Update on strip Multiplicity

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on behalf of Trieste SuperB Group

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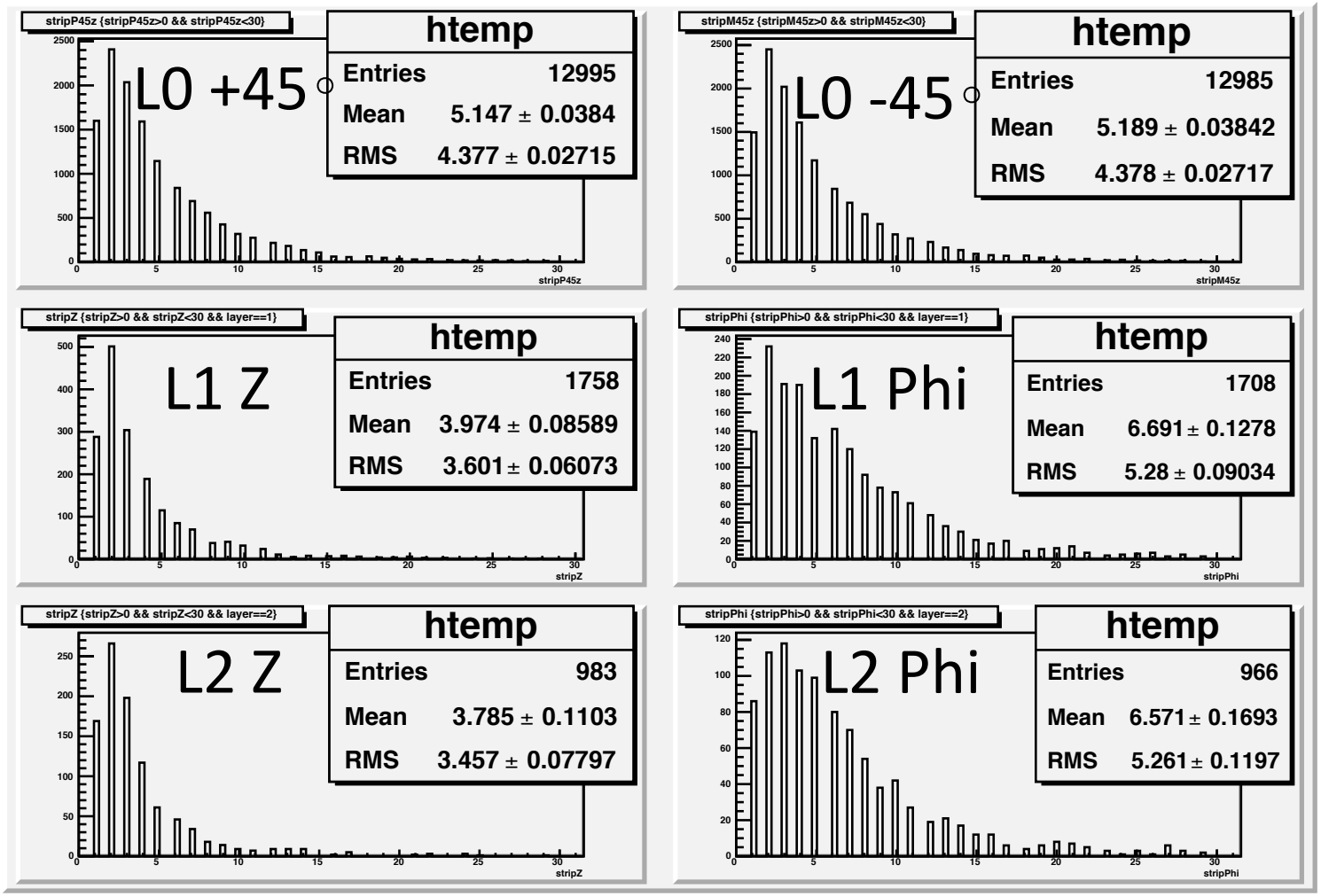
Outline

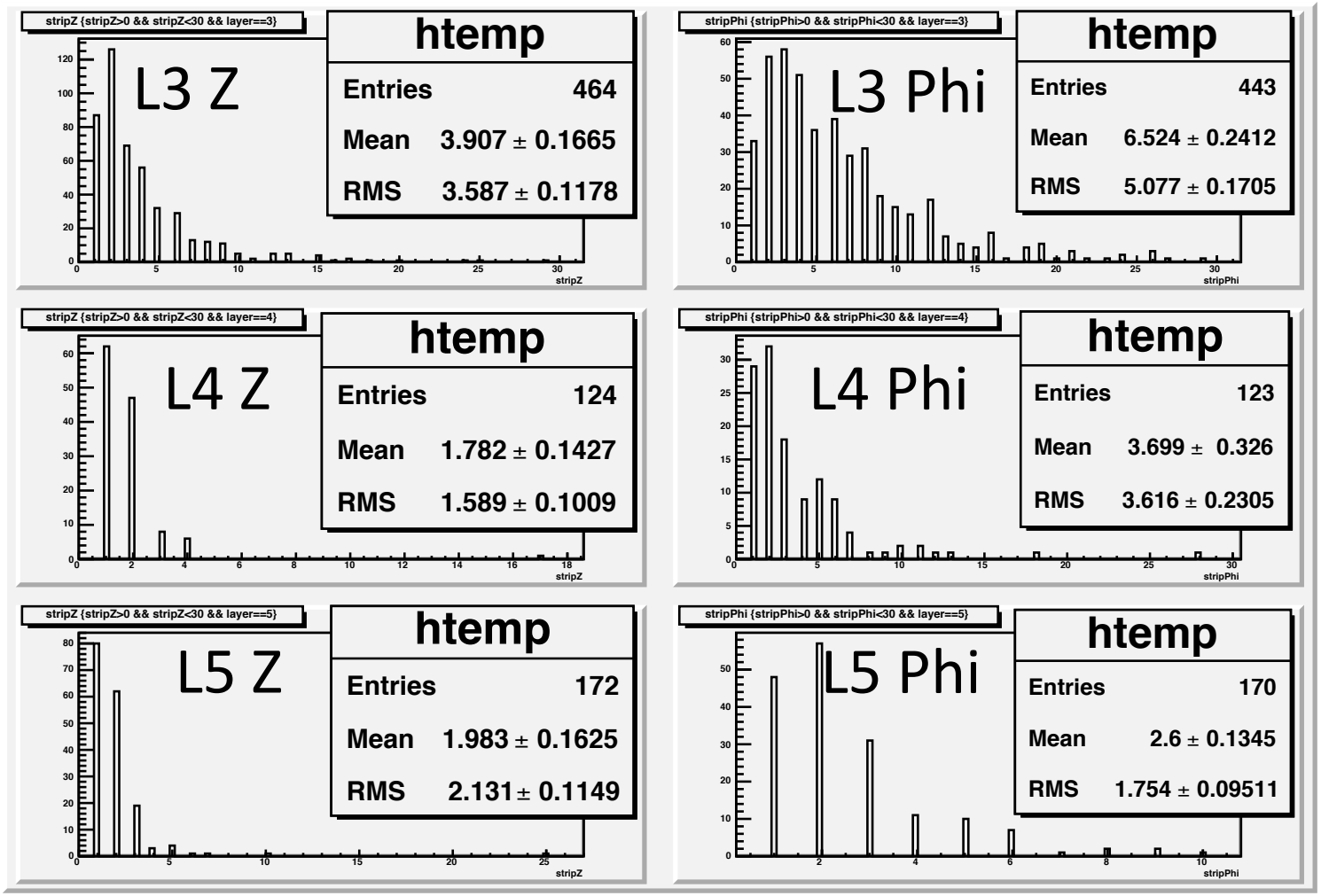
News since last meeting:

- Cross checks using Riccardo Root files ~10x ev (1.48 or 1.55? Mevents)
  - Bruno r465, geometry V12SF10, magnetic field configuration Final_focus_BField_P4_layout_DataCard.txt
- With old files (160 kevents):
  - Now also Strip multiplicity per event (before per cluster)
  - Calculation of rates

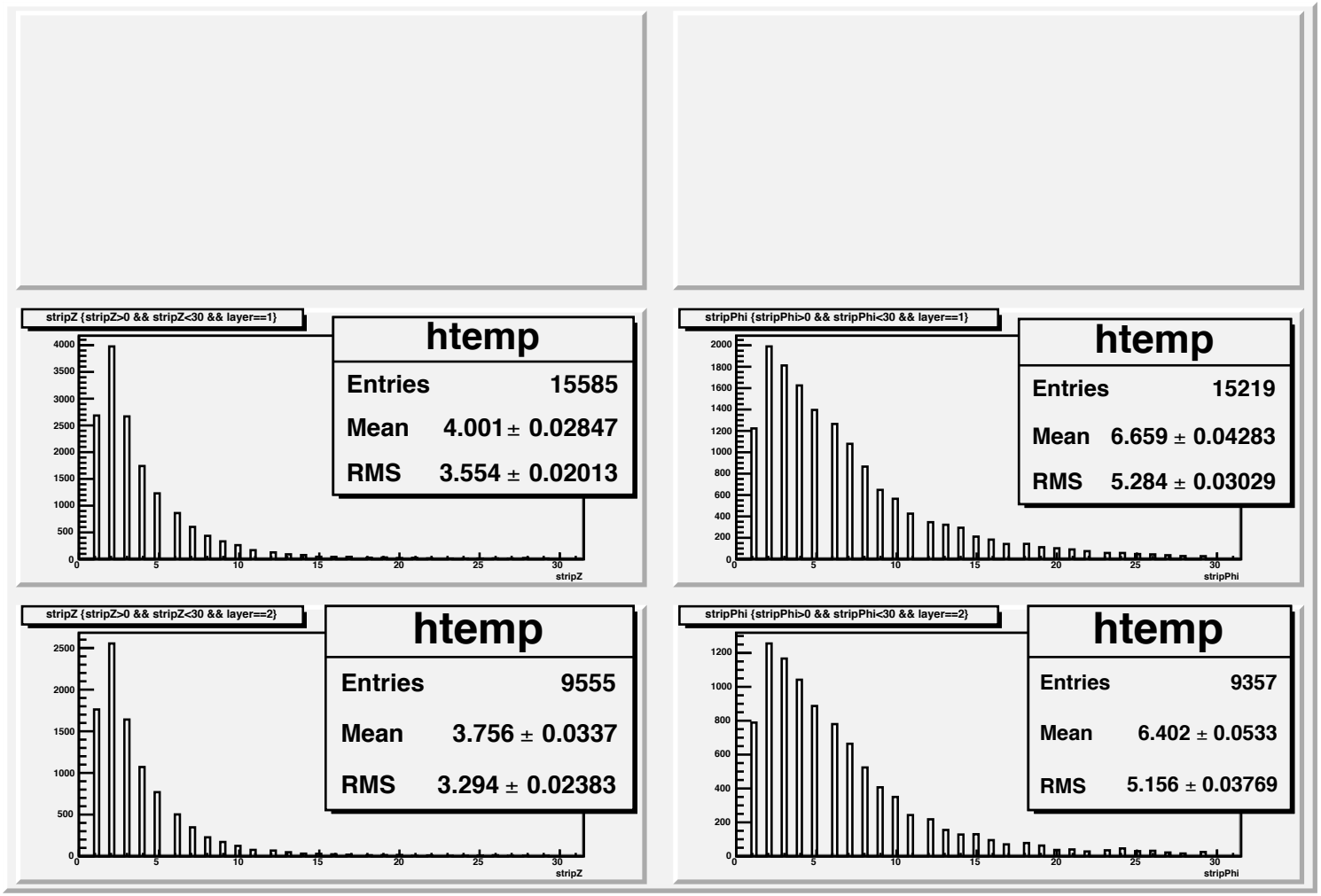
Cluster strip multiplicity e± from pairs OLD files No threshold cut



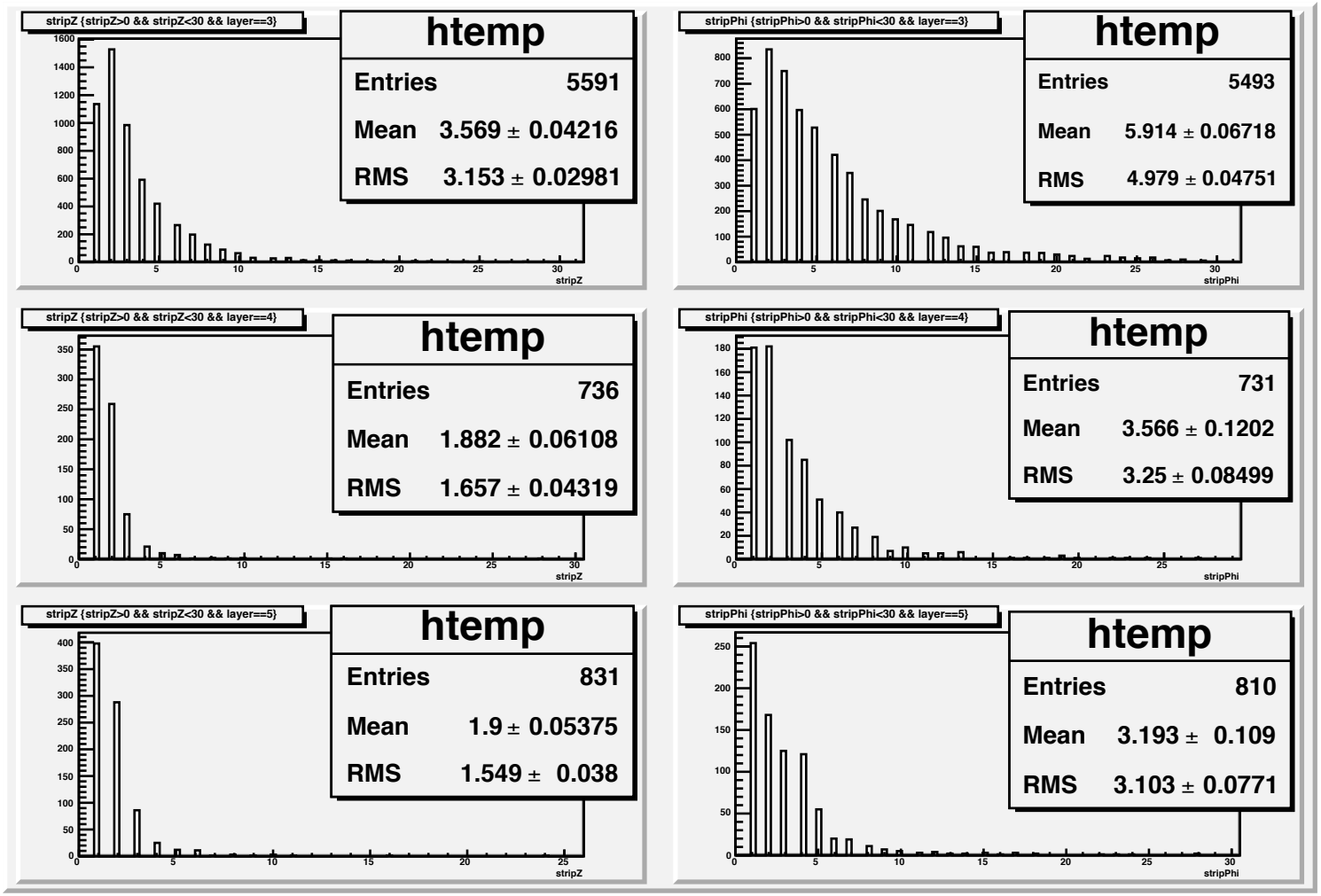
Cluster strip multiplicity e± from pairs OLD files No threshold cut



Cluster strip multiplicity e± from pairs NEW files - No threshold cut



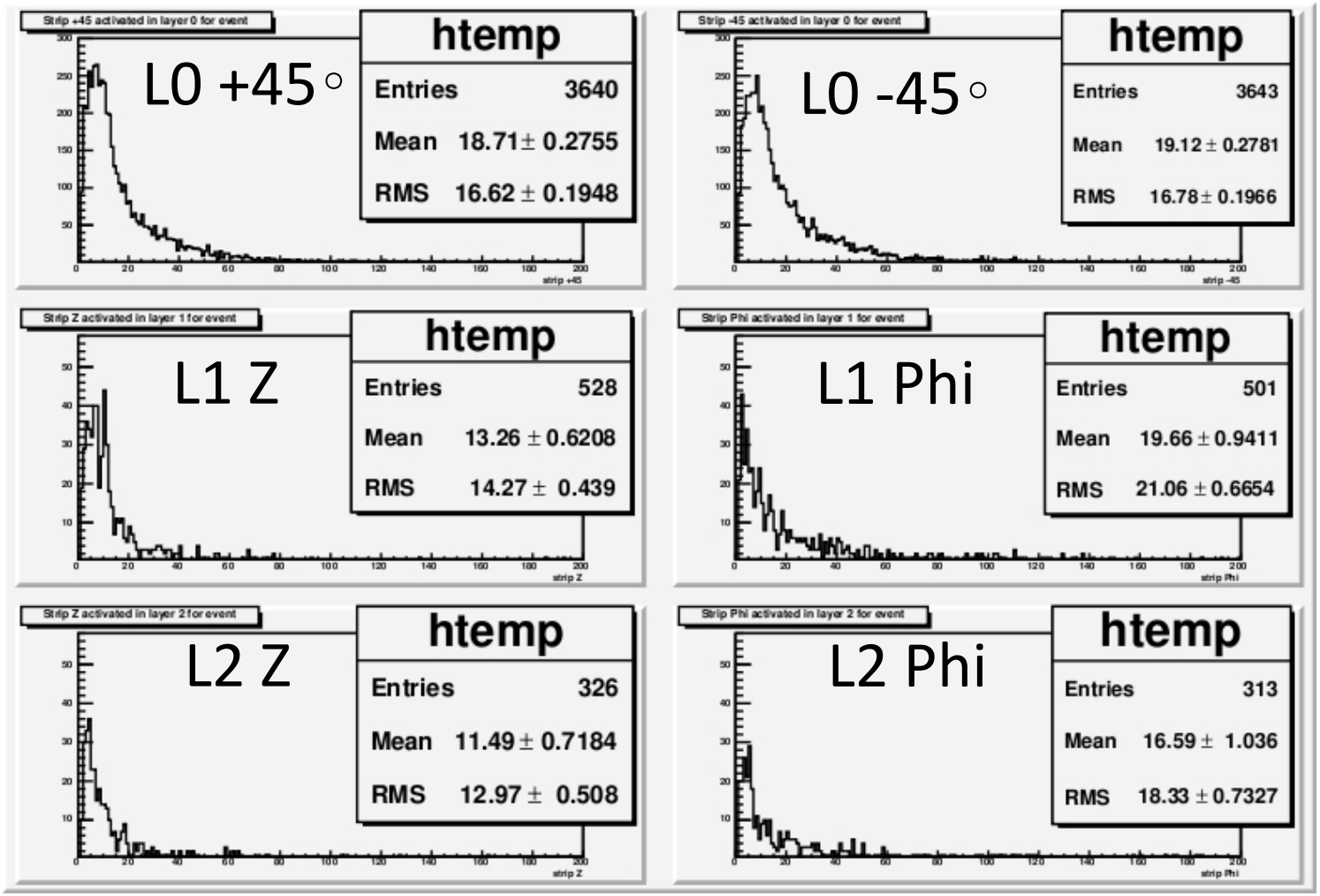
Cluster strip multiplicity e± from pairs NEW files - No threshold cut



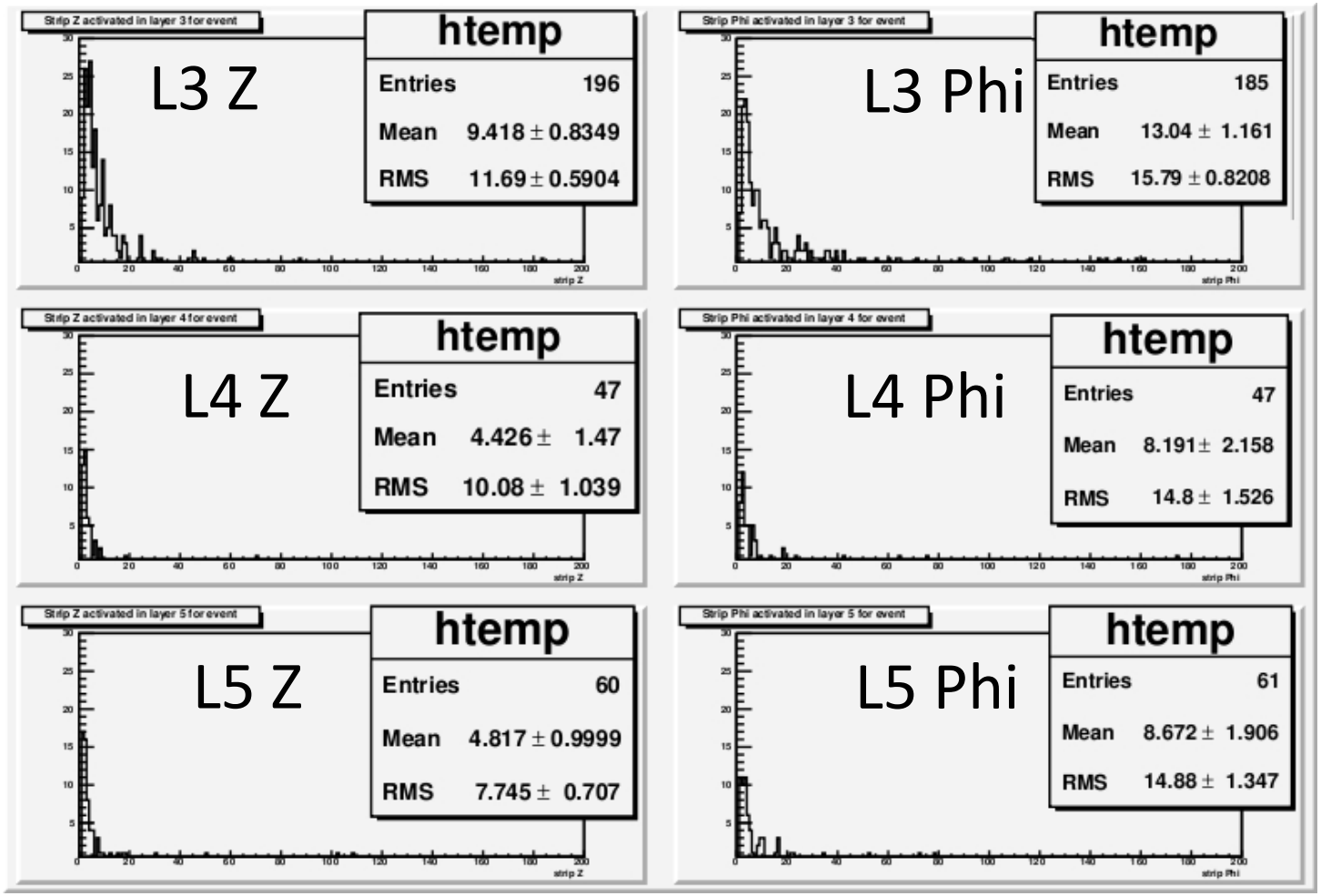
Average strip multiplicity **per Cluster** for e± from pairs OLD vs. (NEW) No threshold cut

Layer	RO PitchZ (or +45◦) µm	<n>_Z	RO PitchPhi (or -45◦) µm	<n>_Phi
0	50	5.1 (X.X)	50	5.2 (X.X)
1	100	4.0 (4.0)	50	6.7 (6.7)
2	100	3.8 (3.8)	55	6.6 (6.4)
3	100	3.9 (3.6)	55	6.5 (5.9)
4	210	1.8 (1.9)	100	3.7 (3.6)
5	210	2.0 (1.9)	100	2.6 (3.2)

Event strip multiplicity e± from pairs OLD files No threshold cut



Event strip multiplicity e± from pairs OLD files No threshold cut



Average strip multiplicity for e± from pairs **per Cluster** vs. (**per Event**) OLD files - No threshold cut

Layer	RO PitchZ (or +45◦) µm	<n>_Z	RO PitchPhi (or -45◦) µm	<n>_Phi
0	50	5.1 (18.7)	50	5.2 (19.1)
1	100	4.0 (13.3)	50	6.7 (19.7)
2	100	3.8 (11.5)	55	6.6 (16.6)
3	100	3.9 (9.4)	55	6.5 (13)
4	210	1.8 (4)	100	3.7 (8)
5	210	2.0 (5)	100	2.6 (9)

Cluster rates for e± from pairs OLD files vs. (NEW) and vs. Ric

Sorry, Work in progress

Layer	Cluster Rate kHz/cm2	Cluster Rate Riccardo kHz/cm2	Event Rates MHz
0	7.5(X.X)x10^3	6.4x10^3	166 (XXX)
1	216(X.X)	220	24(26)
2	88(X.X)	120	15 (17)
3	19(X.X)	38	9(11)
4	2.3*(X.X)	5.8	2(1.9)*
5	2.1*(X.X)	3.4	3(2.1)*

Conclusions

- Consistency checks with Riccardo new production **ok**:
  - Cluster multiplicity old vs new consistent
  - Cluster Rates in L0&L1 consistent with Riccardo
  - Need to work on new L0 geometry
- Computed also Strip multiplicity per Event (before was only per Cluster) **3X larger and with very large tails!!!**

Backup Slides

dE/dx in SVT

- Carlo Stella (diploma student) is studying dE/dx in the 6 double layers of SVT
- Study was driven by FSSR2 (that provides a 3-bit ADC information for each recorded hit)
- We are using full simulated events BRUNO (with 200 μm cylindrical Layer0)
  - e+e-e+e- (pairs) 160k events
  - Single particle (momentum distributions as inclusive *soft π's* from ϒ(4s) and cc) 50k

Pseudo Digitization procedure

- Require particle identity (abs(SVTHits.pdg)==11 pairs, 211 π)
- 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 dE_i
- First & last strip has random

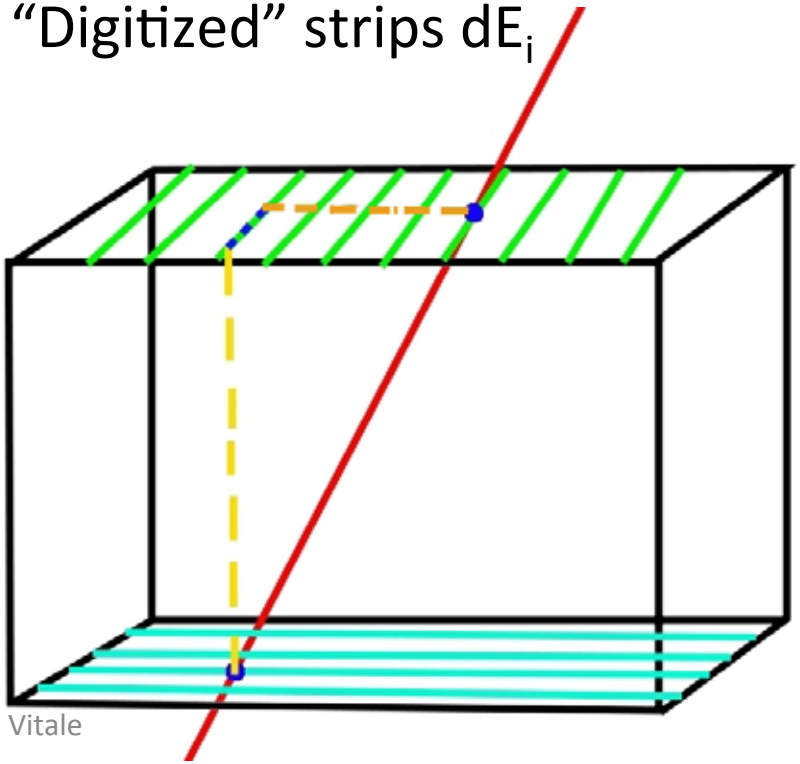
flat dE_i, the others the same

- Smear dE_i with gaussian
- Apply two sets of thresholds

on dE_i (=each strip):

2880 e- 0.18(0.12)MIP-L0(L1-5)

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



CAVEAT

- In Frascati we had a Bug in Strip multiplicity (thr. was not applied on mult, dE/dx was ~ok)
- Old BRUNO version (2-3 months ago) with some modifications (Active silicon in L0)
- Neglect soft photons (probably below thr?)
- No Landau fluctuations per strip (Landau only per global
- Path Δx is assumed straight
- Low stat for pairs in external layers (4-5)
- Mean is truncated at 30