Group Meeting

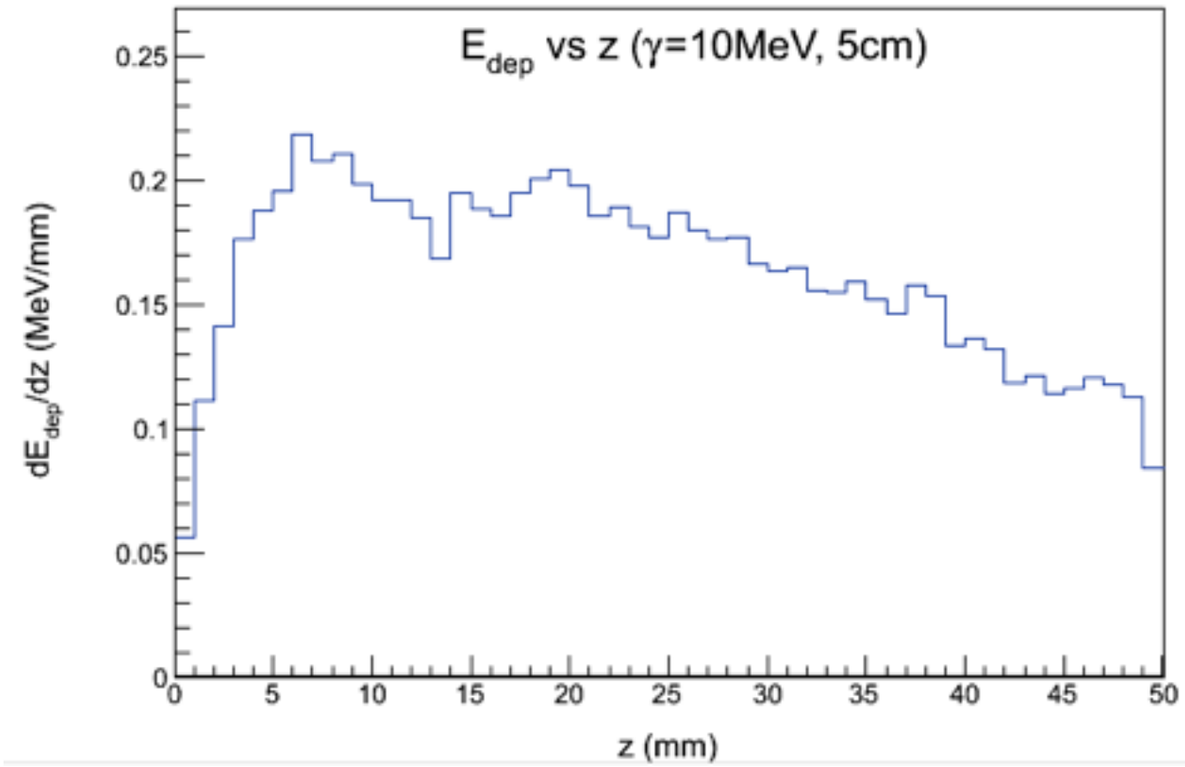
Status of LAMPS-low simulation

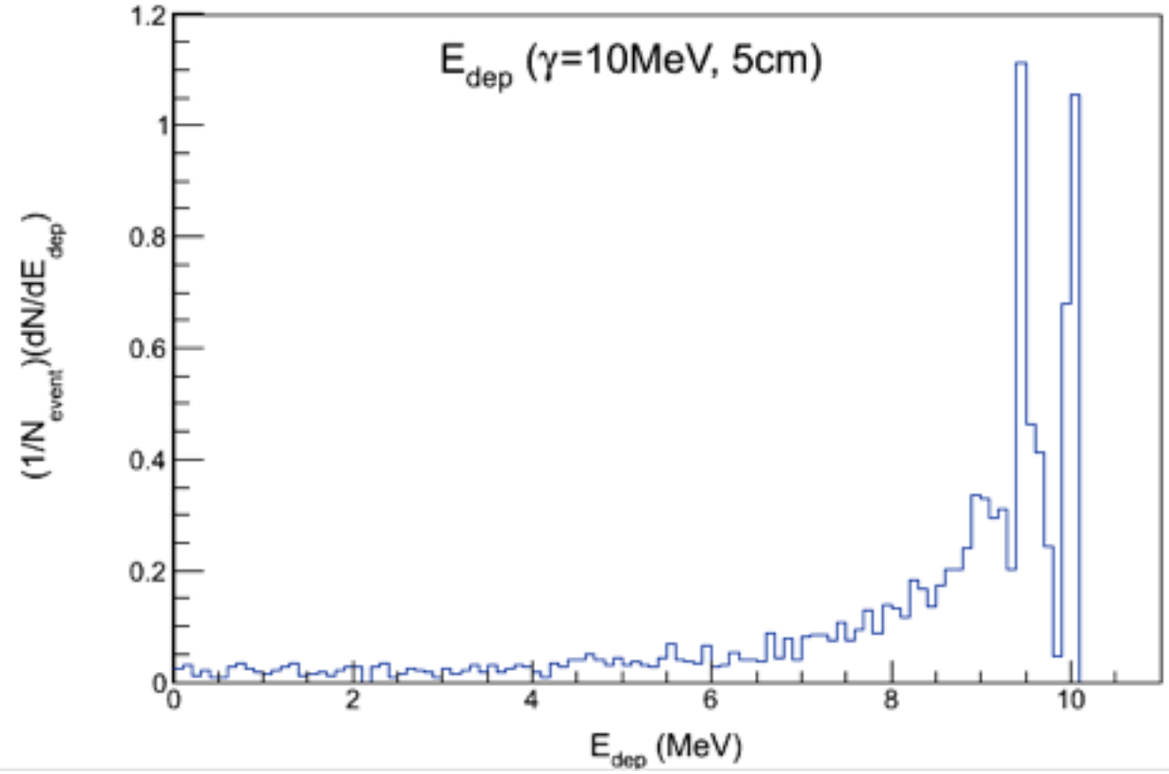
Jaebeom

Neutron detector simulation

- 1 Silicon (100μm), 1 CsI (5cm), 1Scintillator (20cm)
- Neutron run : each 5000 event for different energy
- Energy : 3MeV, 5MeV, 7MeV, 10MeV, 15MeV

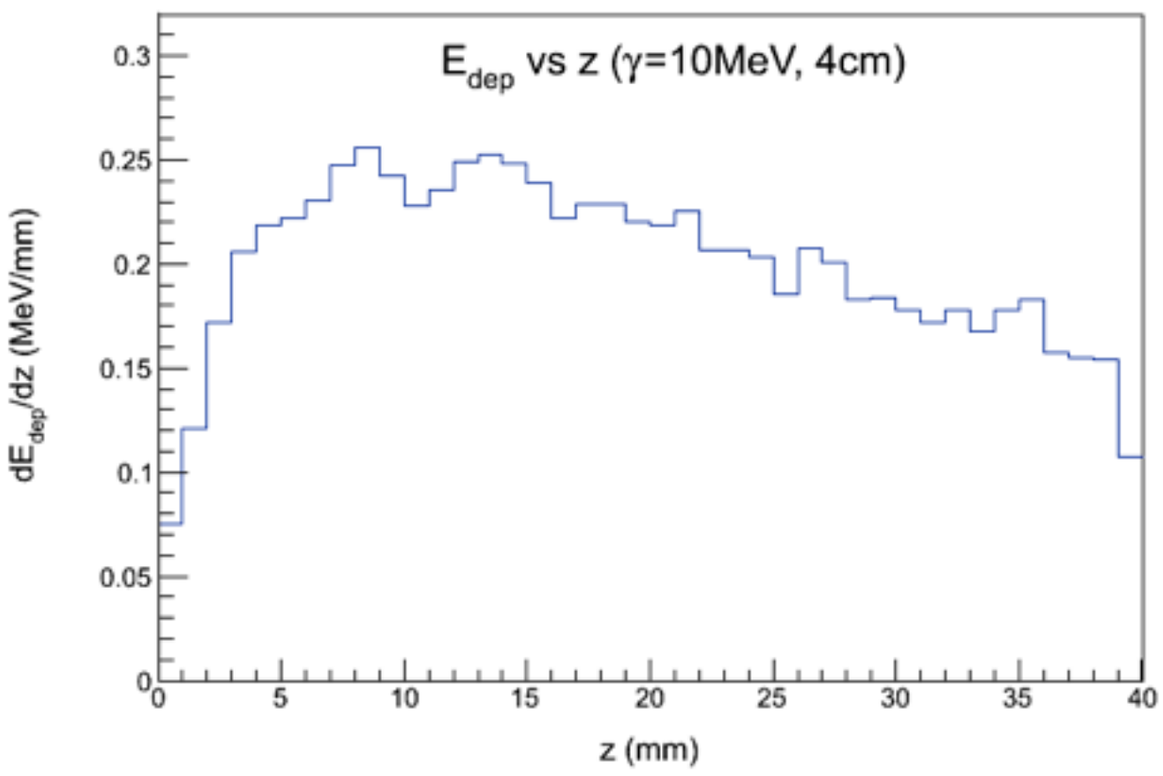
Gamma Efficiency

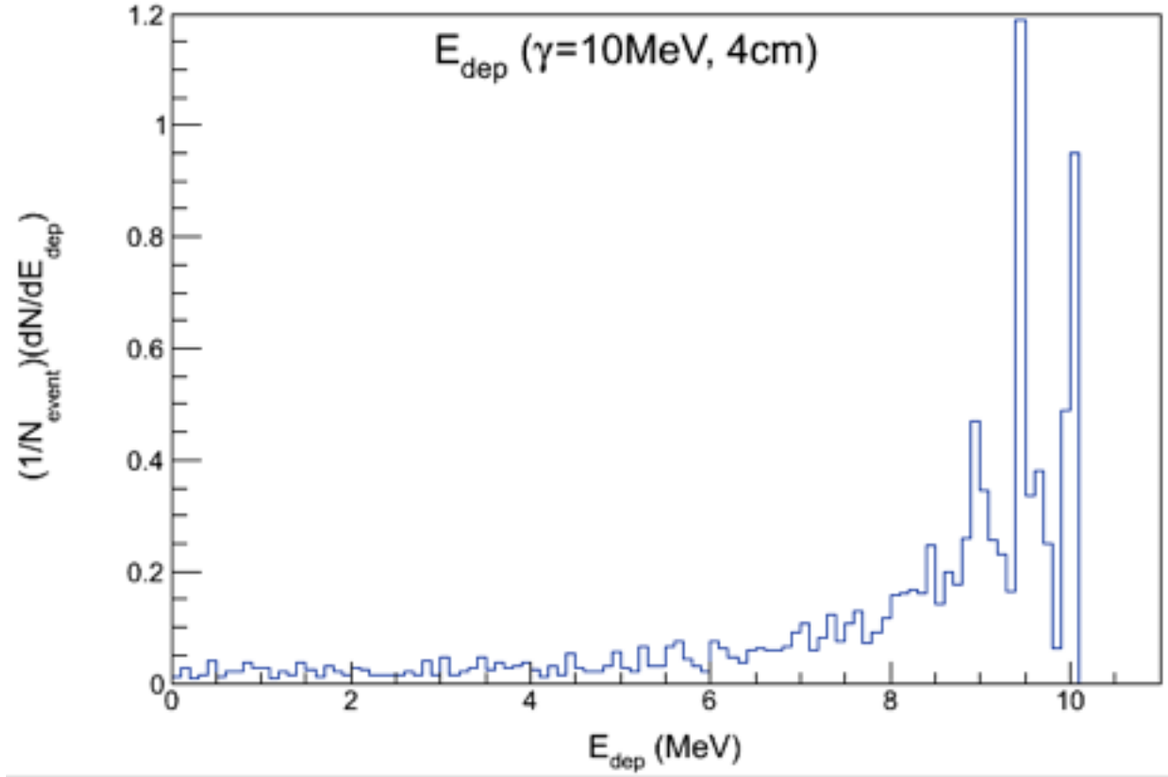




N_{Gen}(# of generated gamma) = 5000
N_{det} (# of detected gamma) = 2982
$P_{Hit} = N_{det}/N_{Gen}$ (probability of leaving a hit in CsI) = 0.5964 (59.64%)

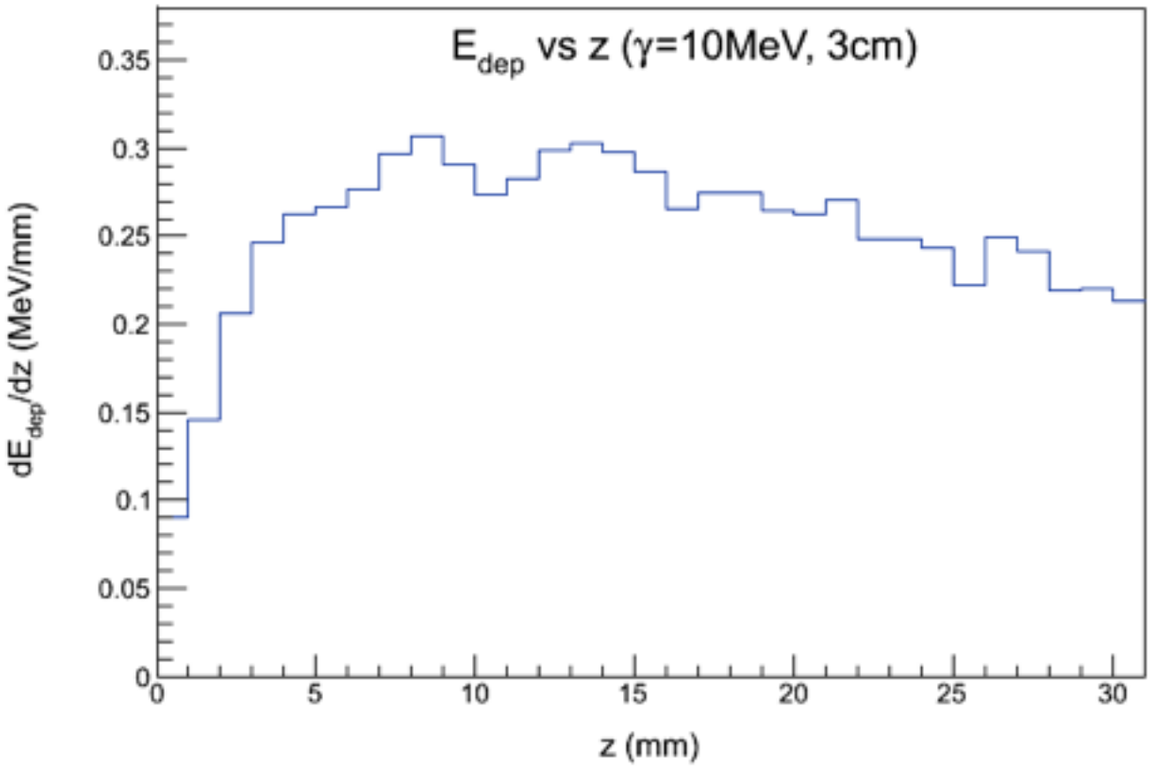
Gamma Efficiency

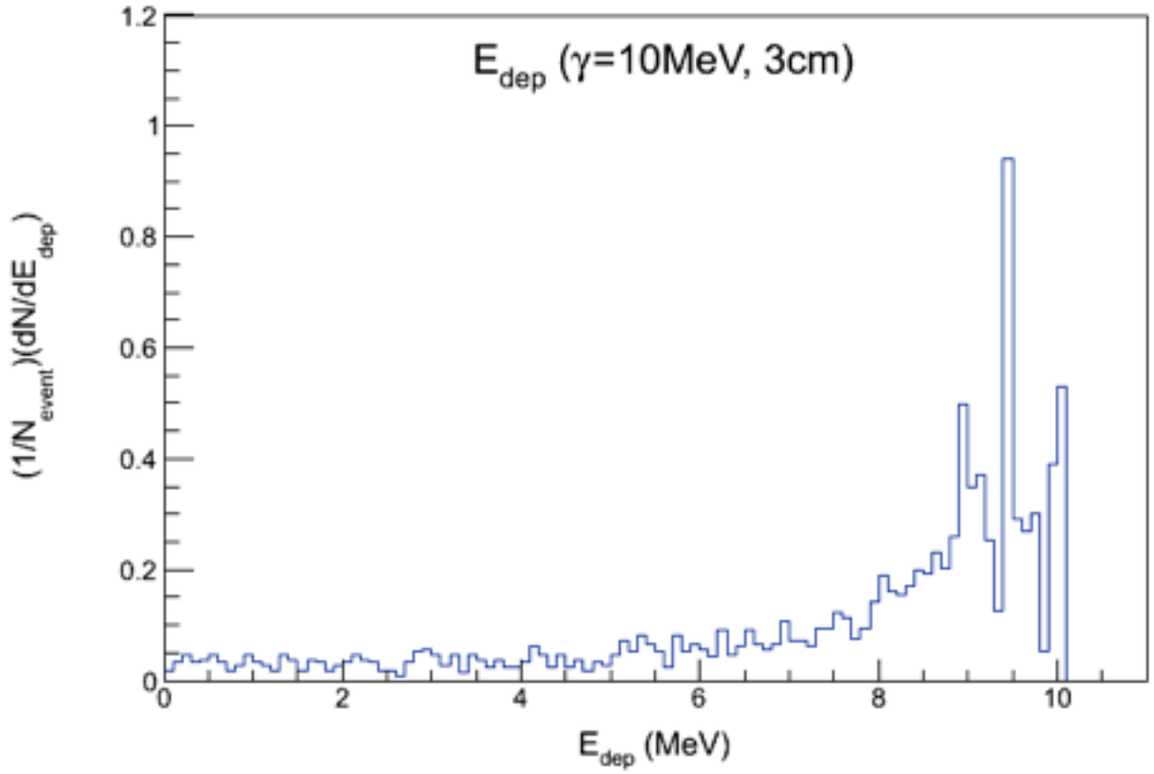




N_{Gen}(# of generated gamma) = 5000
N_{det} (# of detected gamma) = 2551
$P_{Hit} = N_{det}/N_{Gen}$ (probability of leaving a hit in CsI) = 0.5102 (51.02%)

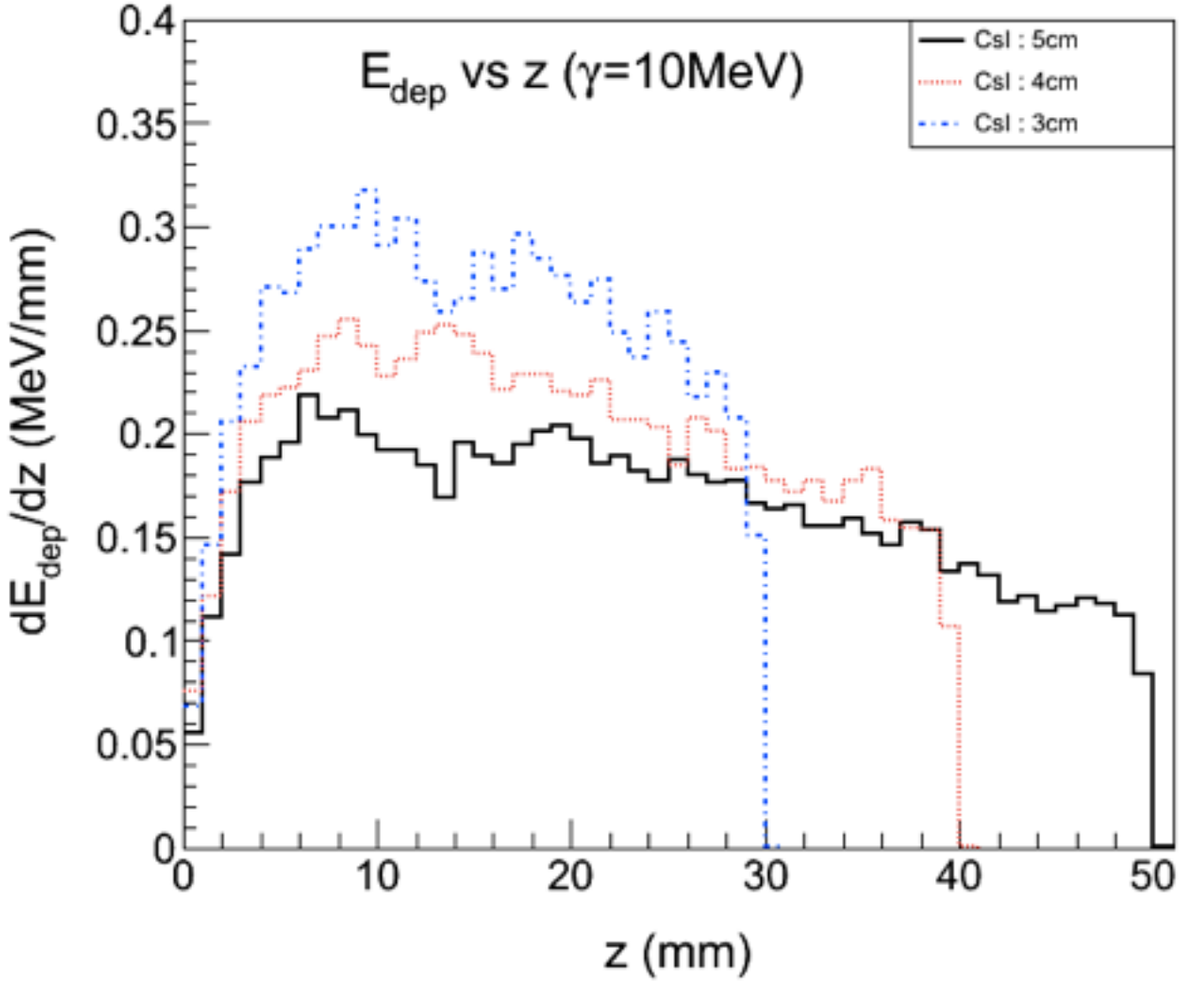
Gamma Efficiency

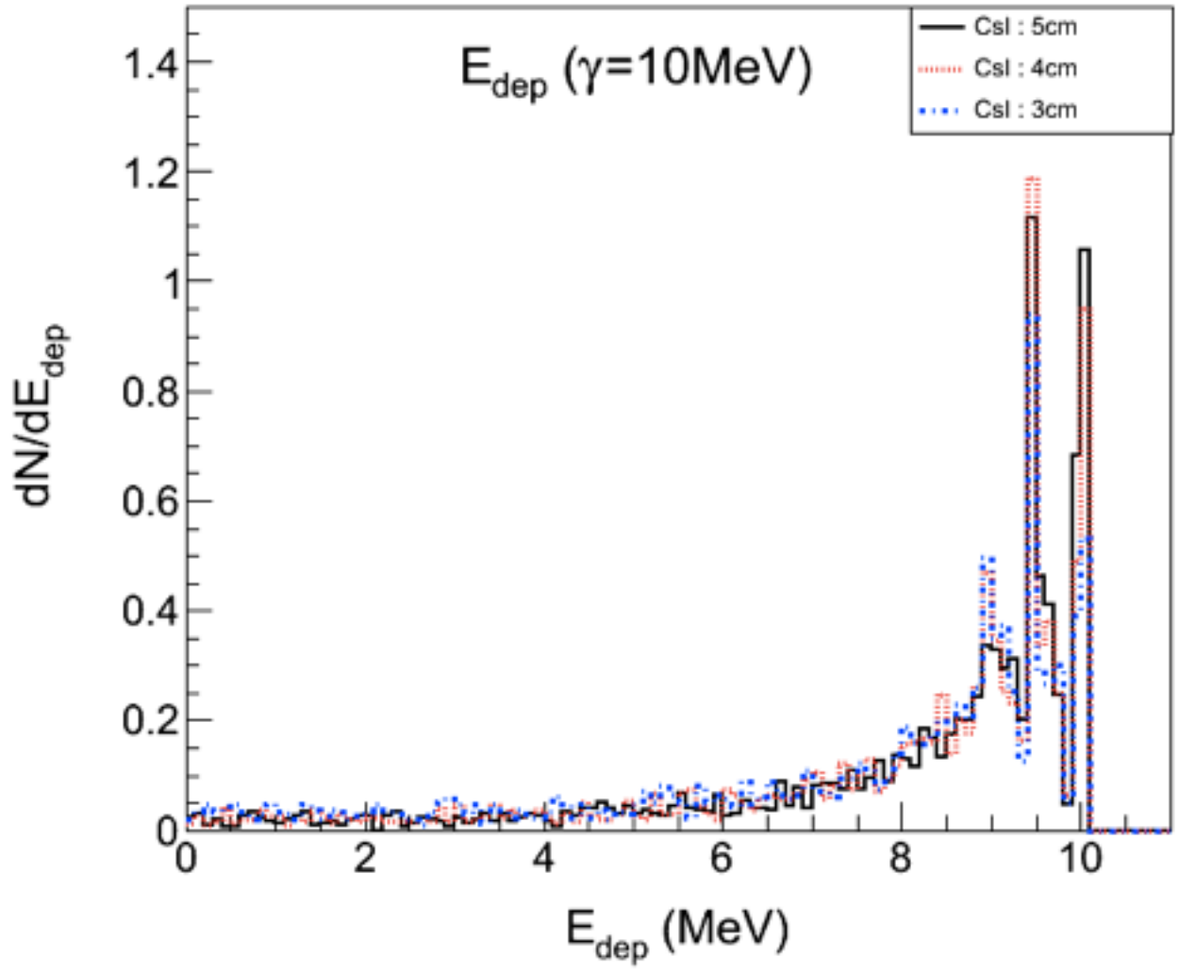




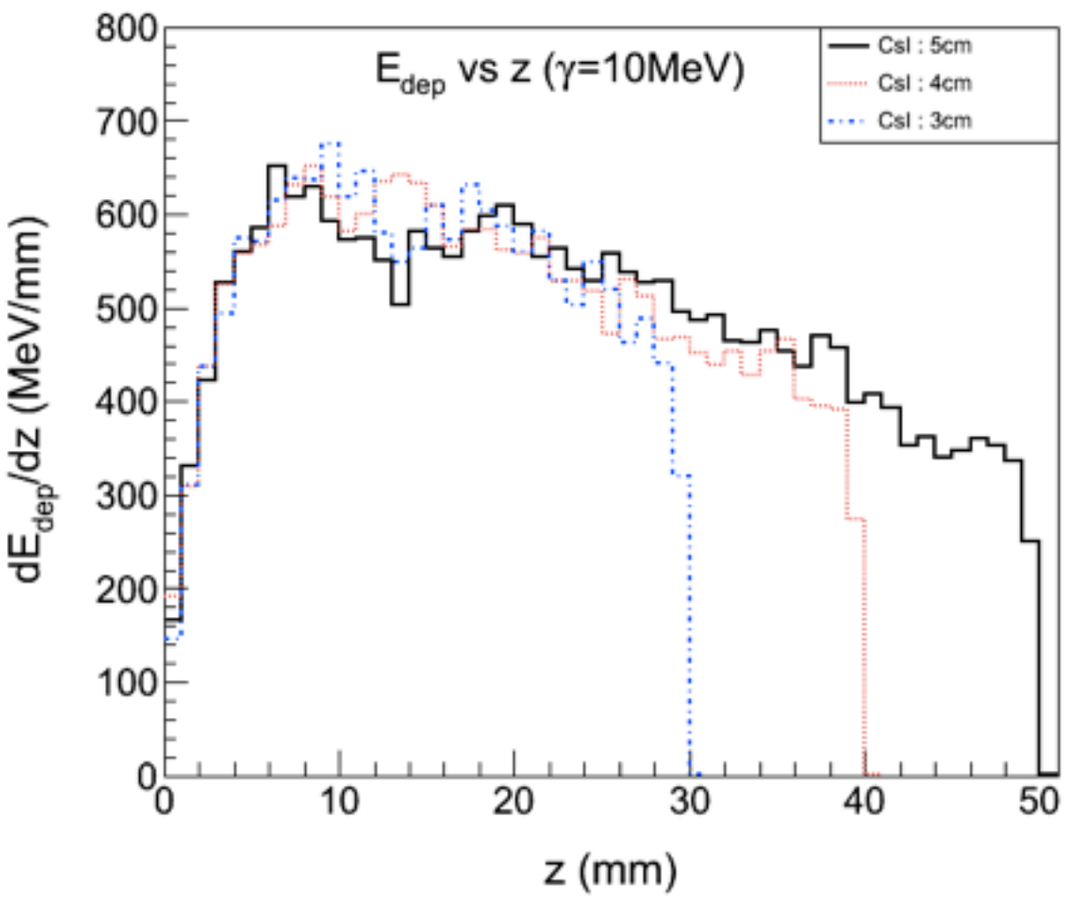
N_{Gen}(# of generated gamma) = 5000
N_{det} (# of detected gamma) = 2126
$P_{Hit} = N_{det}/N_{Gen}$ (probability of leaving a hit in CsI) = 0.4252 (42.52%)

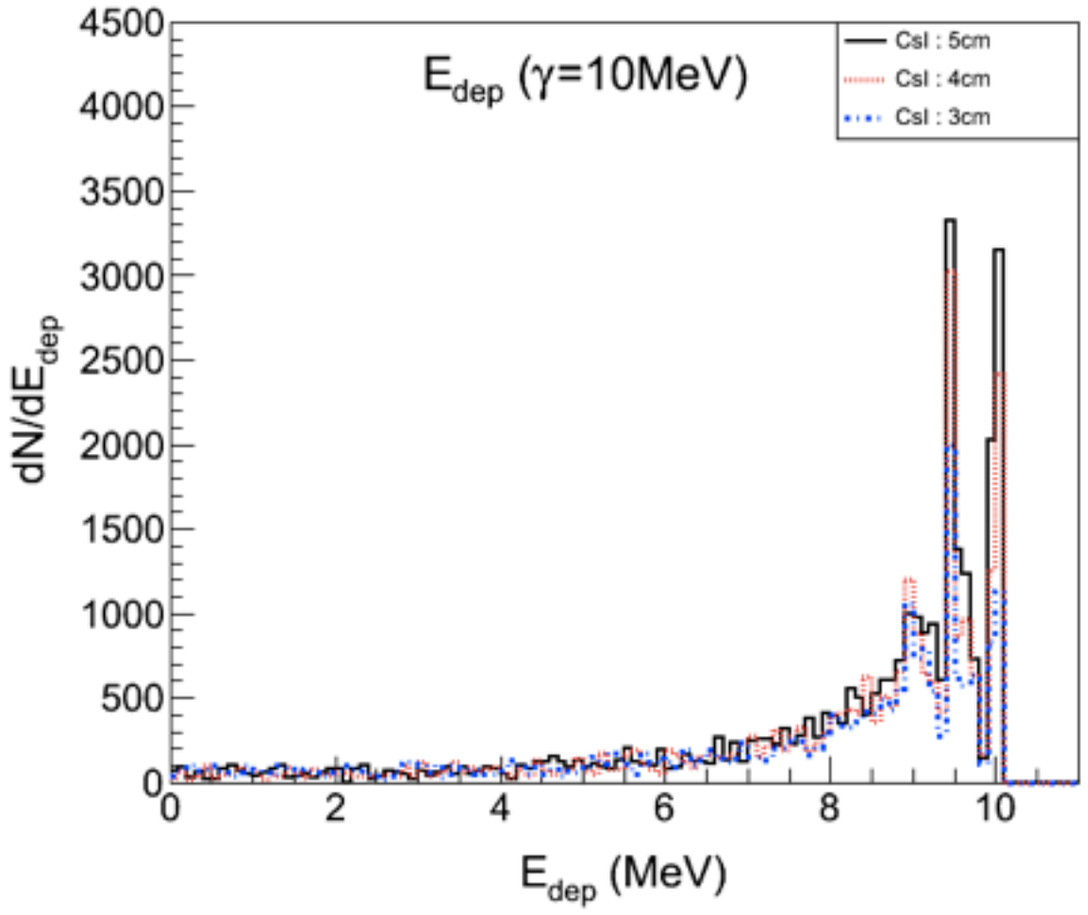
Gamma Efficiency – event normalized





Gamma Efficiency – Counts





N_{Gen}(# of generated gamma) = 5000
N_{det} (# of detected gamma) = 2126
$P_{Hit} = N_{det}/N_{Gen}$ (probability of leaving a hit in CsI) = 0.4252 (42.52%)

Gamma Efficiency

```
 ******** CsI : 5cm ********

===Hit Histogram Information===
  Total Entries : 161249
  Integral - Gamma energy per event (MeV) 8.15066
  Mean (mm) : 23.3314

===Reconstruction Histogram Information===
  # of detected Gammas : 2982
  CsI interaction probability (%) : 59.64
  # of particle >= 8MeV : 2100
  # of particle >= 9MeV : 1537
  Probability Gamma Energy more than 8MeV (%) : 70.4225
  Probability Gamma Energy more than 9MeV (%) : 51.5426
  Mean Energy of Gamma (MeV) : 8.15066
```

```
 ******** CsI : 4cm ********

===Hit Histogram Information===
  Total Entries : 135668
  Integral - Gamma energy per event (MeV) : 7.9913
  Mean (mm) : 19.1816

===Reconstruction Histogram Information===
  # of detected Gammas : 2551
  CsI interaction probability (%) : 51.02
  # of particle >= 8MeV : 1733
  # of particle >= 8MeV : 1187
  Probability Gamma Energy more than 8MeV (%) : 67.9341
  Probability Gamma Energy more than 8MeV (%) : 46.5308
  Mean Energy of Gamma (MeV) : 7.9913
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 ******** CsI : 3cm ********

===Hit Histogram Information===
  Total Entries : 107562
  Integral - Gamma energy per event (MeV) : 7.53569
  Mean (mm) : 15.0586

===Reconstruction Histogram Information===
  # of detected Gammas : 2126
  CsI interaction probability (%) : 42.52
  # of particle >= 8MeV : 1303
  # of particle >= 9MeV : 824
  Probability Gamma Energy more than 8MeV (%) : 61.2888
  Probability Gamma Energy more than 9MeV (%) : 38.7582
  Mean Energy of Gamma (MeV) : 7.53569
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Cosmic Ray Test

6 Scintillators on top - 10x10x100cm

15 Scintillators on bottom - 10x10x100cm

Each Side Light Guide & PMT

Using CAMAC system

Cosmic Muon Detecting & Tracking

PMT Voltage = 2000V

Trigger Metal Plane Coincidence : Both 900V applied

250cm

Cosmic Ray Test Plan

All done with undergraduate students (Prof. Ahn) & Innocent

Check all PMT's wrapping, PMT's response & cable

08/02 Saturday : Learn data taking & coincidence
from Dr. Hyosang Lee (IBS)

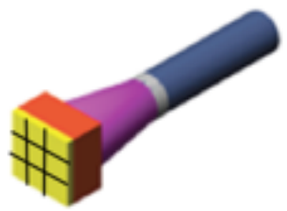
08/04 ~ 08/11 : Gain matching & data taking
(1set =1000events : 1day)

08/11 ~ 08/18 : Data Analysis

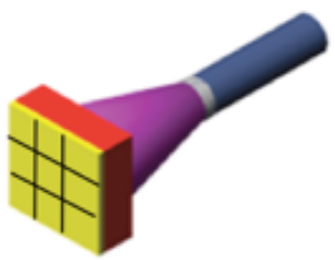
Back- up

SiCsI Geometry – with JI Kim

Total 58 detector units
($17.5^\circ < \theta_{lab} < 77.5^\circ$)
9 x 9 x 0.01 cm^3 Si (3 x 3 Pad)
9 x 9 x 5 cm^3 CsI (PMT readout)



Total 35 detector units
($78^\circ < \theta_{lab} < 150^\circ$)
15 x 15 x 0.01 cm^3 Si (3 x 3 Pad)
15 x 15 x 5 cm^3 CsI (PMT readout)

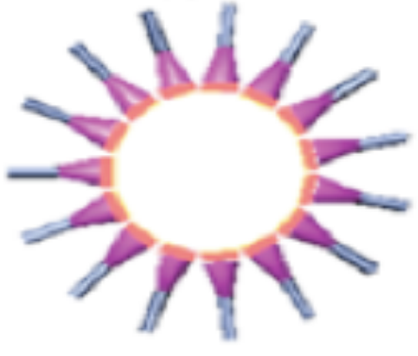


CsI(T1) cover polar angle 17.5° ~ 150°
17.5° ~ 77.5° : 4 detector pieces
(15° interval)

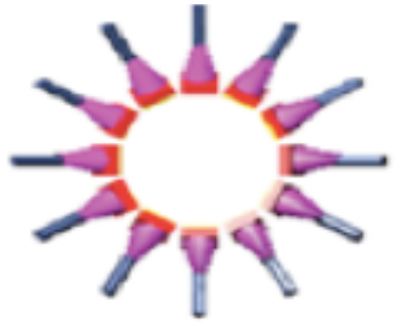
78° ~ 150° : 3 detector pieces
(24° interval)

8units **12units** **18units** **20units**
25° **40°** **55°** **70°**

15units
90°



12units
114°

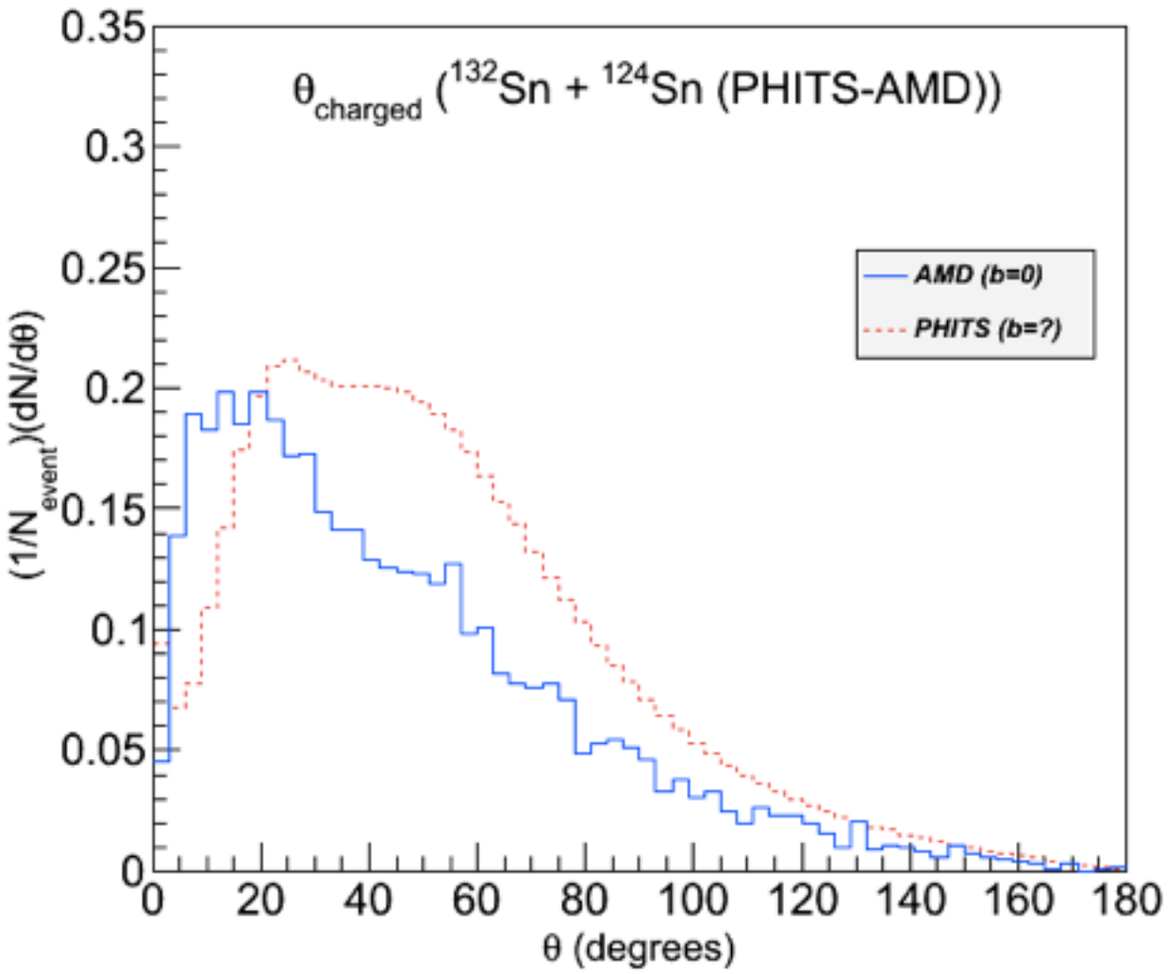


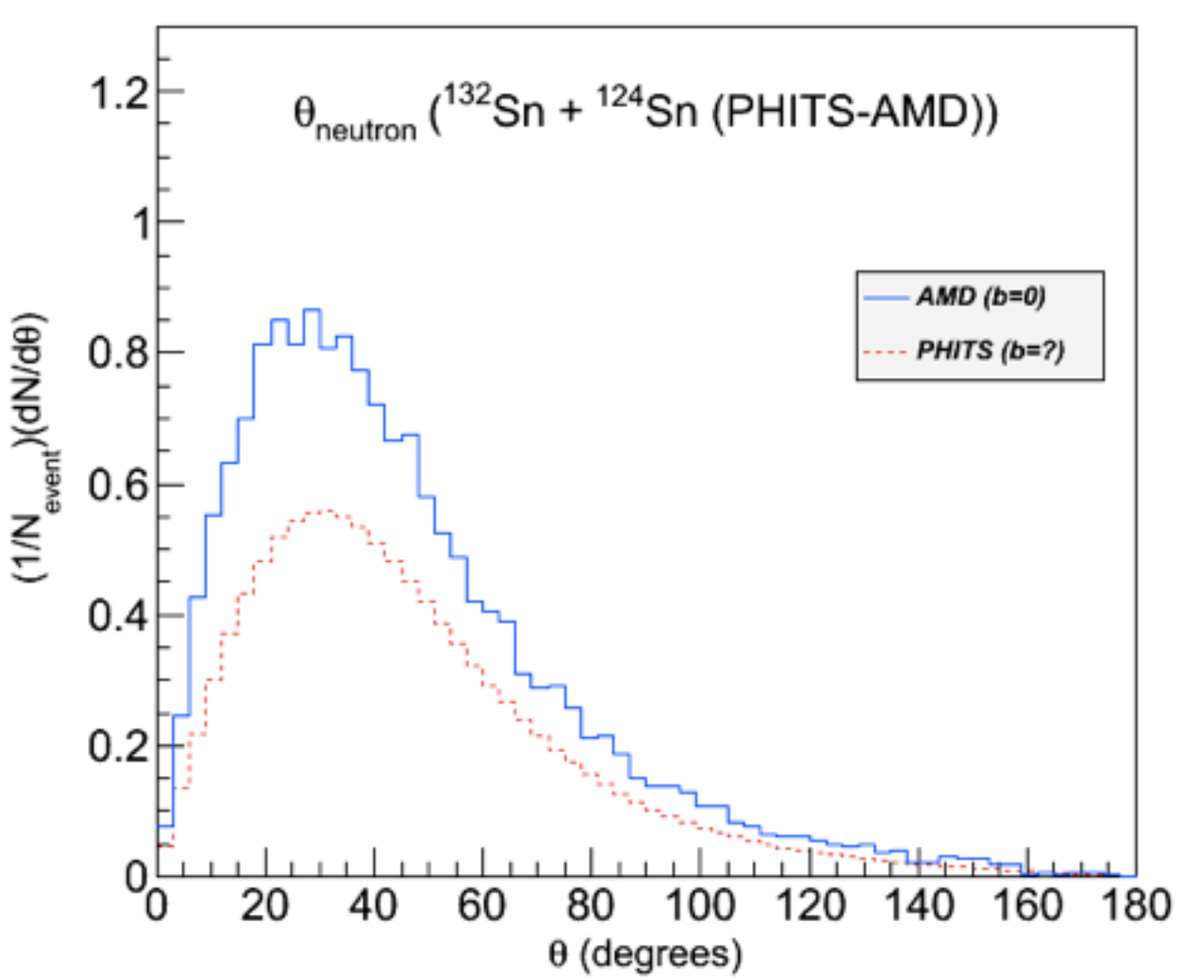
8units
138°

Det.CoverRange

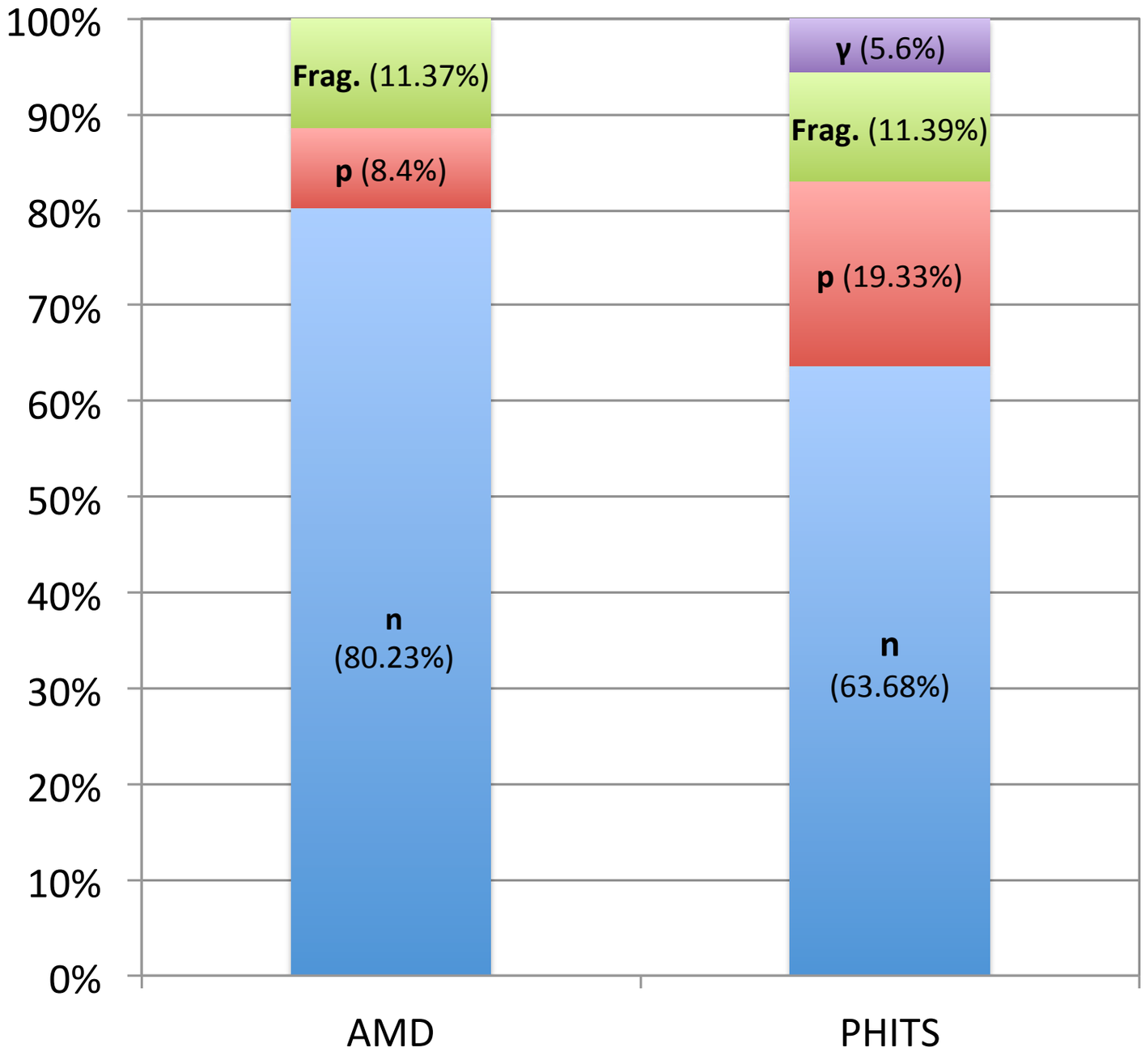
	N_gen(△θ)	N_det(△θ)	Det.CovRange (%) (simulation)	Det.CovRange (%) (geometrical)	# of particle/ Det.cell/event	Occupancy
1 : (17.5°<θ<32.5°)	2.67	1.53	57.25	58.43	0.191	0.0156
2 : (32.5°<θ<47.5°)	1.98	1.14	57.56	57.62	0.095	0.0077
3 : (47.5°<θ<62.5°)	1.71	1.14	66.88	67.81	0.063	0.0052
4 : (62.5°<θ<77.5°)	1.17	0.73	62.33	65.69	0.037	0.0030
5 : (77.5°<θ<102°)	1.10	0.84	76.36	79.11	0.056	0.0046
6 : (102°<θ<126°)	0.56	0.37	67.47	70.70	0.031	0.0025
7 : (126°<θ<150°)	0.25	0.14	57.03	64.35	0.018	0.0014

AMD&PHITS – Theta Distribution (Charged/Neutron)





AMD & PHITS



AMD : $^{132}Sn + ^{124}Sn$ - (20 MeV/u)
impact parameter : b = 0
N_{event}=2010

PHITS : $^{132}Sn + ^{124}Sn$ - (18.5 MeV/u)
impact parameter : wide
N_{event}=272018