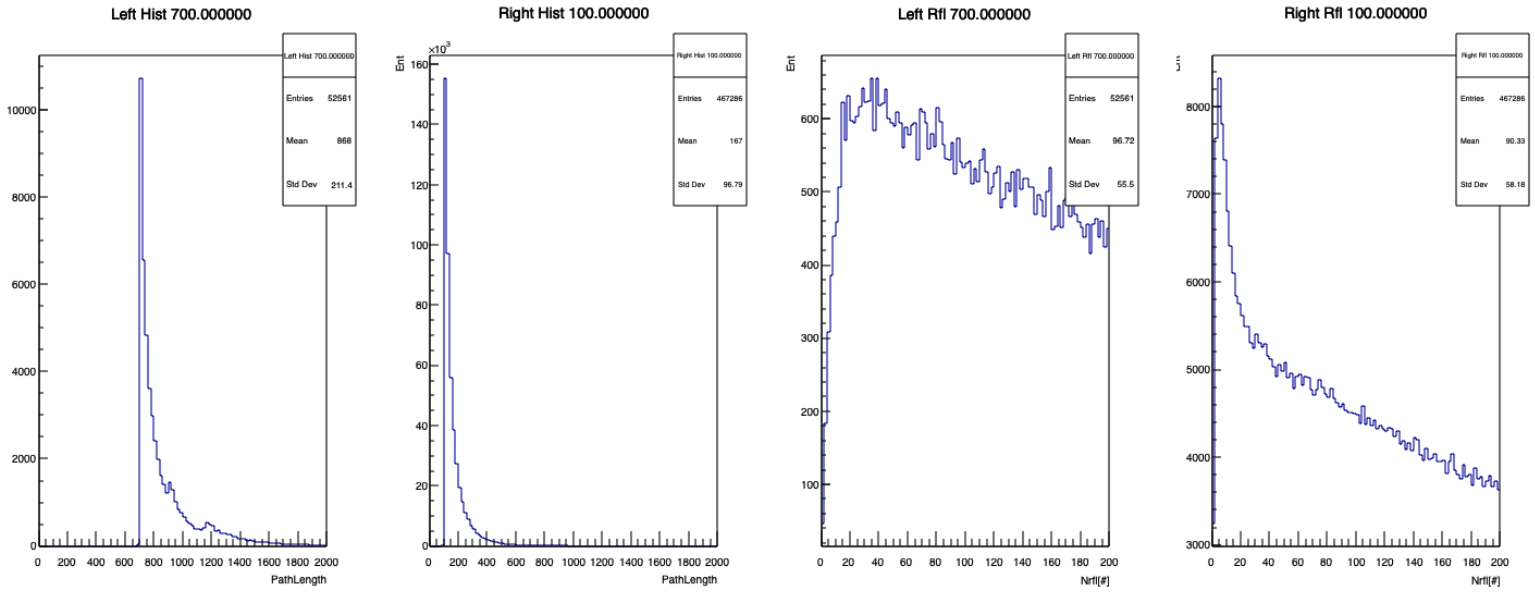
Center +10 cm


Left Hist 500.000000
Entries 85542
Mean 646.6
Std Dev 217.9
PathLength
Right Hist 300.000000
Entries 174710
Mean 401.7
Std Dev 138.9
PathLength
Left Rfl 500.000000
Entries 85542
Mean 98.75
Std Dev 56.35
Nrfl[#]
Right Rfl 300.000000
Entries 174710
Mean 96.87
Std Dev 56.91
Nrfl[#]

Center + 20 cm


Left Hist 600.000000
Entries 66440
Mean 762.7
Std Dev 225
PathLength
Right Hist 200.000000
Entries 275335
Mean 288.5
Std Dev 122.2
PathLength
Left Rfl 600.000000
Entries 66440
Mean 98.4
Std Dev 55.84
Nrfl[#]
Right Rfl 200.000000
Entries 275335
Mean 94.85
Std Dev 57.43
Nrfl[#]

Center + 30 cm


Left Hist 700.000000
Entries 52561
Mean 868
Std Dev 211.4
PathLength
Right Hist 100.000000
Entries 467286
Mean 167
Std Dev 96.79
PathLength
Left Rfl 700.000000
Entries 52561
Mean 96.72
Std Dev 55.5
Nrfl[#]
Right Rfl 100.000000
Entries 467286
Mean 90.33
Std Dev 58.18
Nrfl[#]