Update on SVT Rates And Multiplicity

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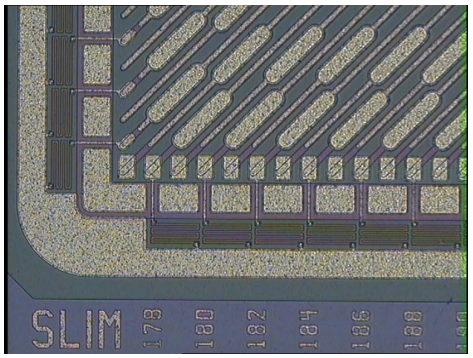
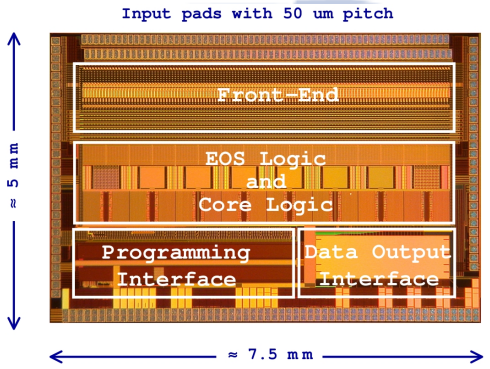


Outline



- Add Layer 0 New Geometry and Incident Angle
- New SVT Study:
  - Mean Strip Multiplicity per Cluster
  - Strip Rate
  - Strip Multiplicity and dE per Strip vs Incident Angle

Layer 0 New Geometry and Incident Angle

- Layer 0 New Geometry and Incident Angle has been added in Root Macro used for studying strip multiplicity and dE
- We are using full simulated event (BRUNO) with NEW Layer 0 Geometry:

  - Layer 0 now with 8 module

  - e+e-e+e- (pairs) 1.48M events

  with new Geometry May 2011 production by Riccardo

New SVT Study

- New data are compared with same values obtained by Riccardo
- “No Threshold cut” mean extreme low threshold, about zero.
- Particles, which don't deposit energy in SVT (deposited energy = 0), aren't considered.
- Cluster with no deposit energy in SVT are approximaly 0.09 %

Average strip multiplicity for e± from pairs **per Cluster**
New files - No threshold cut

Layer	RO PitchZ (or +45°) µm	Cenci <n> Z (or +45°)	<n> Z (or +45°)	RO Pitch ϕ (or -45°) µm	Cenci <n> ϕ (or -45°)	<n> ϕ (or -45°)
0	50	5.1	5.4	50	4.1	5.4
1	100	3.2	4.7	50	6.5	8.2
2	100	2.9	4.4	55	5.9	8.0
3	100	2.6	4.8	55	4.9	7.3
4	210	1.3	2.1	100	2.0	4.2
5	210	1.3	1.9	100	1.8	3.7

Average strip rate for e± from pairs
New files - No threshold cut

Layer	RO PitchZ (or +45°) μm	Cenci Rate Z or +45° (MHz / cm^2)	Rate Z or +45° (Mhz / cm^2)	RO Pitch ϕ (or -45°) μm	Cenci Rate ϕ or -45° (MHz / cm^2)	Rate ϕ or -45° (MHz / cm^2)
0	50	29.9	24.3	50	23.3	24.3
1	100	0.7	0.93	50	1.5	1.61
2	100	0.35	0.40	55	0.72	0.73
3	100	0.097	0.12	55	0.19	0.19
4	210	0.0076	0.0036	100	0.012	0.007
5	210	0.0041	0.0024	100	0.006	0.005

Average strip multiplicity for e± from pairs **per Cluster**
New files - No threshold cut – 30 Limited

Layer	RO PitchZ (or +45°) μm	Cenci <n> Z (or +45°)	<n> Z * (or +45°)	RO Pitch ϕ (or -45°) μm	Cenci <n> ϕ (or -45°)	<n> ϕ * (or -45°)
0	50	5.1	4.9	50	4.1	4.9
1	100	3.1	4.0	50	6.5	6.7
2	100	2.9	3.7	55	5.9	6.4
3	100	2.6	3.6	55	4.9	5.9
4	210	1.3	1.9	100	2.0	3.5
5	210	1.3	1.9	100	1.8	3.4

* = Value obtained with a max limit of 30 strip activated per cluster

Average strip rate for e± from pairs
New files - No threshold cut – 90 Limited

Layer	RO PitchZ (or +45°) µm	Cenci Rate Z or +45° (MHz / cm^2)	Rate Z or +45° (Mhz / cm^2)	RO Pitch ϕ (or -45°) µm	Cenci Rate ϕ or -45° (MHz / cm^2)	Rate ϕ or -45° (MHz / cm^2)
0	50	29.9	22.9	50	23.3	22.9
1	100	0.7	0.8	50	1.5	1.1
2	100	0.35	0.34	55	0.72	0.53
3	100	0.097	0.088	55	0.19	0.14
4	210	0.0076	0.0032	100	0.012	0.0062
5	210	0.0041	0.0024	100	0.006	0.0040

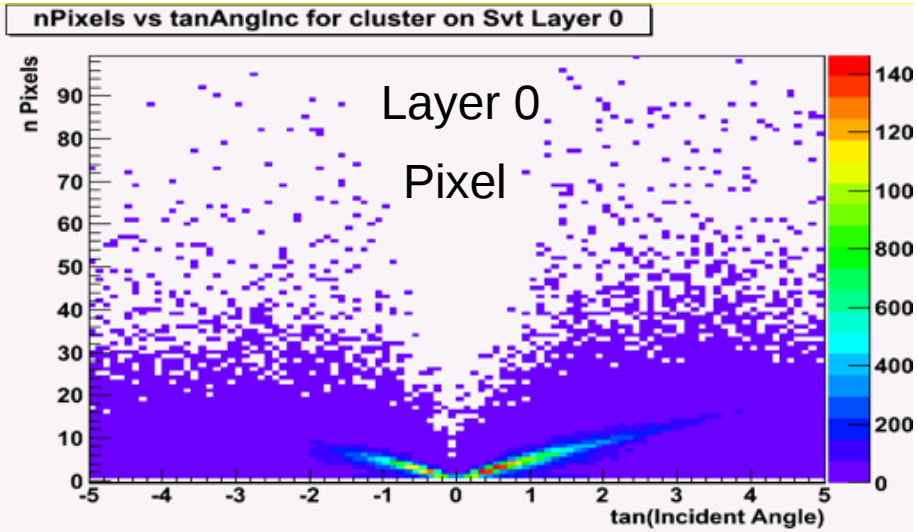
* = Value obtained with a max limit of 90 strip activated per QED event

Activate Strips

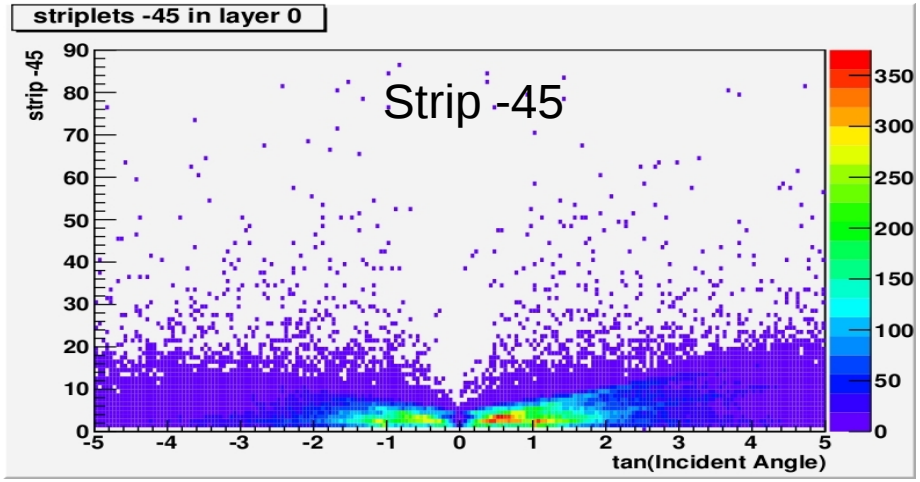
vs

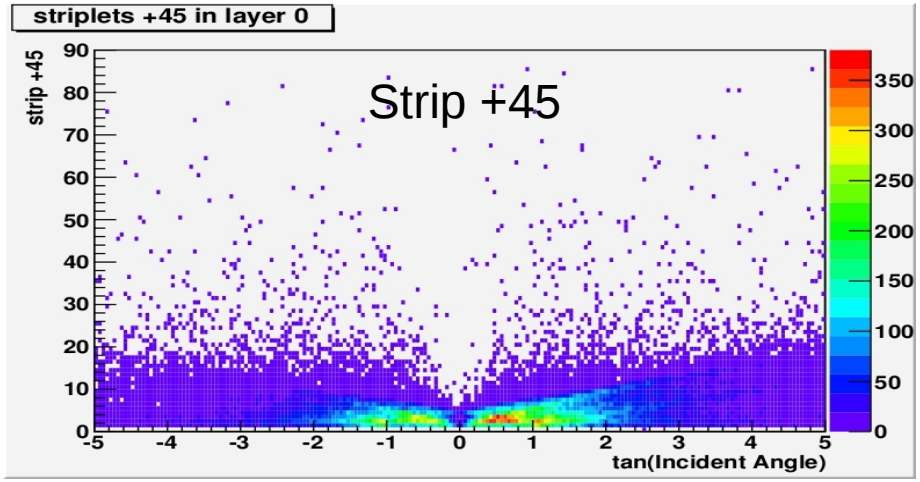
Tangent of Incident Angle

Strip vs Incident Angle
(layer 0)

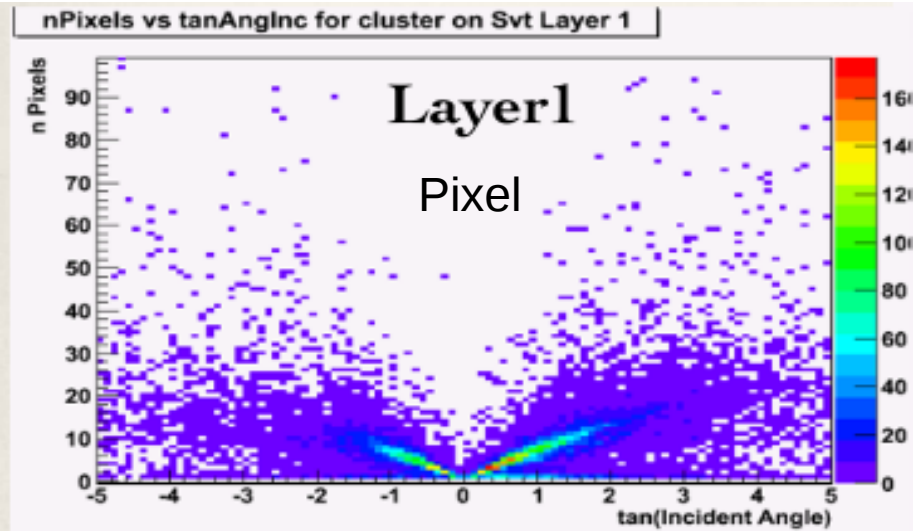


- Activated Striplets in layer 0 (+/- 45° z) vs Tangent of incident angle
- Negative values are for particle going inwards
- Real Geometry Modules for Strip, Cilindric Approximation for Pixel

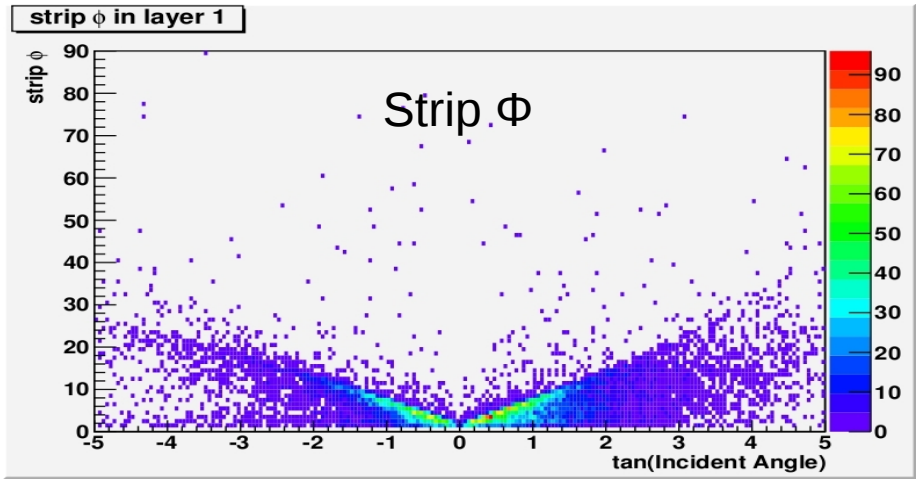


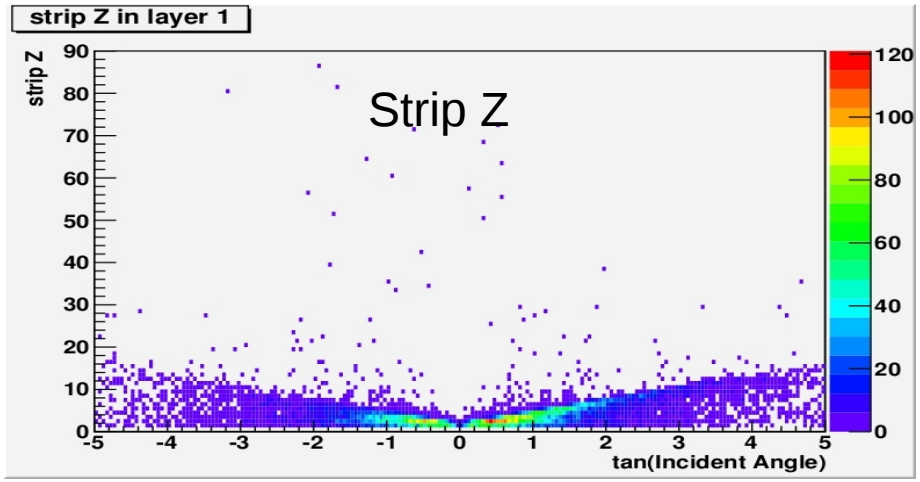


Strip vs Incident Angle
(layer 1)

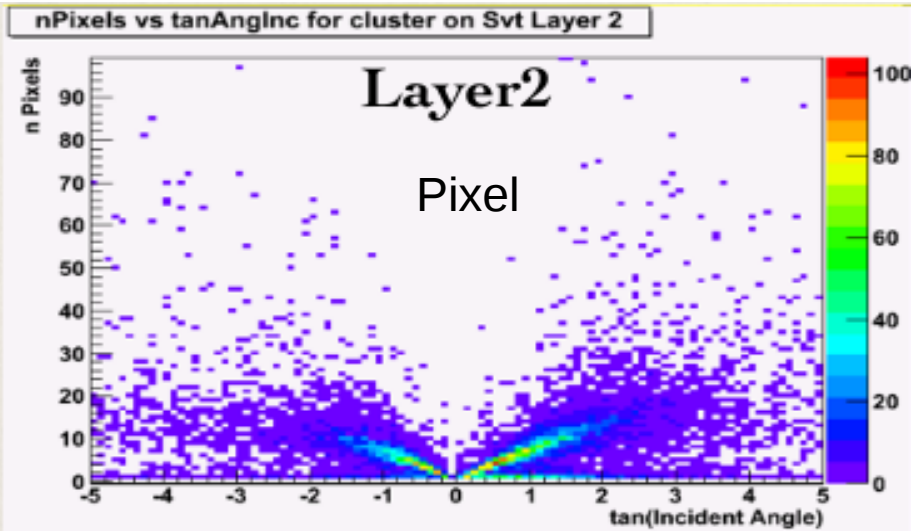


- Activated Striplets in layer 1 (Z & Φ) vs Tangent of Incident Angle
- Negative values are for particle going inwards
- Real Geometry Modules for Strip, Cilindric Approximation for Pixel

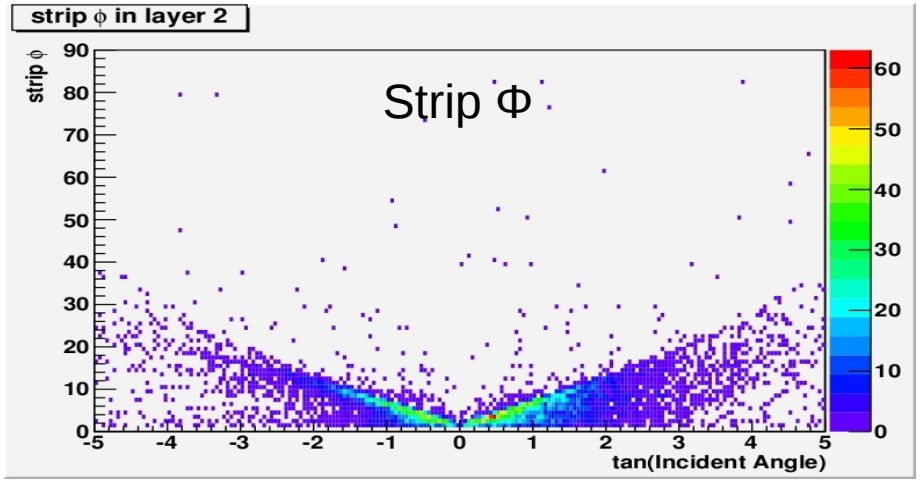


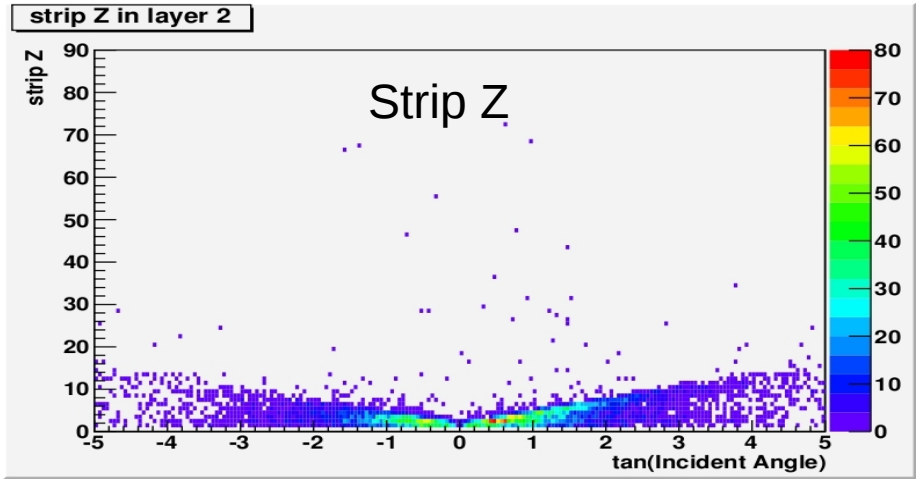


Strip vs Incident Angle
(layer 2)

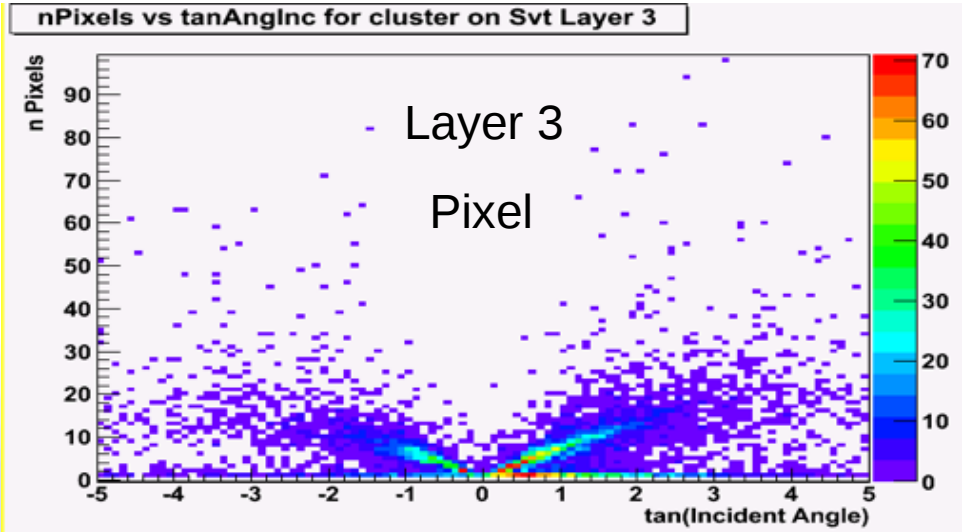


- Activated Striplets in layer 2 (Z & Φ) vs Tangent of Incident Angle
- Negative values are for particle going inwards
- Real Geometry Modules for Strip, Cilindric Approximation for Pixel

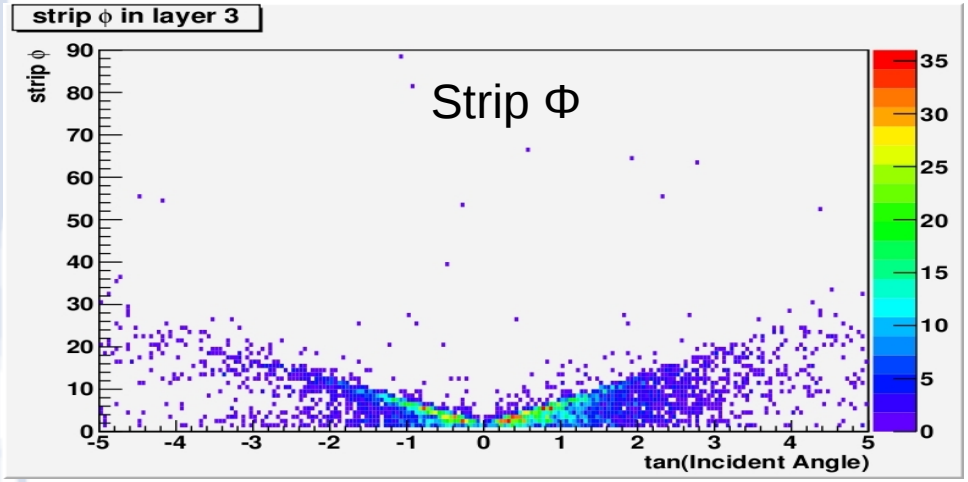


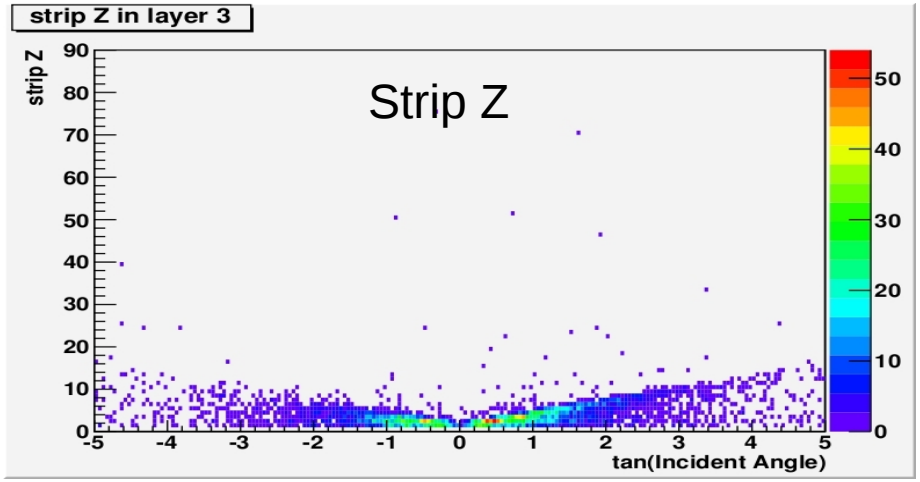


Strip vs Incident Angle
(layer 3)

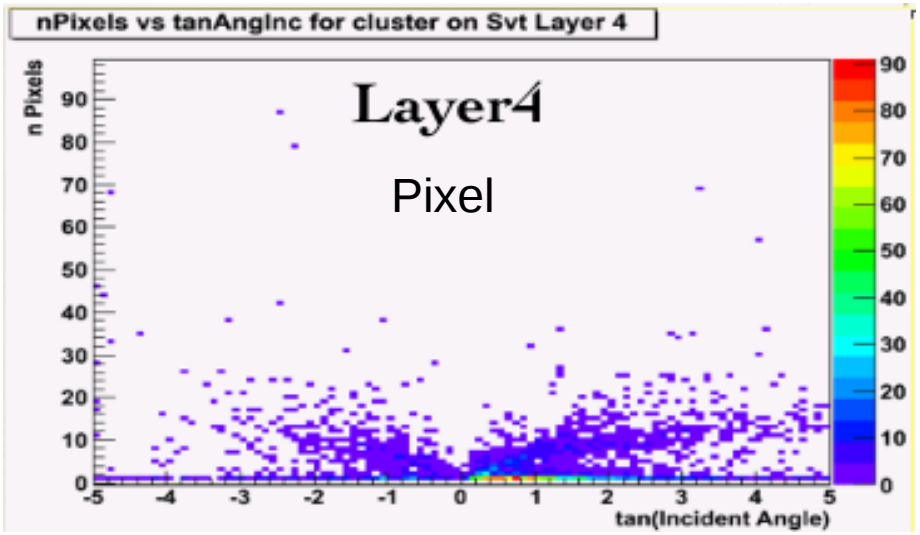


- Activated Striplets in layer 3 (Z & Φ) vs Tangent of Incident Angle
- Negative values are for particle going inwards
- Real Geometry Modules for Strip, Cilindric Approximation for Pixel

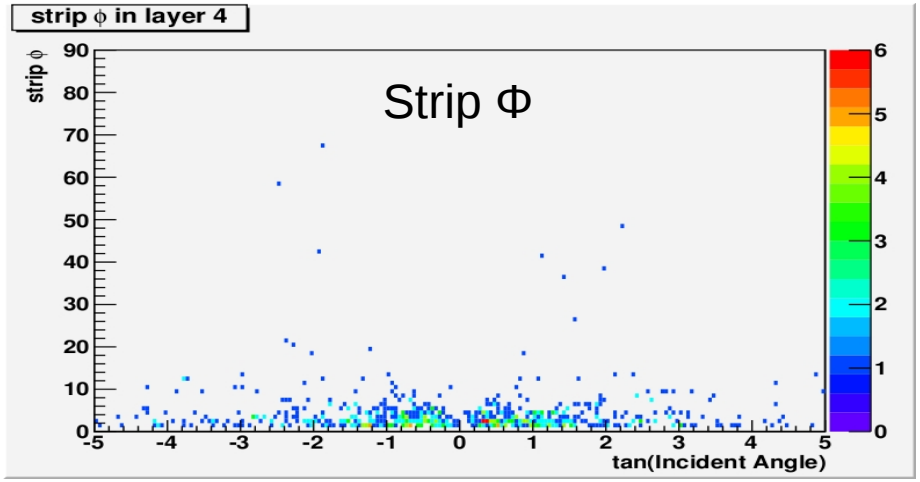


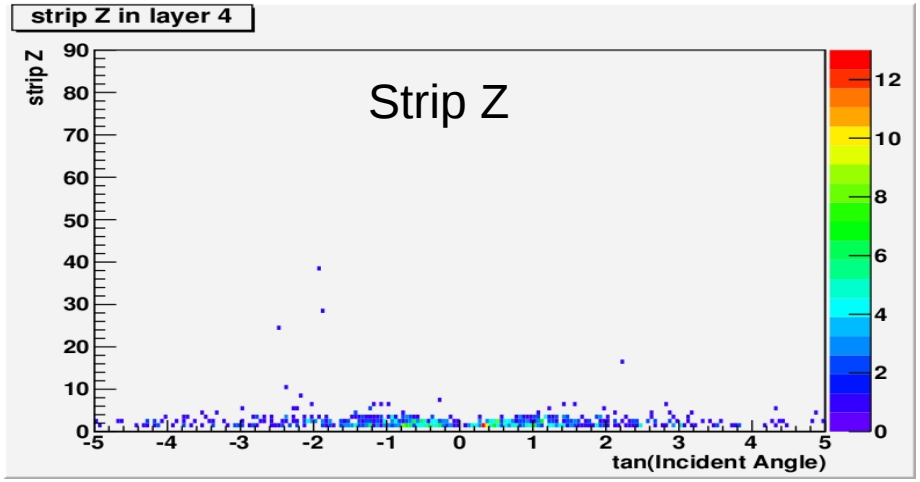


Strip vs Incident Angle
(layer 4)

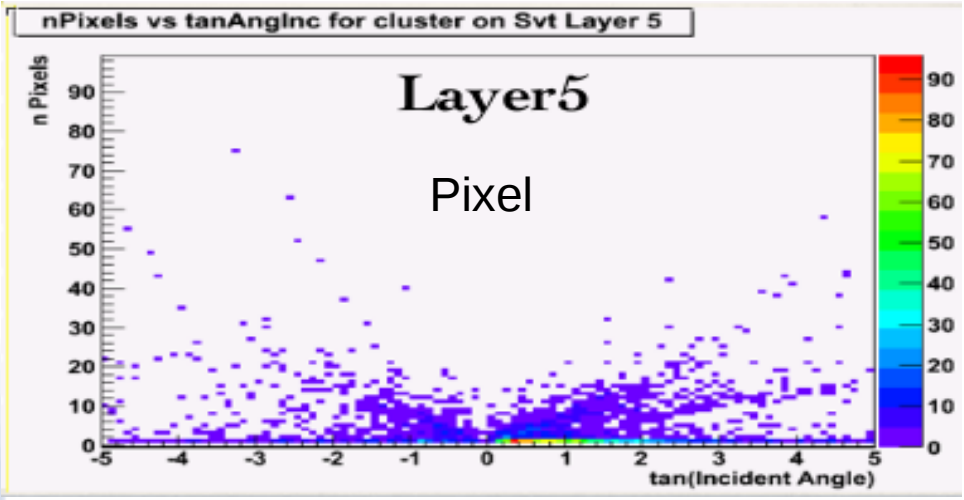


- Activated Striplets in layer 4 (Z & Φ) vs Tangent of Incident Angle
- Negative values are for particle going inwards
- Real Geometry Modules for Strip, Cilindric Approximation for Pixel

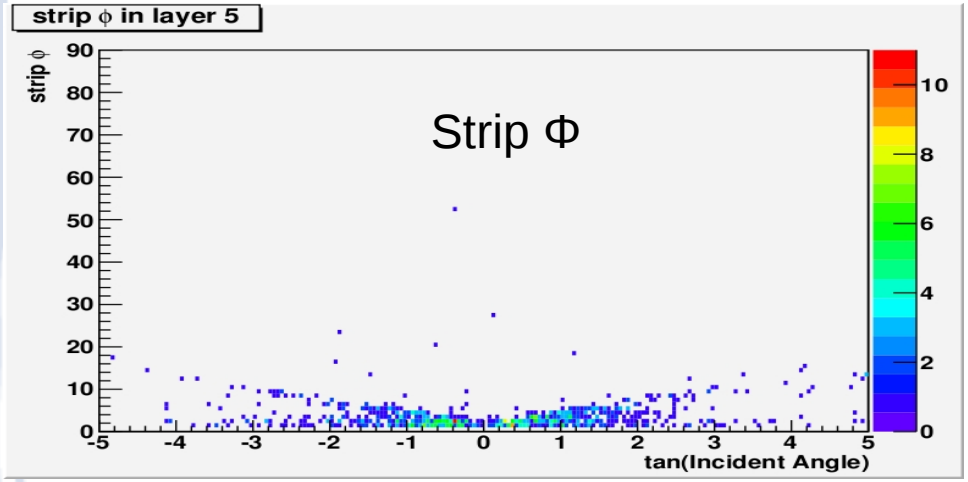


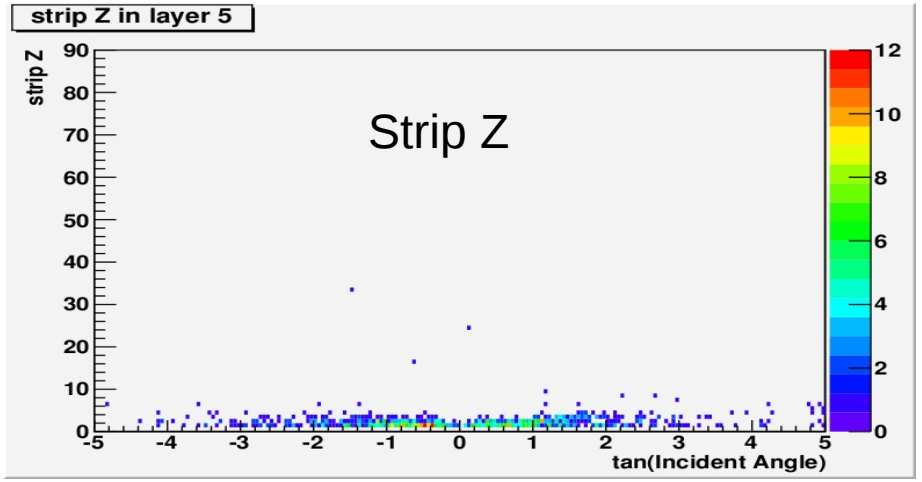


Strip vs Incident Angle
(layer 5)



- Activated Striplets in layer 5 (Z & Φ) vs Tangent of Incident Angle
- Negative values are for particle going inwards
- Real Geometry Modules for Strip, Cilindric Approximation for Pixel



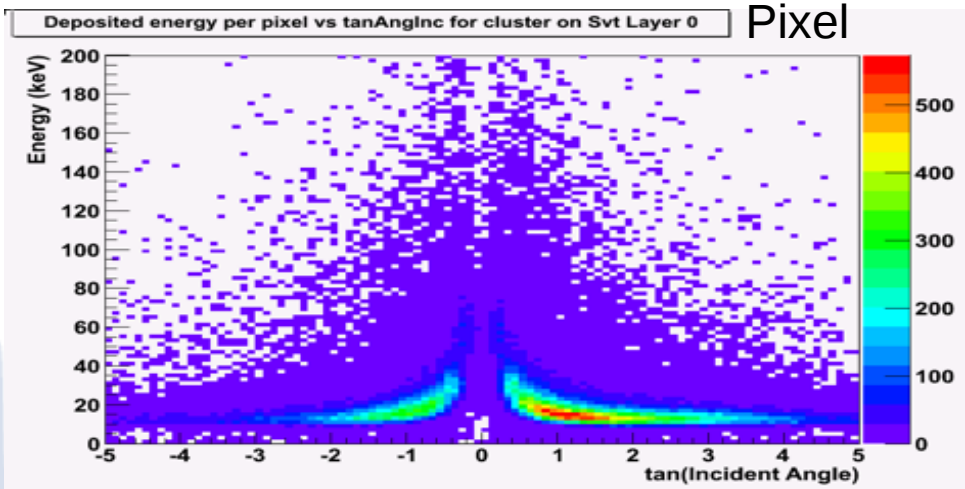


Deposited Energy per Strip

vs

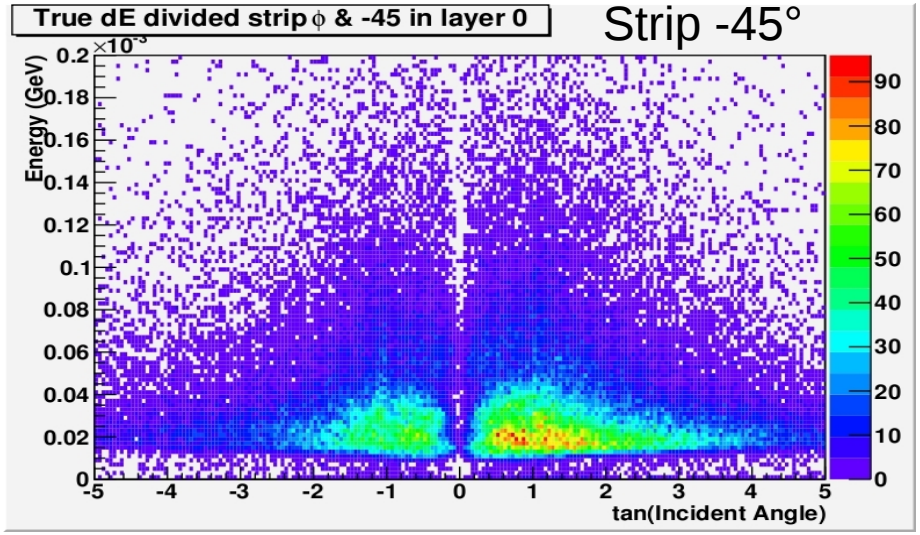
Tangent of Incident Angle

Energy per Strip vs Incident Angle (layer 0)

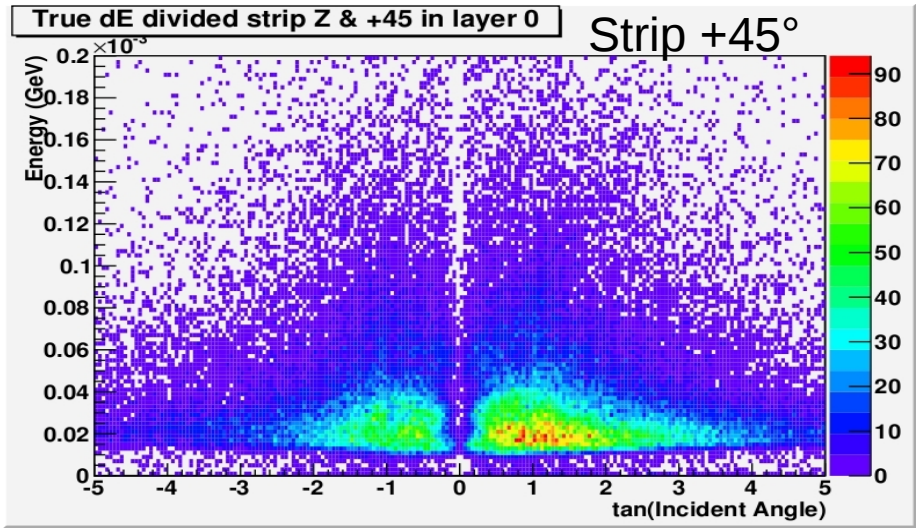


Pixel

- Deposites energy per strip (+/- 45) in layer 0 vs tangent of incident angle
- Negative values are for particle going inwards
- Real Geometry Modules for Strip, Cilindric Approximation for Pixel

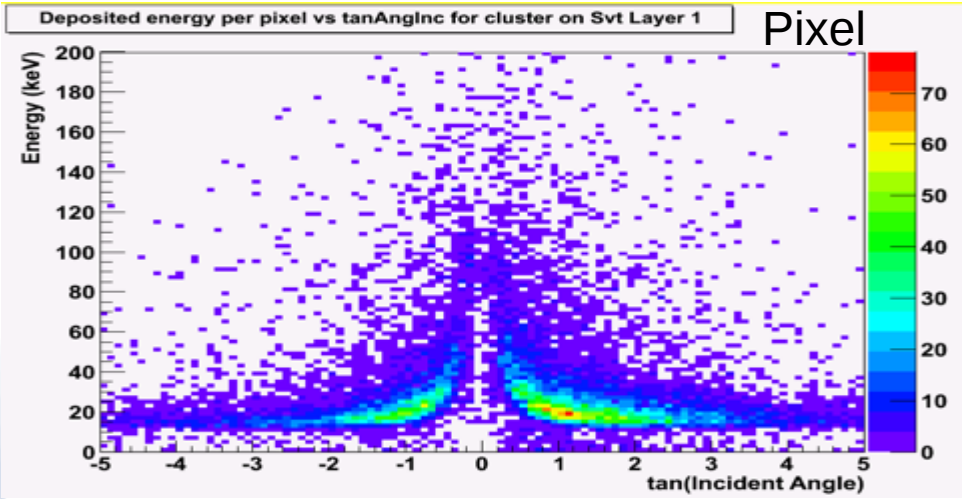


Strip -45°



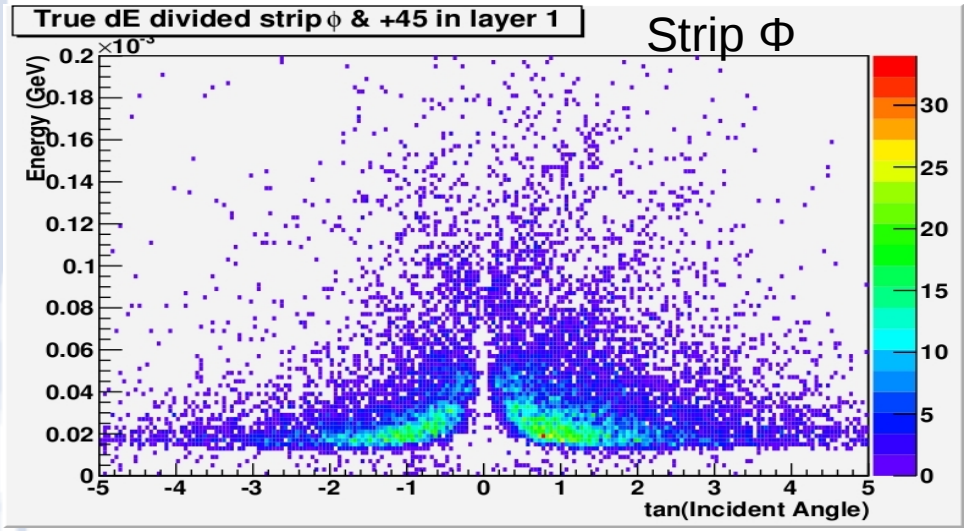
Strip +45°

Energy per Strip vs Incident Angle (layer 1)

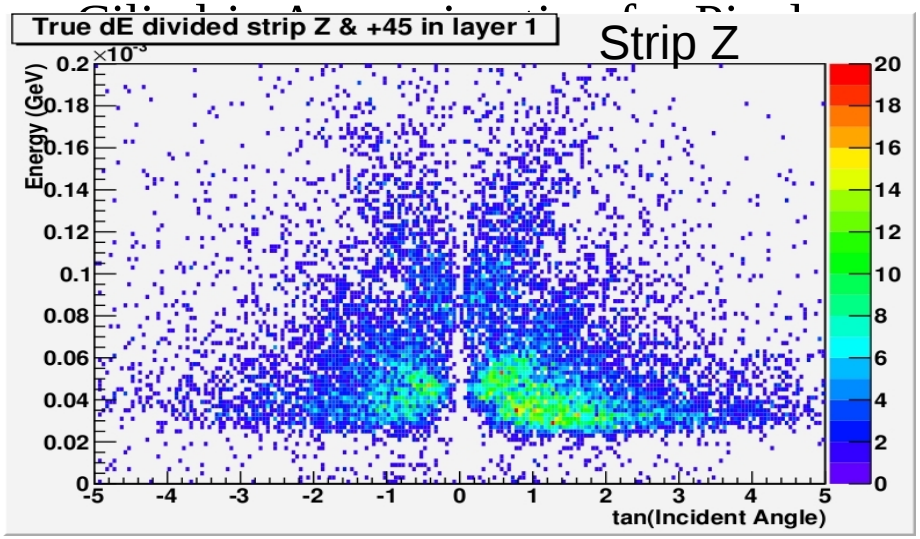


Pixel

- Deposites energy per strip (Z & Φ) in layer 0 vs tangent of incident angle
- Negative values are for particle going inwards
- Real Geometry Modules for Strip,

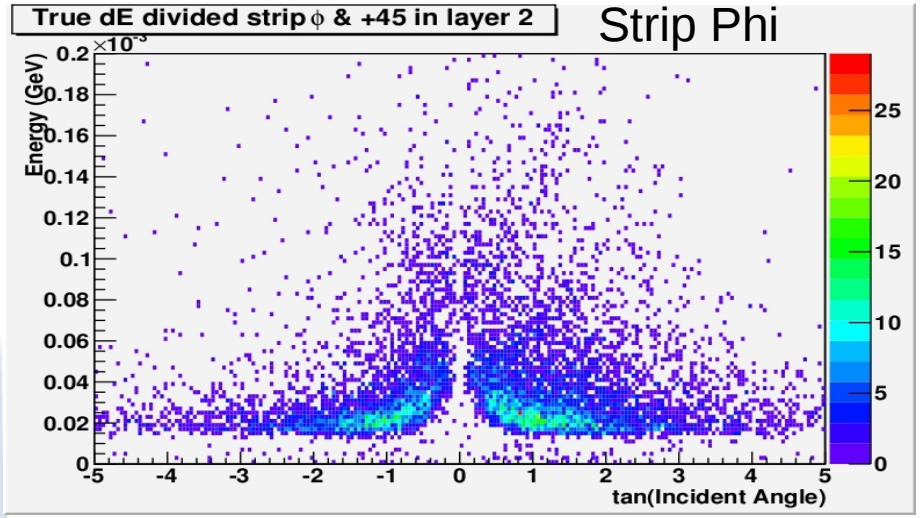


Strip Φ

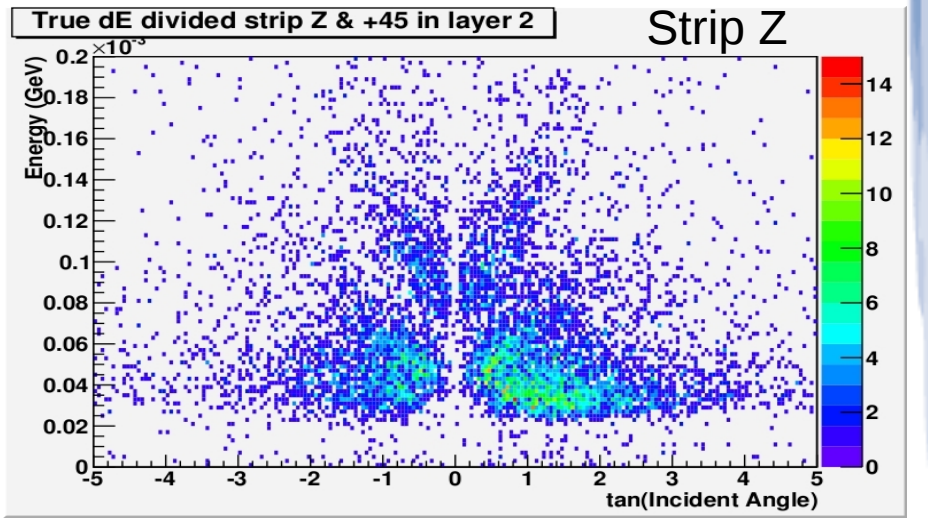


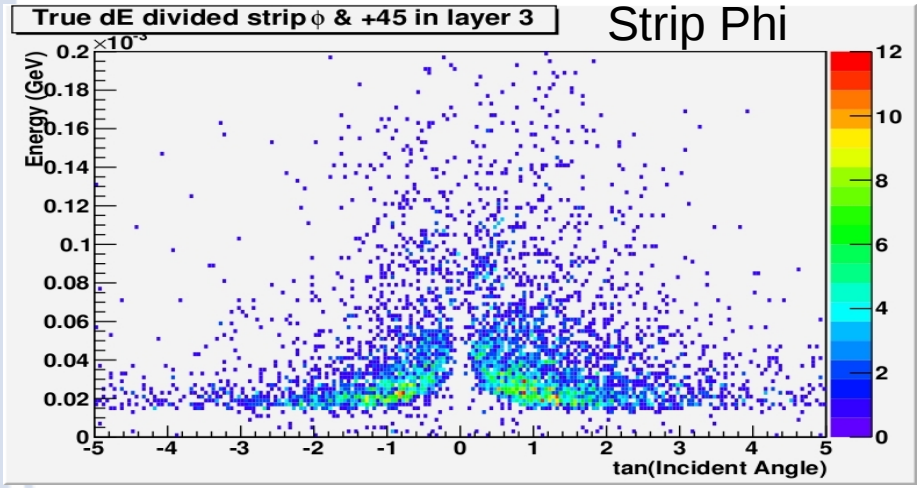
Strip Z

Energy per Strip vs Incident Angle
(layer 2 & 3)

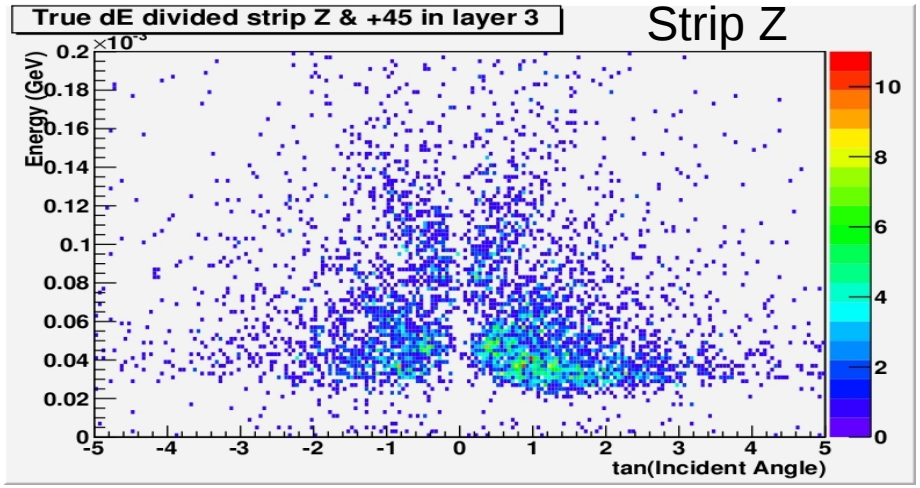


Layer 2

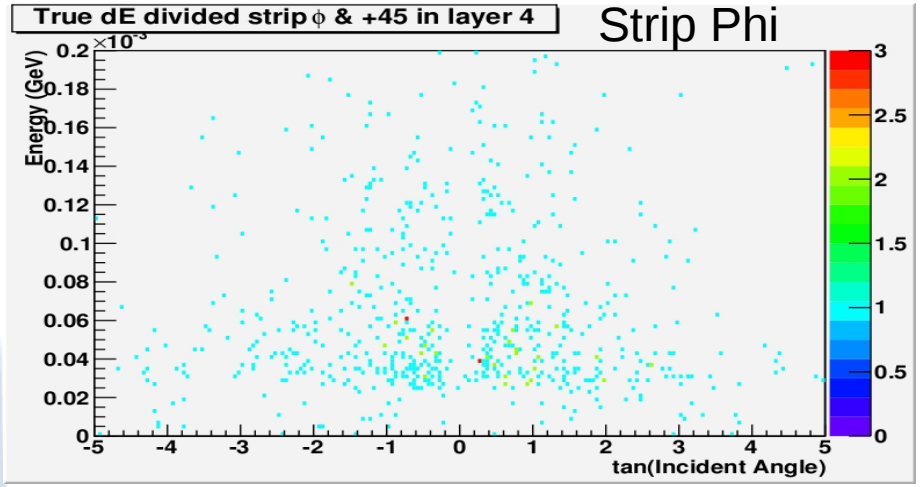




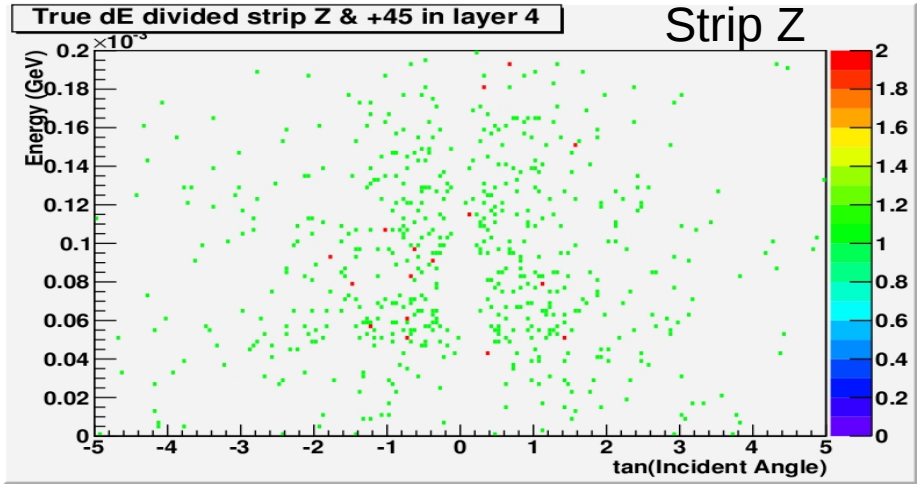
Layer 3

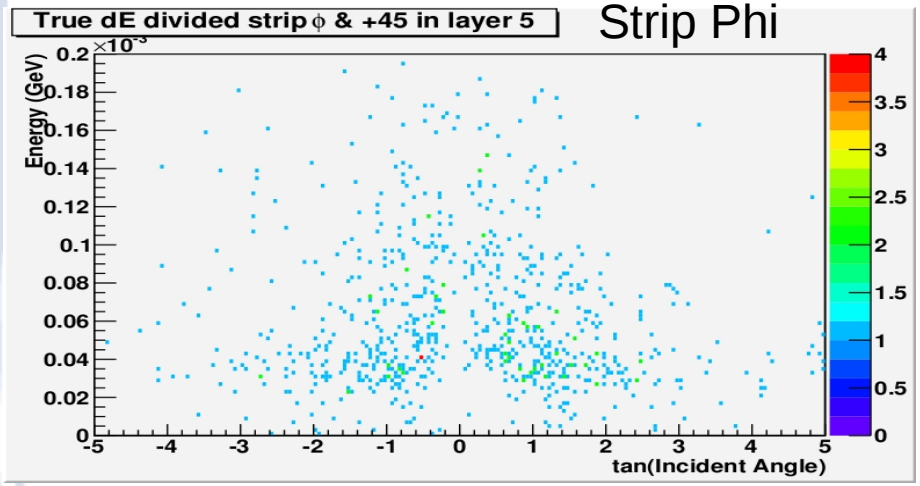


Energy per Strip vs Incident Angle
(layer 4 & 5)

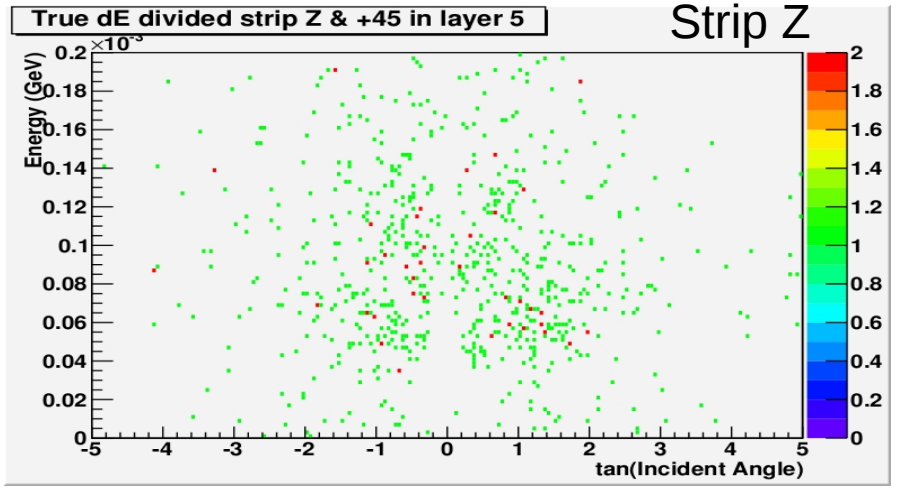


Layer 4



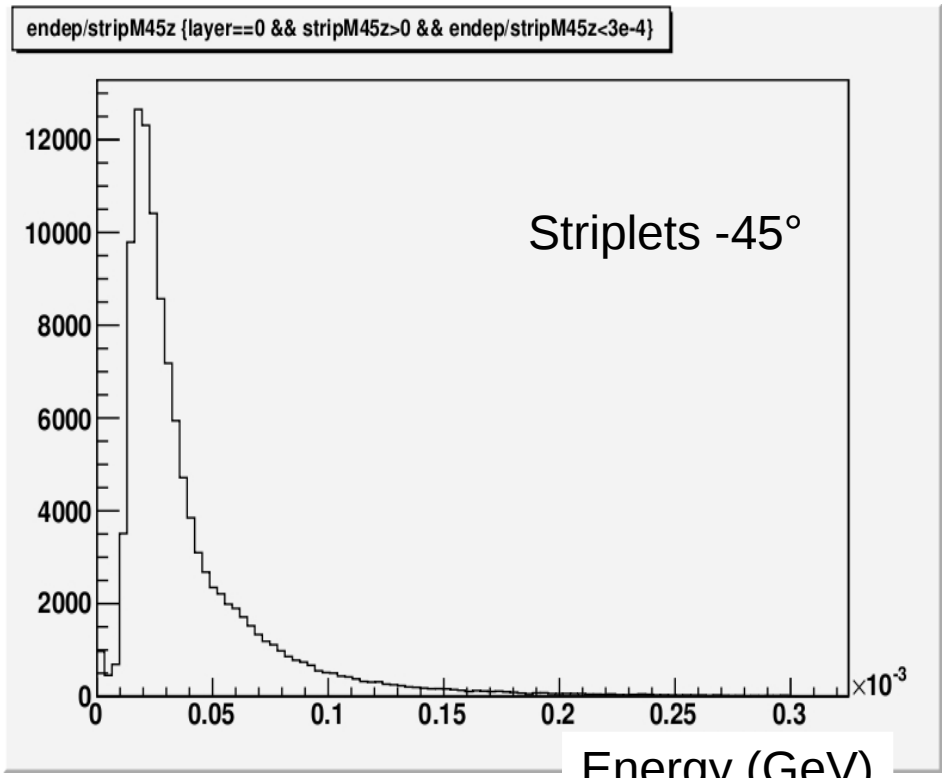


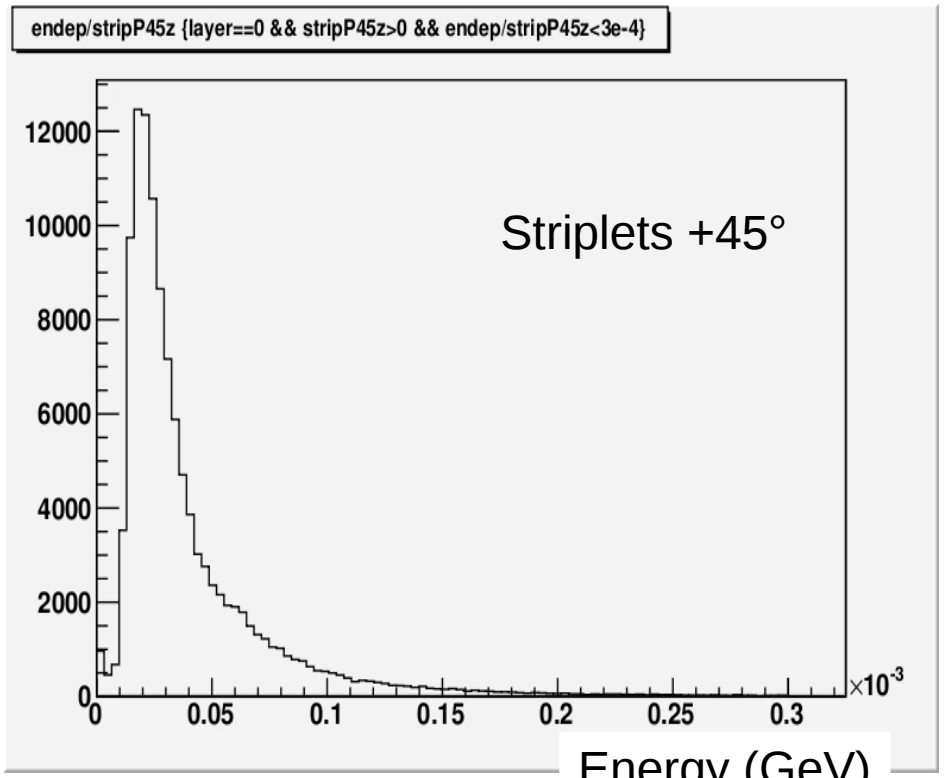
Layer 5



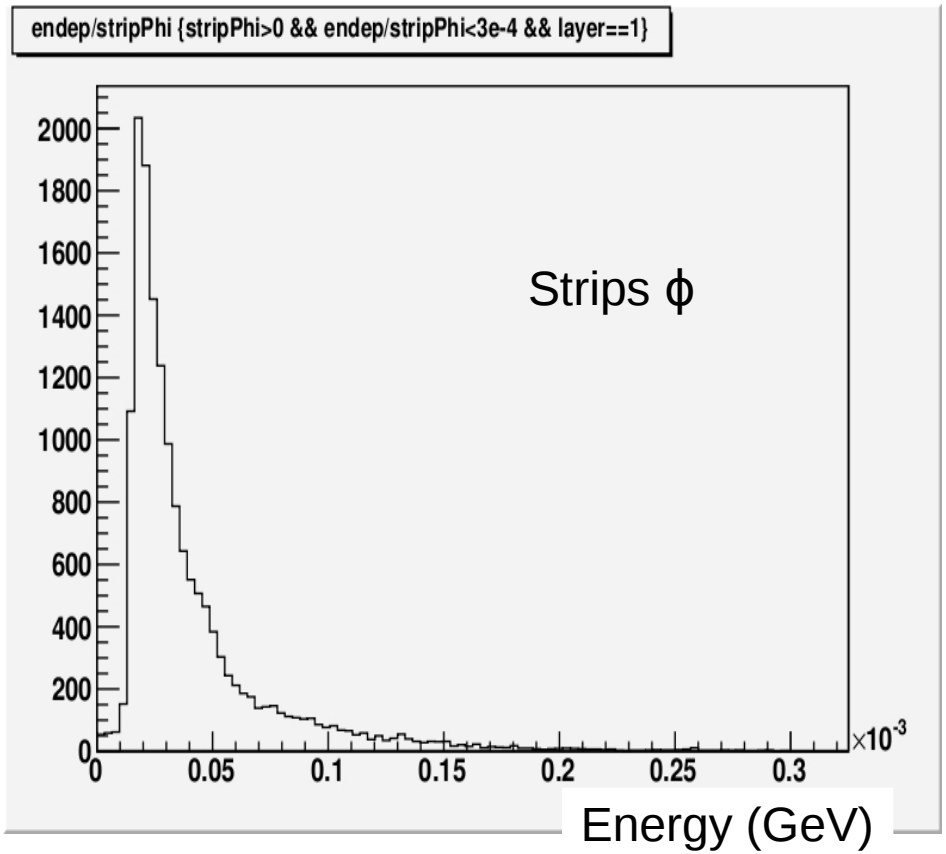
Backup Slides

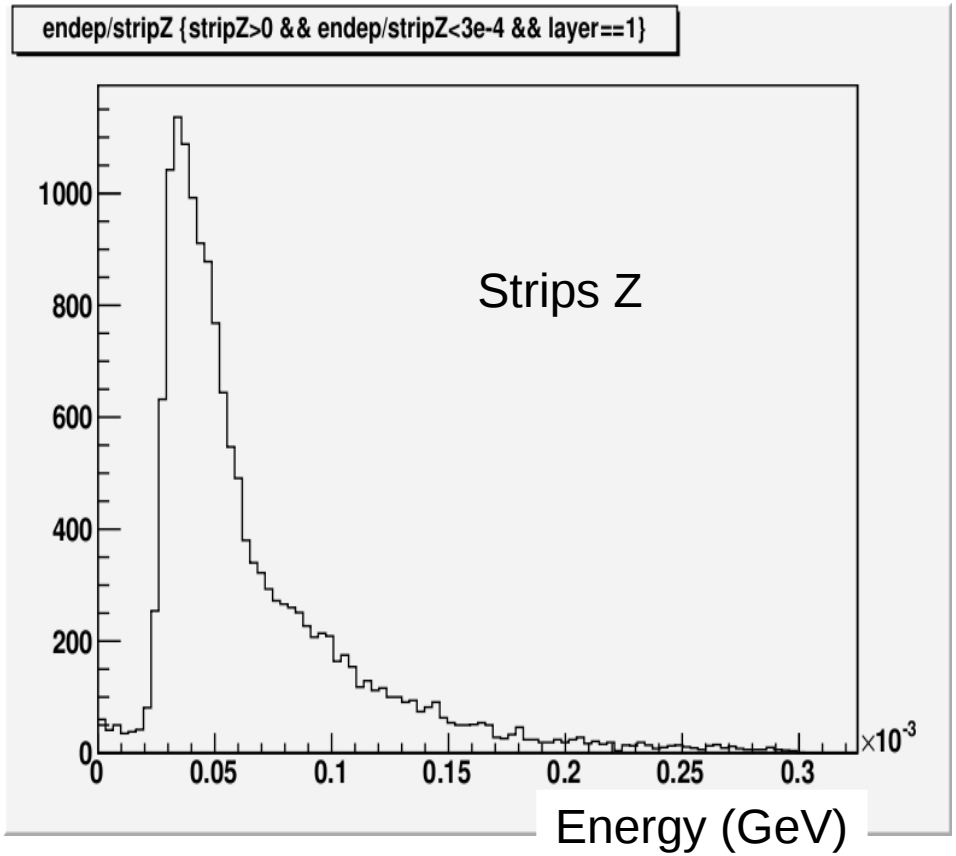
Energy per strip distribution
(layer 0)



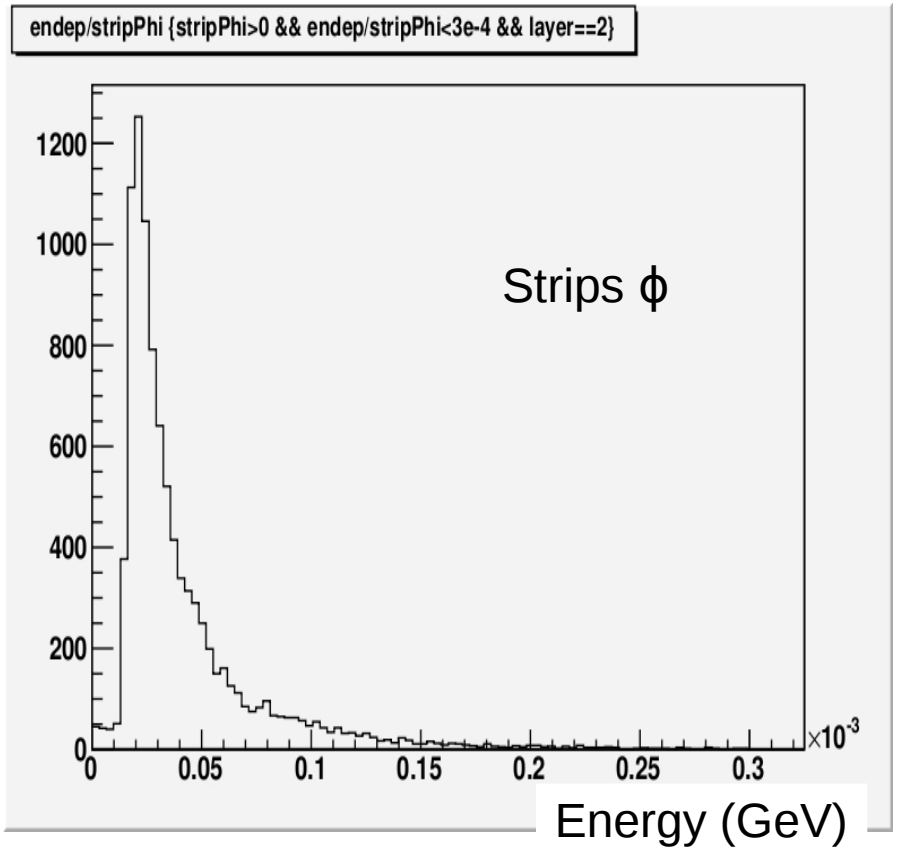


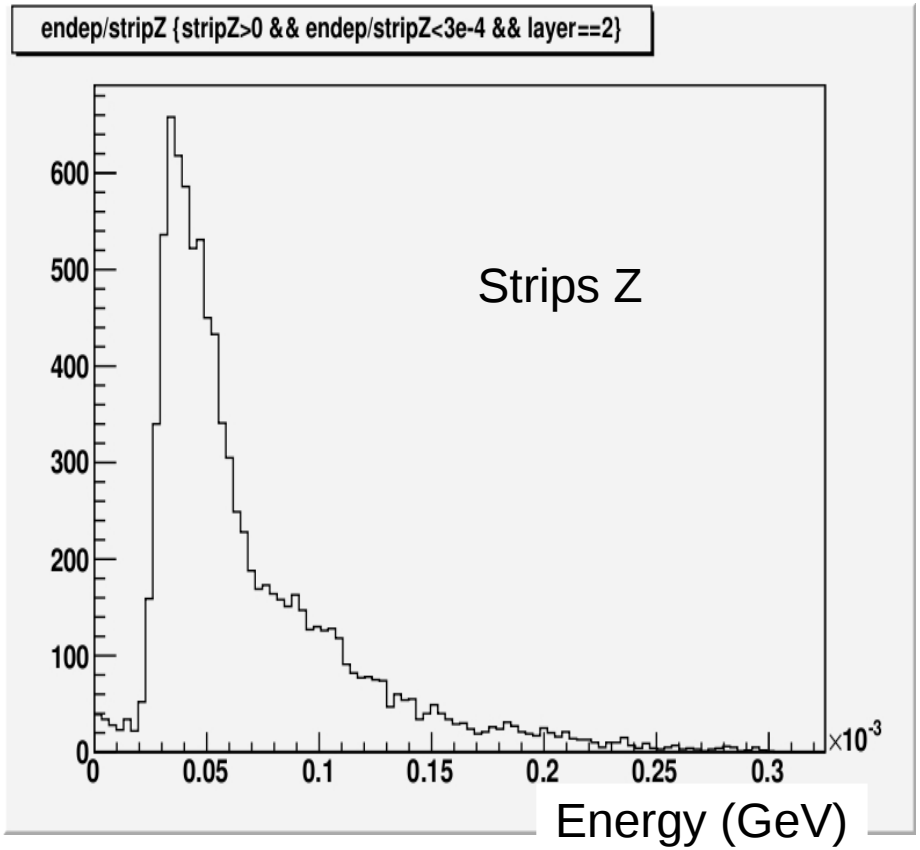
Energy per strip distribution
(layer 1)



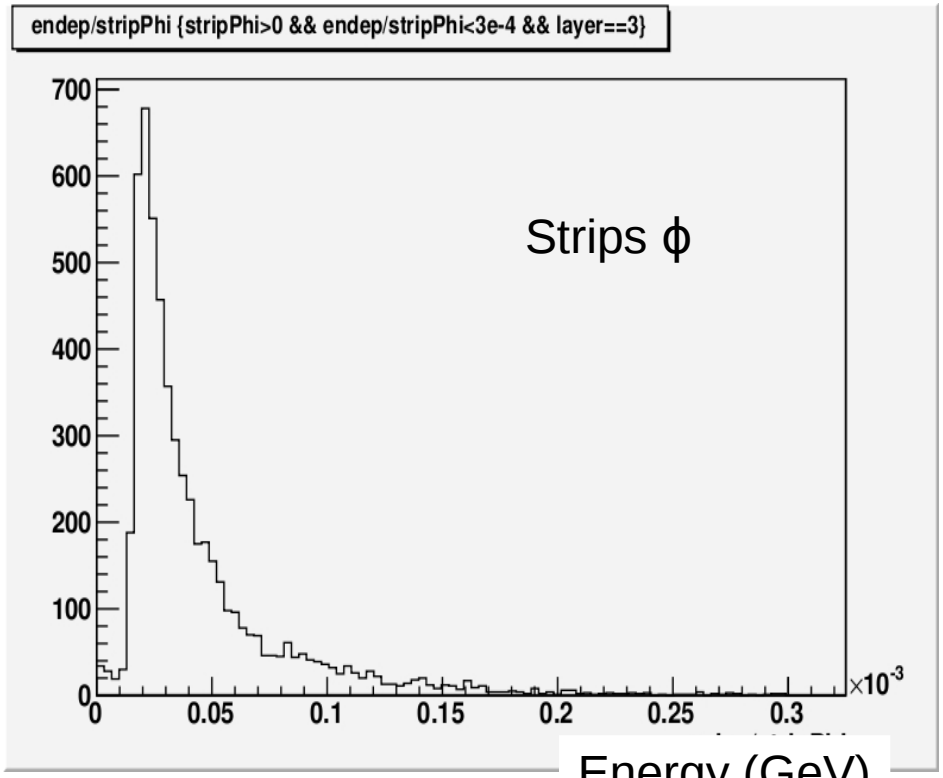


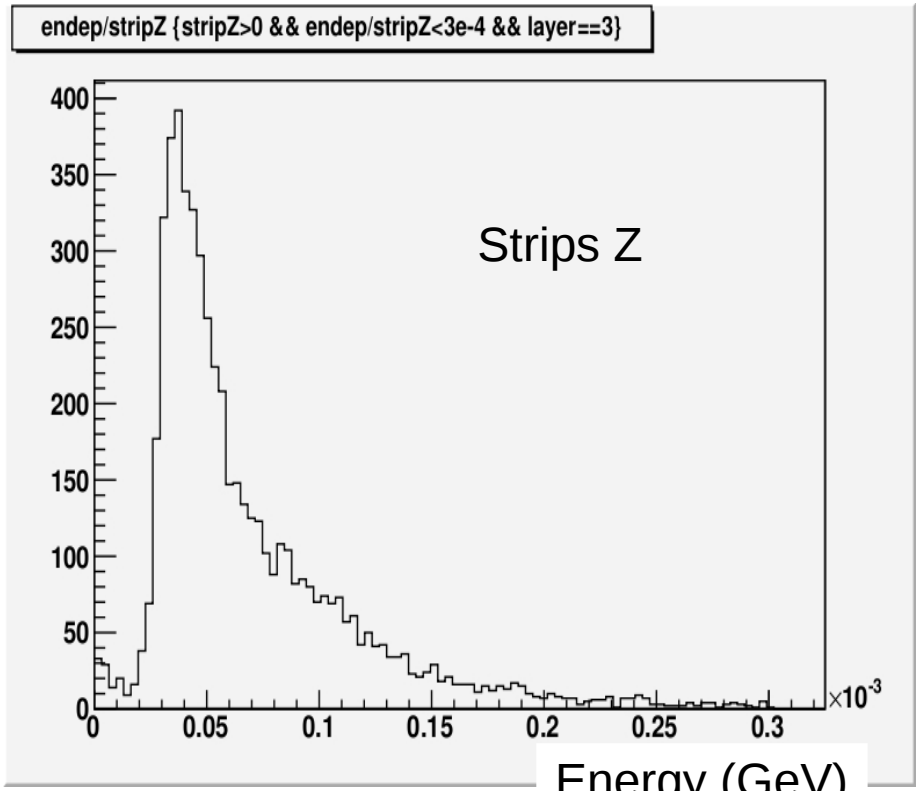
Energy per strip distribution
(layer 2)



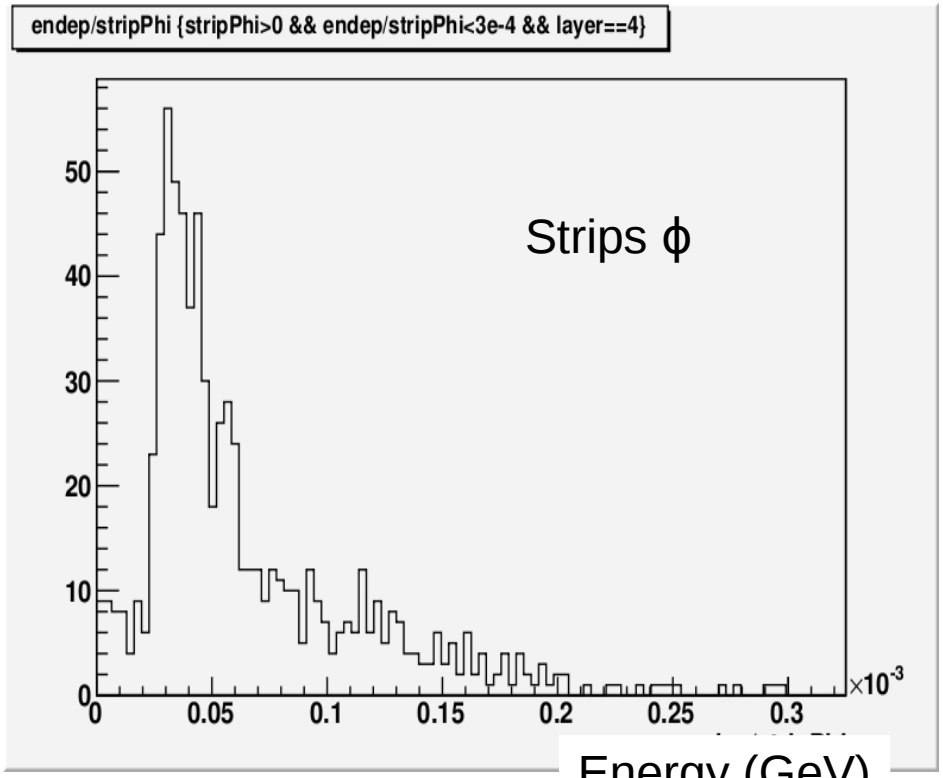


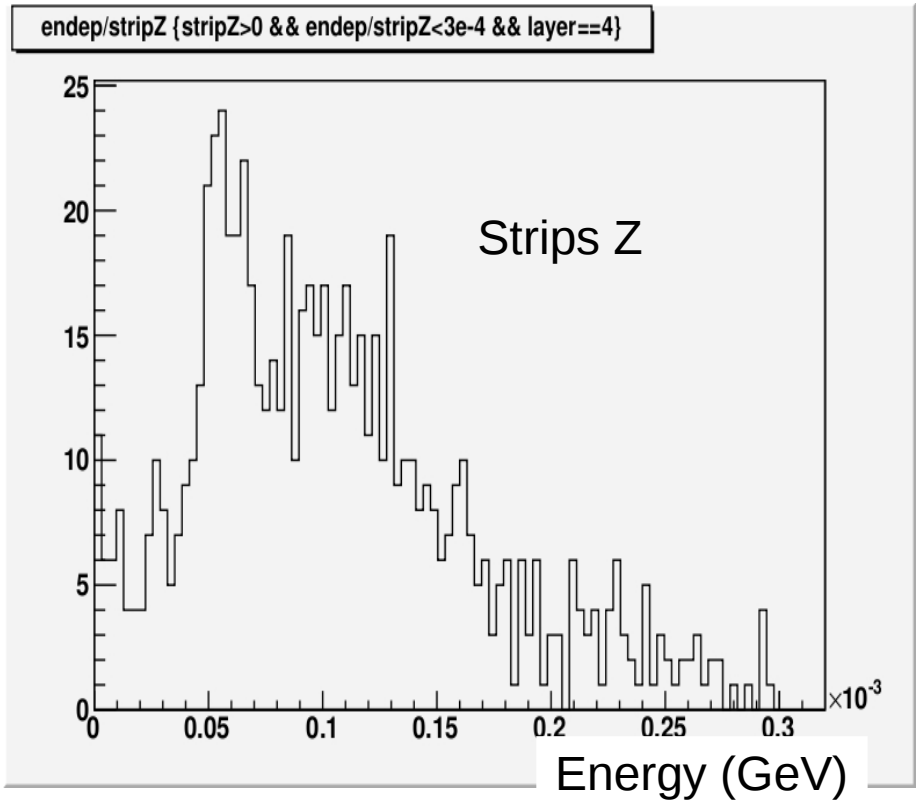
Energy per strip distribution
(layer 3)



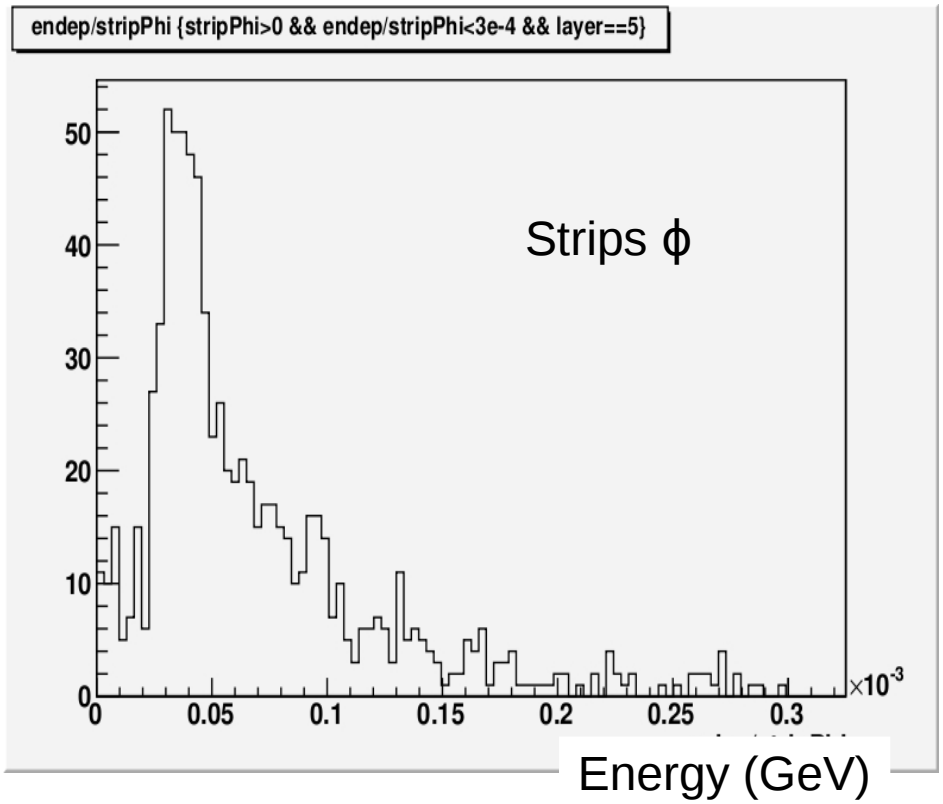


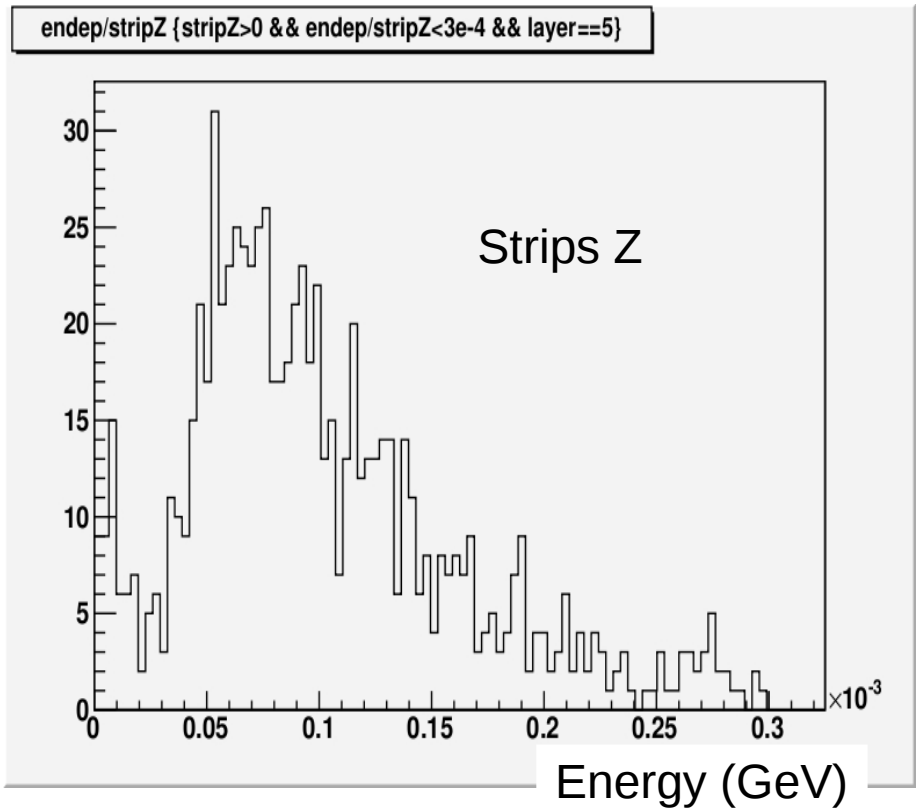
Energy per strip distribution
(layer 4)





Energy per strip distribution
(layer 5)





Average cluster rate for e± from pairs
New files - No threshold cut

Layer	RO Pitch Z (or +45°) μm	<n> Z (or +45°) Per Cluster	Rate Z or +45° (Mhz / cm^2)	RO Pitch ϕ (or -45°) μm	<n> ϕ (or -45°) Per Cluster	Rate ϕ or -45° (MHz / cm^2)	Cluster Rate (MHz / cm^2)
0	50	5.4	24.3	50	5.4	24.3	4.52
1	100	4.7	0.93	50	8.2	1.61	0.20
2	100	4.4	0.40	55	8.0	0.73	0.09
3	100	4.8	0.12	55	7.3	0.19	0.025
4	210	2.1	0.0036	100	4.2	0.007	0.0017
5	210	1.9	0.0024	100	3.7	0.005	0.0013

dE/dx

vs

Tangent of Incident Angle

Digitization procedure

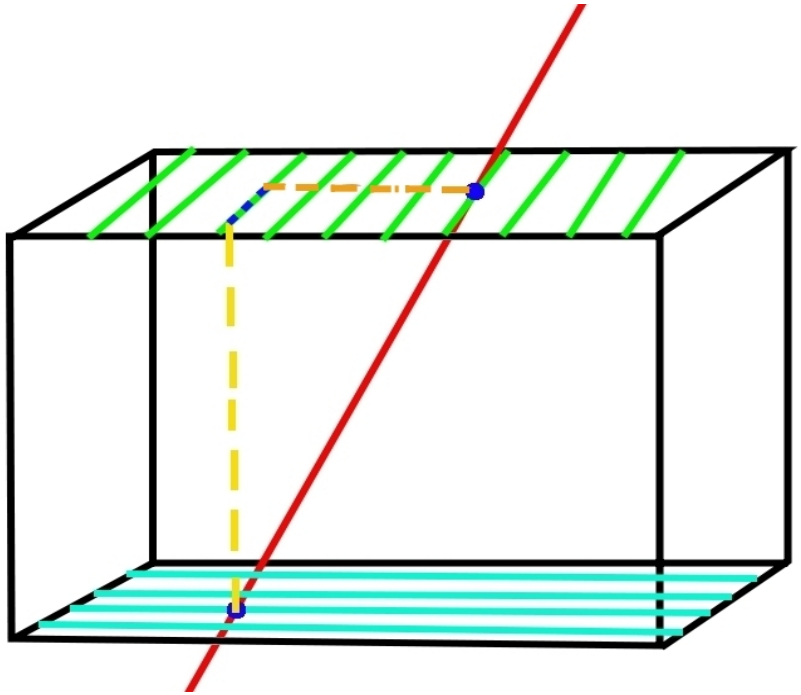
- Require particle identity (abs(SVTHits.pdg)==11 pairs)
- Use entrance and exit point to define path Δx in wafer and project it onto Z and RΦ
- Use released energy ΔE in active silicon
- Share the energy among the “Digitized” strips dEi
- First & last strip has random

flat dEi, the others the same

- Smear dEi with gaussian
- Apply one sets of thresholds

on dEi (=each strip):

4800 e- 0.30(0.20)MIP-L0(L1-5)

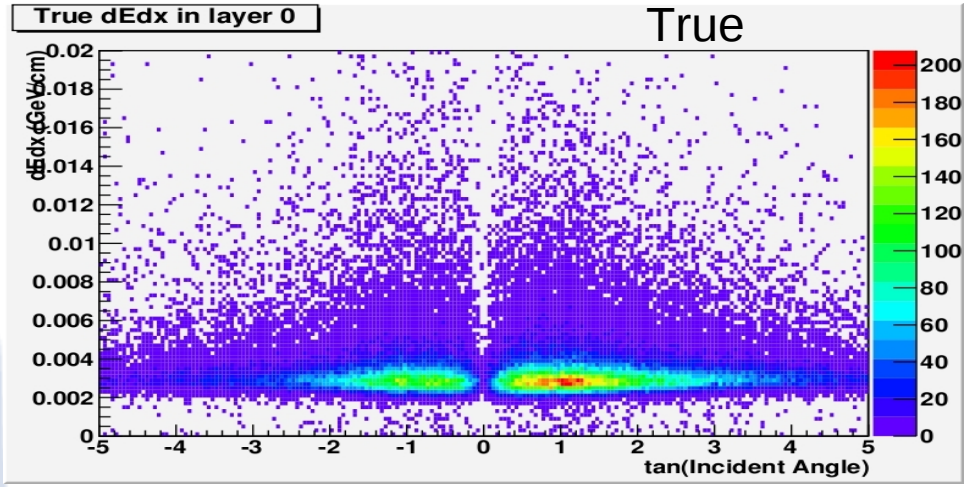


dE/dx vs Incident Angle

- dE/dx study in 6 double layer of SVT
- Study was driven by FSSR2 (that provedes a 3 bit ADC information for each recorded hit)
- Threshold used:

Threeshold	Energy Value (keV)
1	17.28
2	22.44
3	29.14
4	37.84
5	49.14

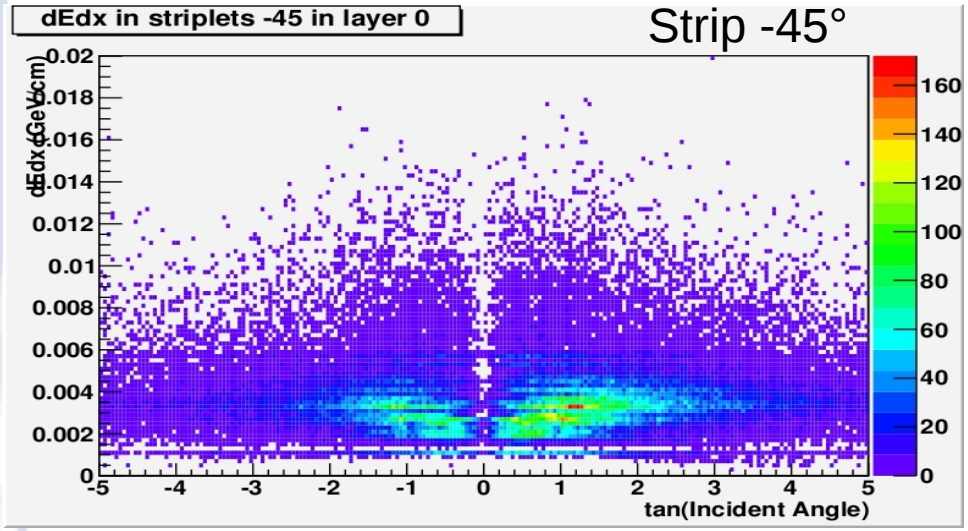
dE/dx vs Incident Angle
(layer 0)

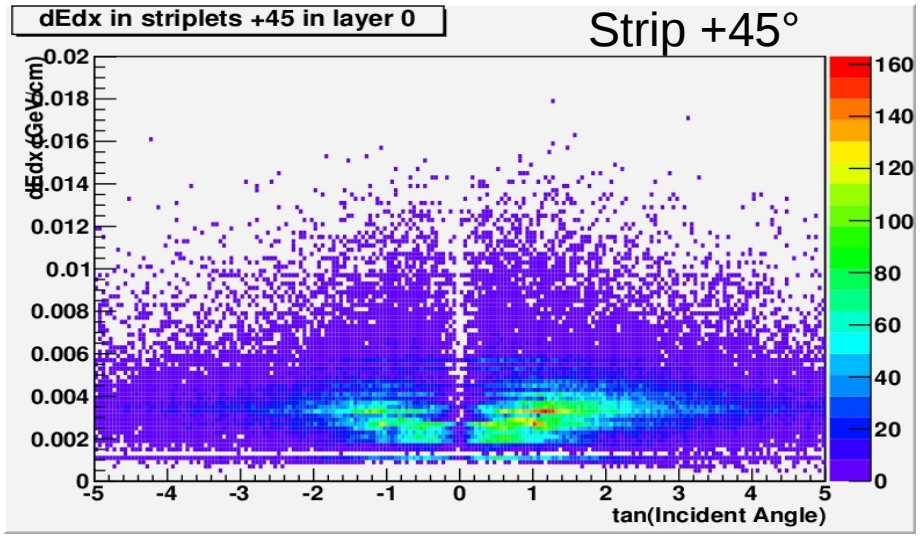


- dE/dx in layer 0 vs tangent of incident angle

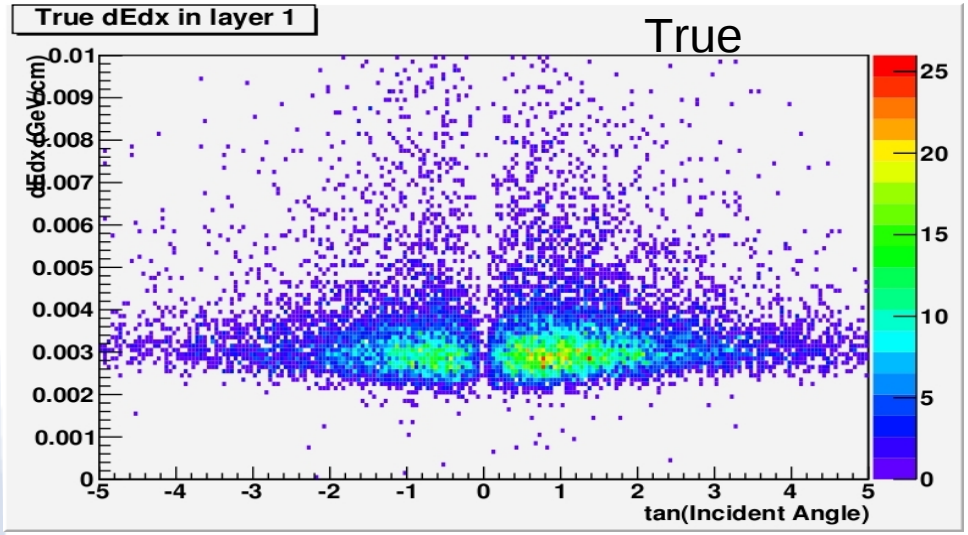
- Negative values are for particle going inwards

- Real Geometry Modules for Strip, Cilindric Approximation for Pixel





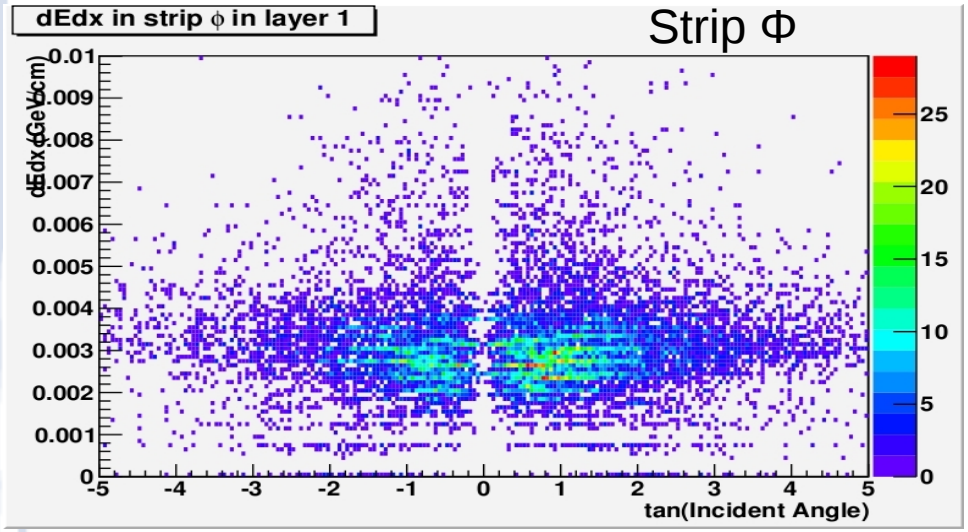
dE/dx vs Incident Angle
(layer 1)

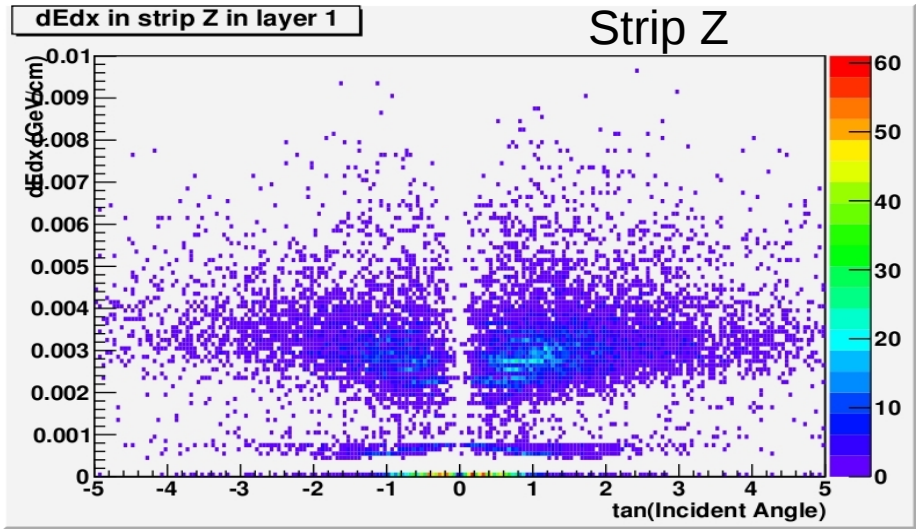


- dE/dx in layer 1 vs tangent of incident angle

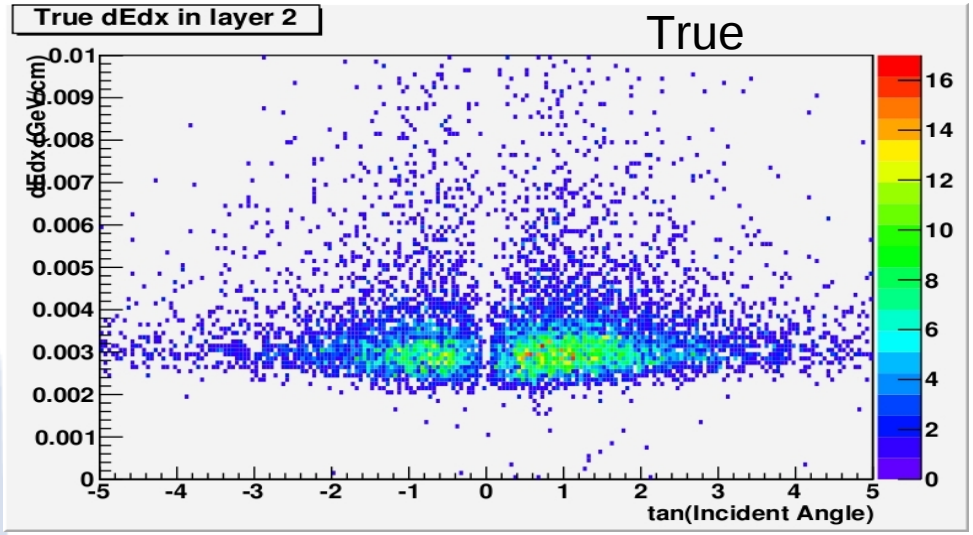
- Negative values are for particle going inwards

- Real Geometry Modules for Strip, Cilindric Approximation for Pixel





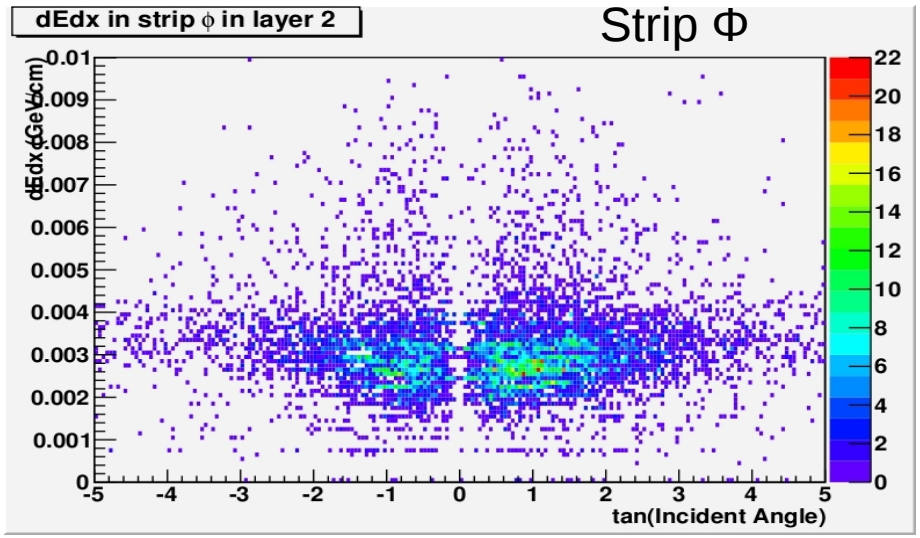
dE/dx vs Incident Angle
(layer 2)

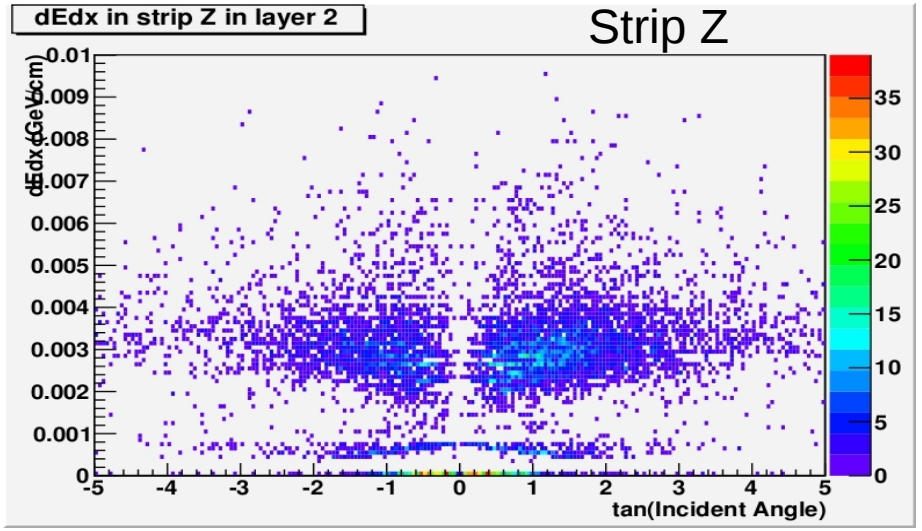


- dE/dx in layer 2 vs tangent of incident angle

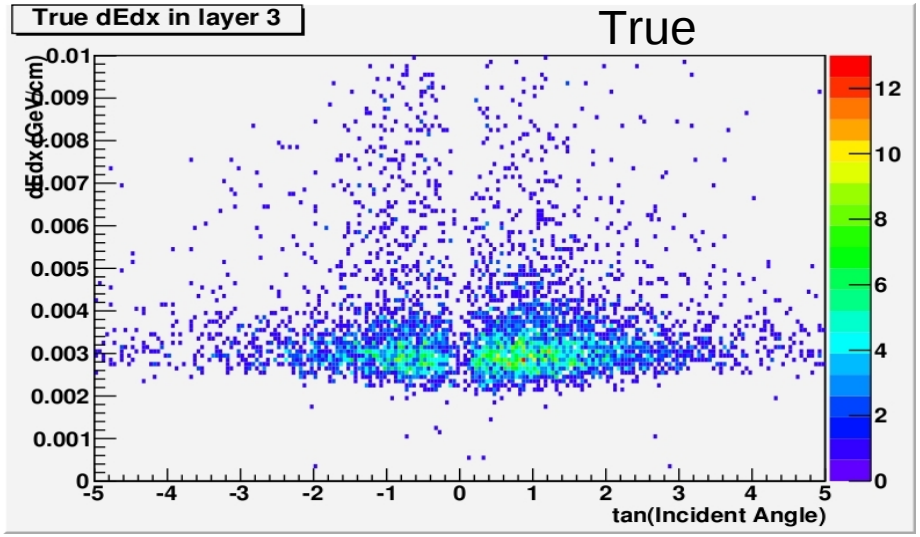
- Negative values are for particle going inwards

- Real Geometry Modules for Strip, Cilindric Approximation for Pixel





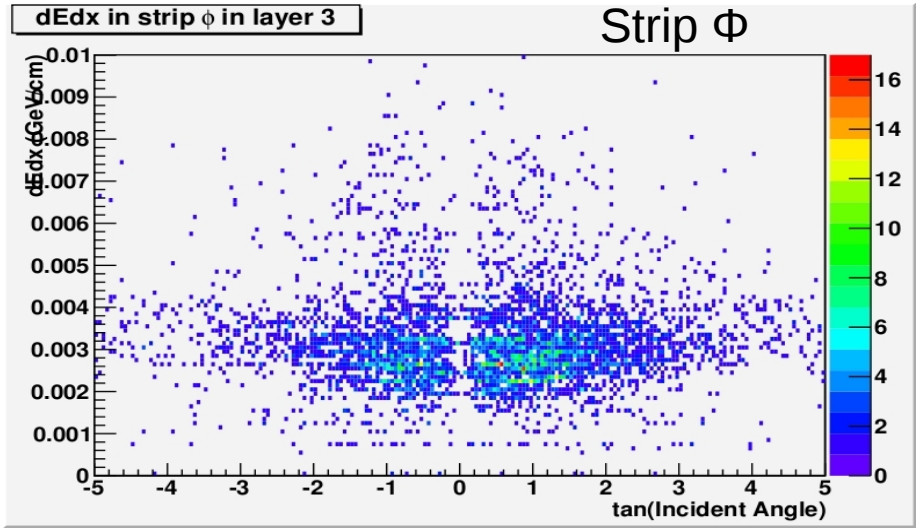
dE/dx vs Incident Angle
(layer 3)

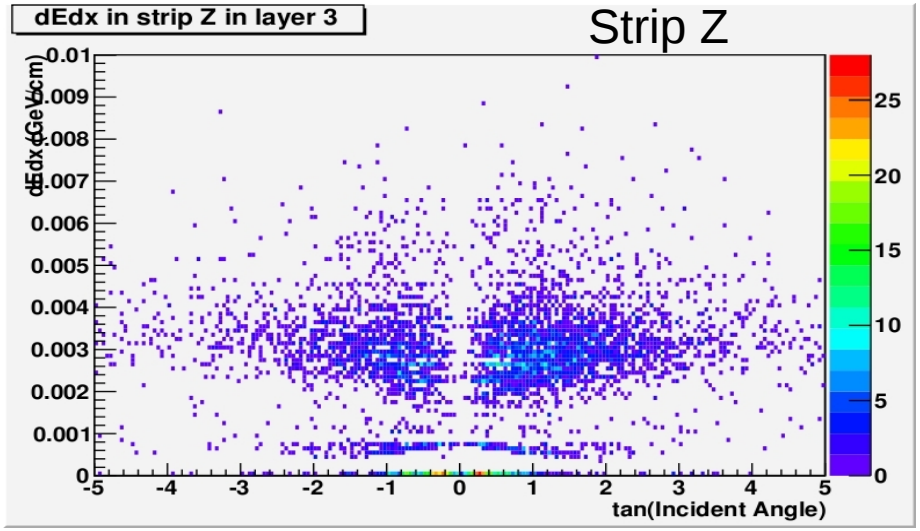


- dE/dx in layer 3 vs tangent of incident angle

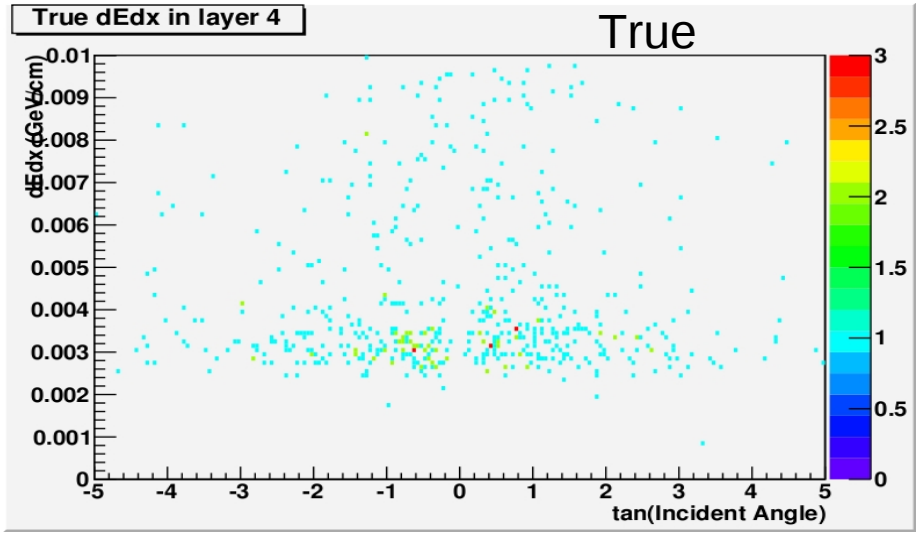
- Negative values are for particle going inwards

- Real Geometry Modules for Strip, Cilindric Approximation for Pixel





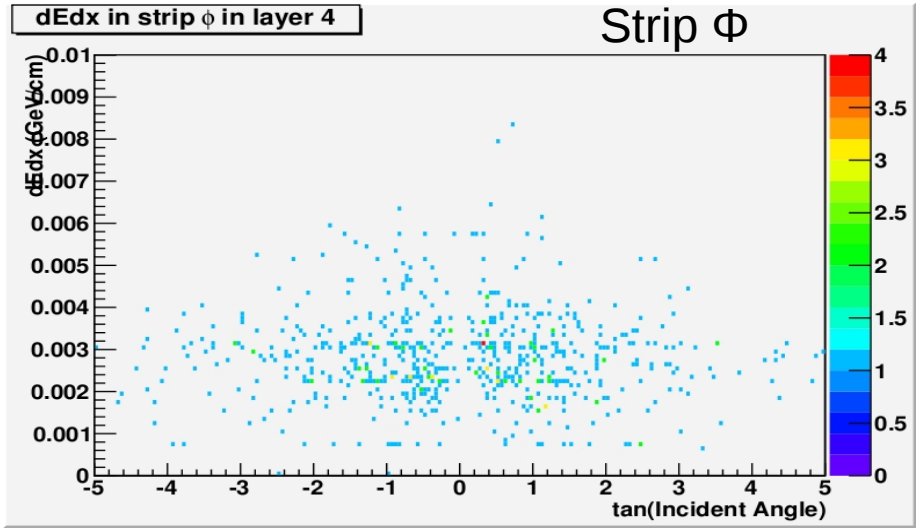
dE/dx vs Incident Angle
(layer 4)

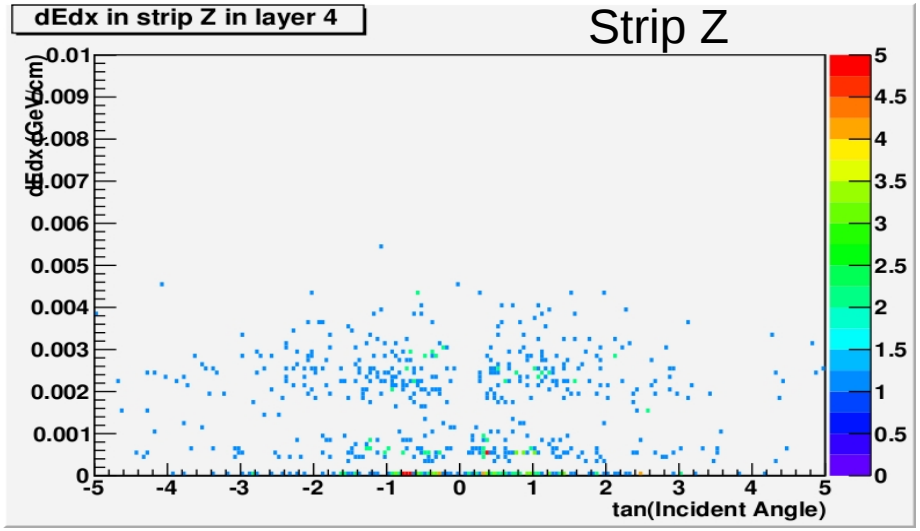


- dE/dx in layer 4 vs tangent of incident angle

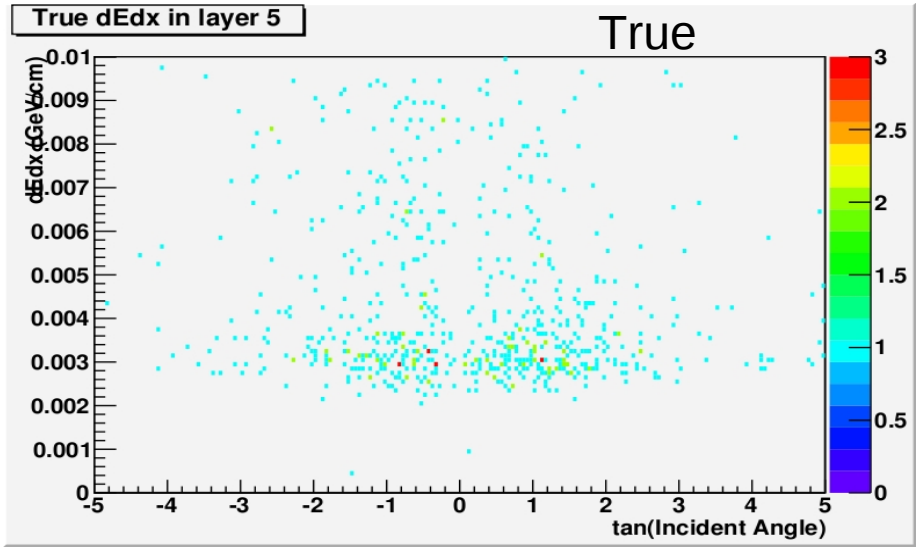
- Negative values are for particle going inwards

- Real Geometry Modules for Strip, Cilindric Approximation for Pixel





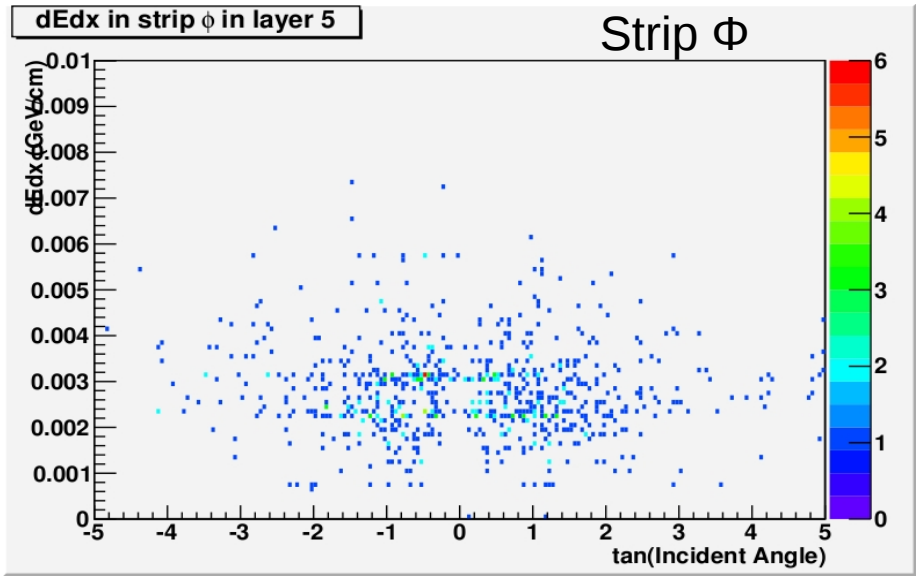
dE/dx vs Incident Angle
(layer 5)

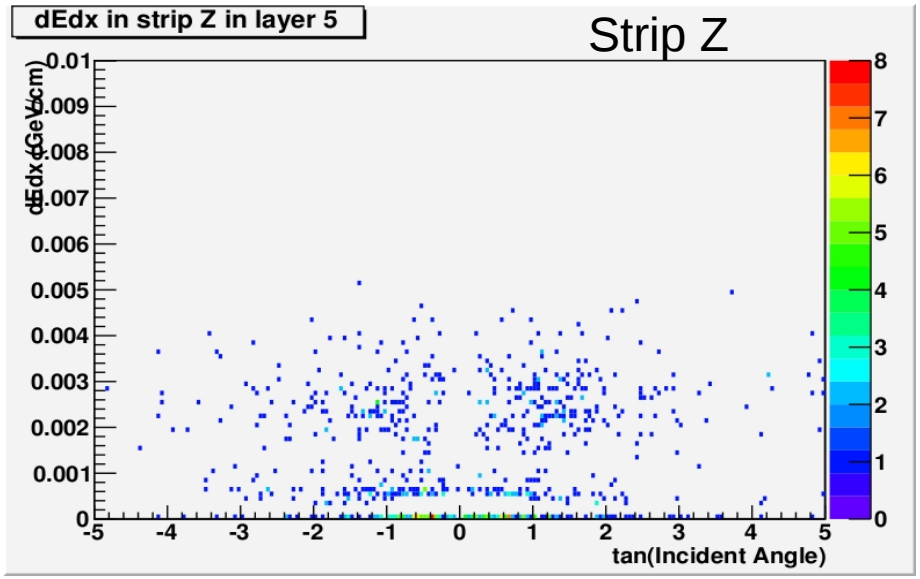


- dE/dx in layer 5 vs tangent of incident angle

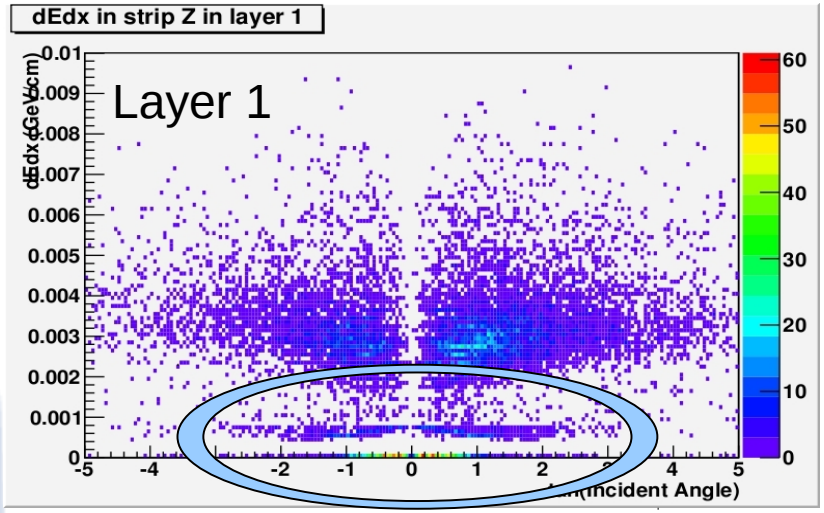
- Negative values are for particle going inwards

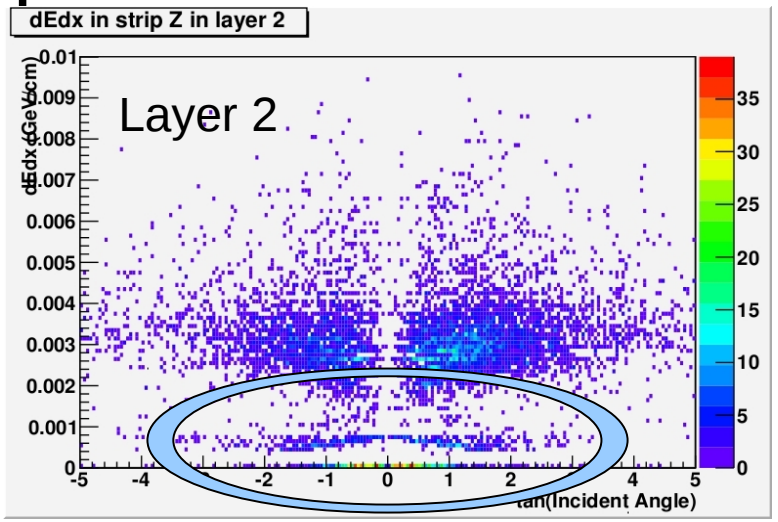
- Real Geometry Modules for Strip, Cilindric Approximation for Pixel





One strip effect
in dE/dx for strips Z





Measures of deposited energy have some peaks associated with one strip measure. The lowest peak cause the bands showed in the plots