HEIC-Cube data analysis

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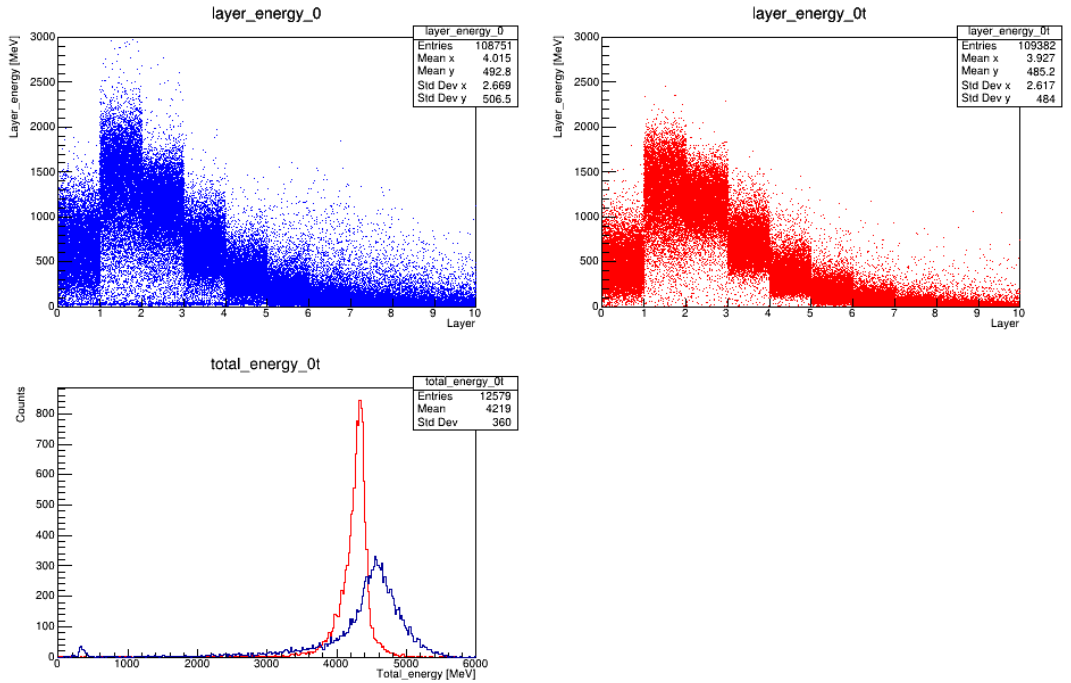
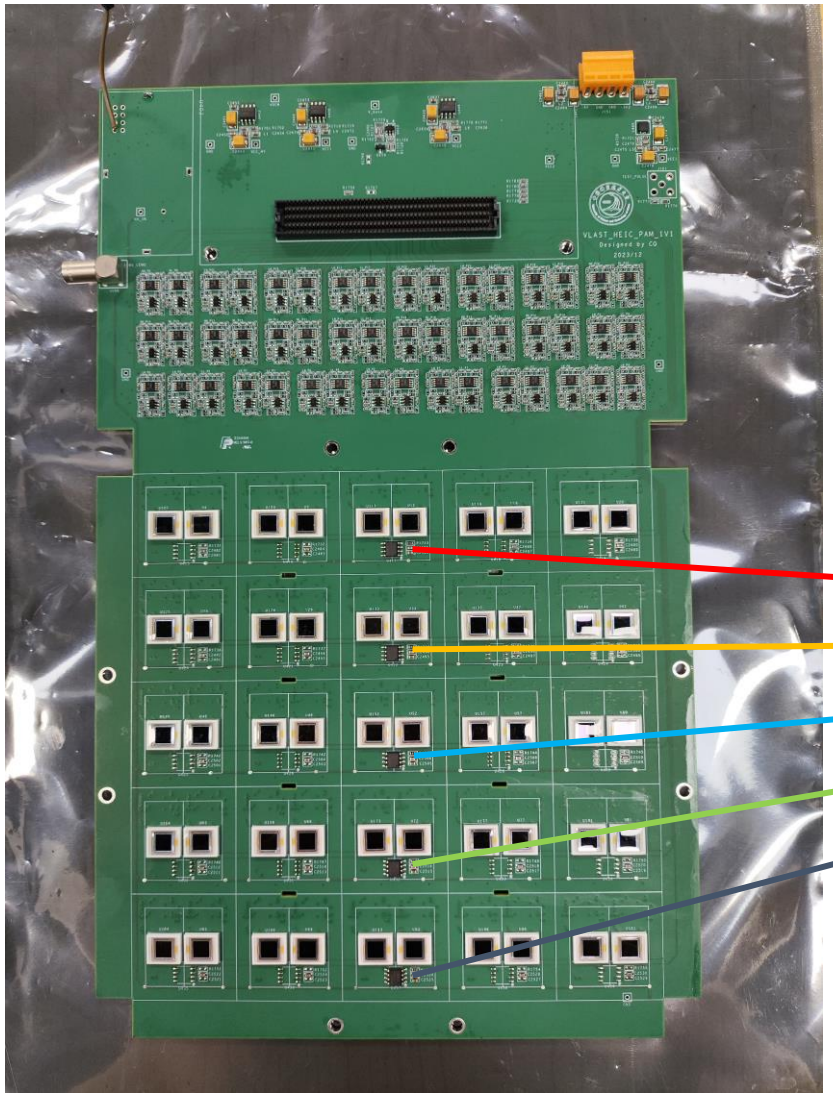
2025.05.12

Outline

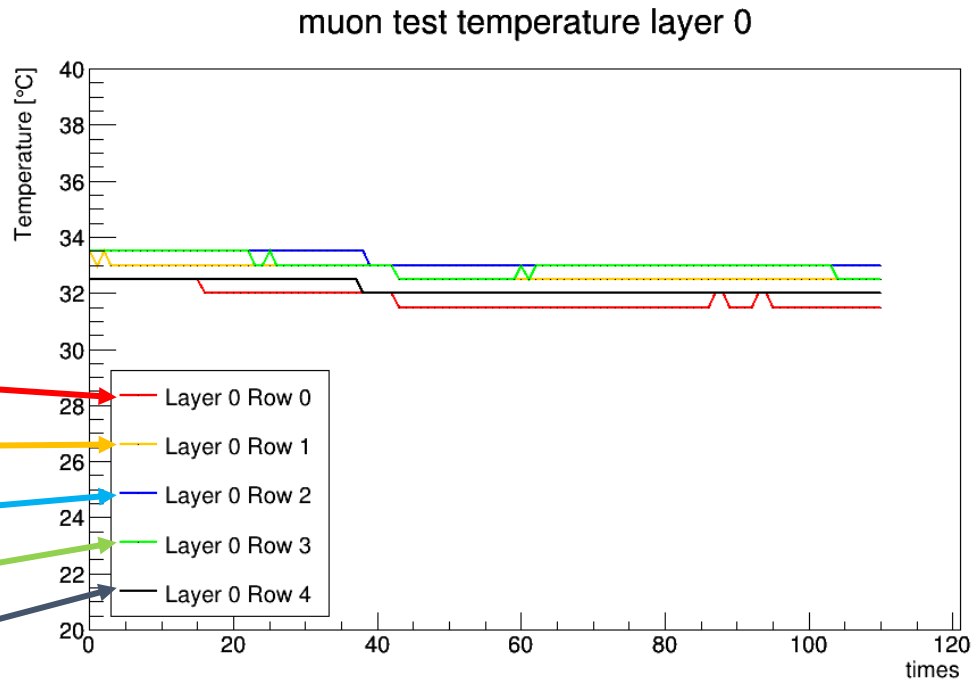
- 模拟结果与束流数据之间差距的原因；
- 利用径迹信息做事例筛选；



Temperature – 5GeV muon

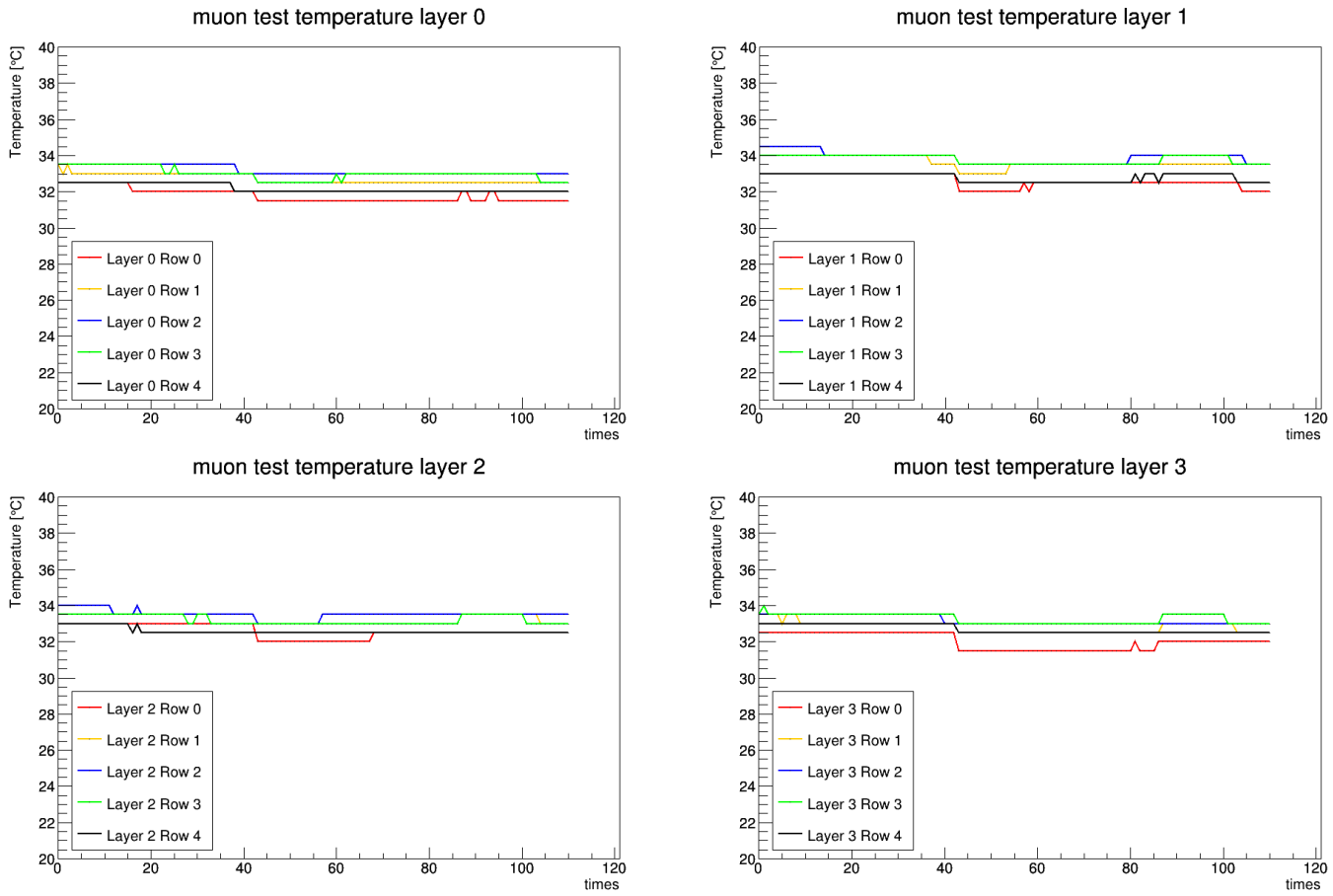


RunID20140+142+143+144+145+330+332+335



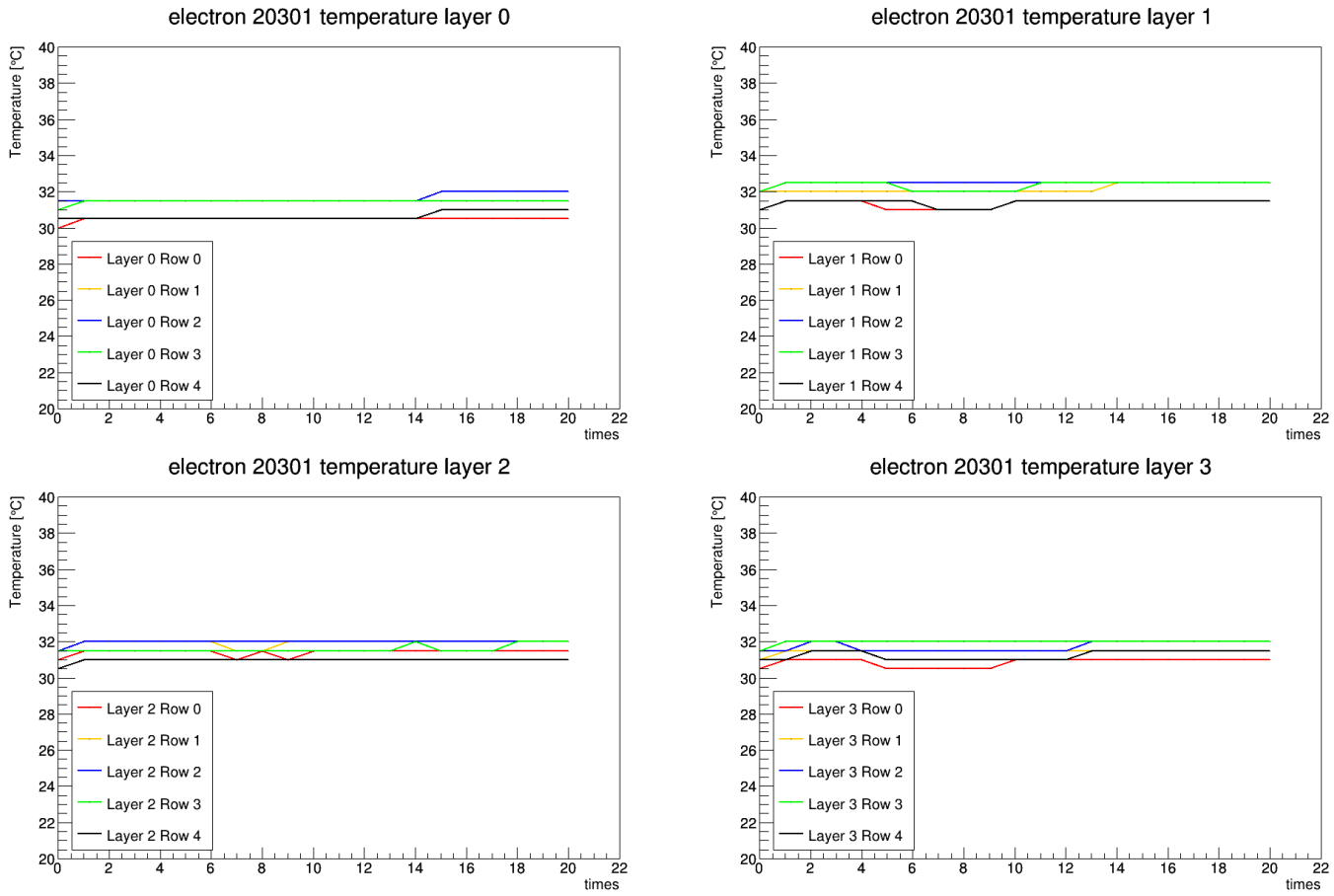
5分钟保存一次，平均温度：33℃

Temperature – 5GeV muon



平均温度：33℃

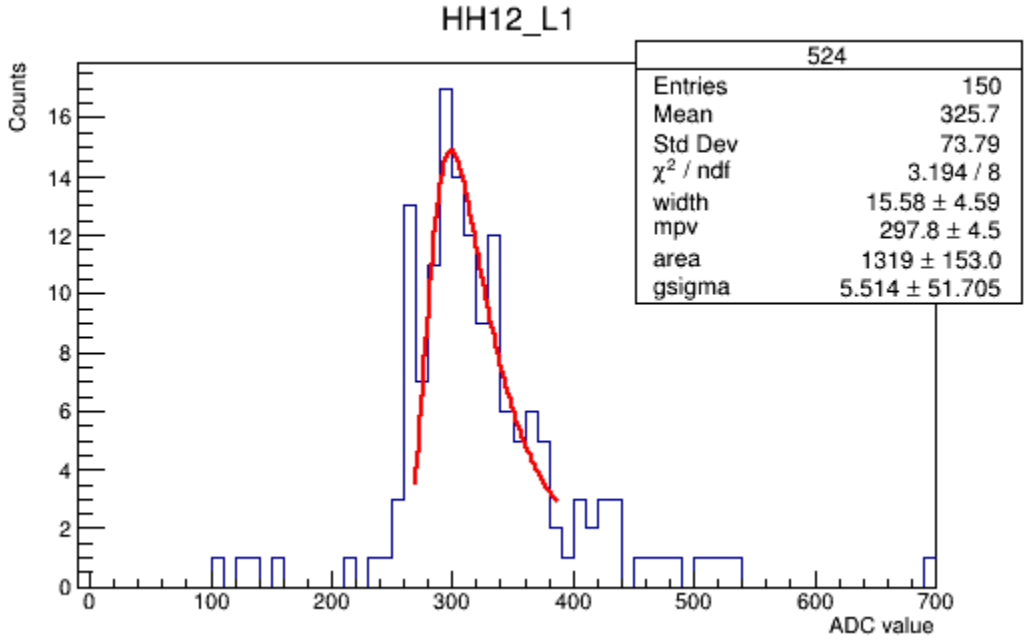
Temperature – 5GeV electron



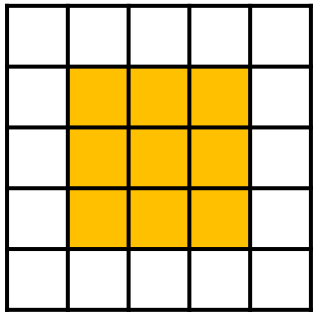
平均温度：31℃，比 muon 低 2℃，影响 **~ 5 %**

MIPs in 5GeV electron RunID20301

- MIPs 筛选条件：
  - 选取无衰减片高增益通道（HH），要求 ADC > 25;
  - 每层有 1 或 2 个 通道被击中；
  - 前3层中至少2层有信号，前6层中至少3层有信号；
- ~ 2000 events；

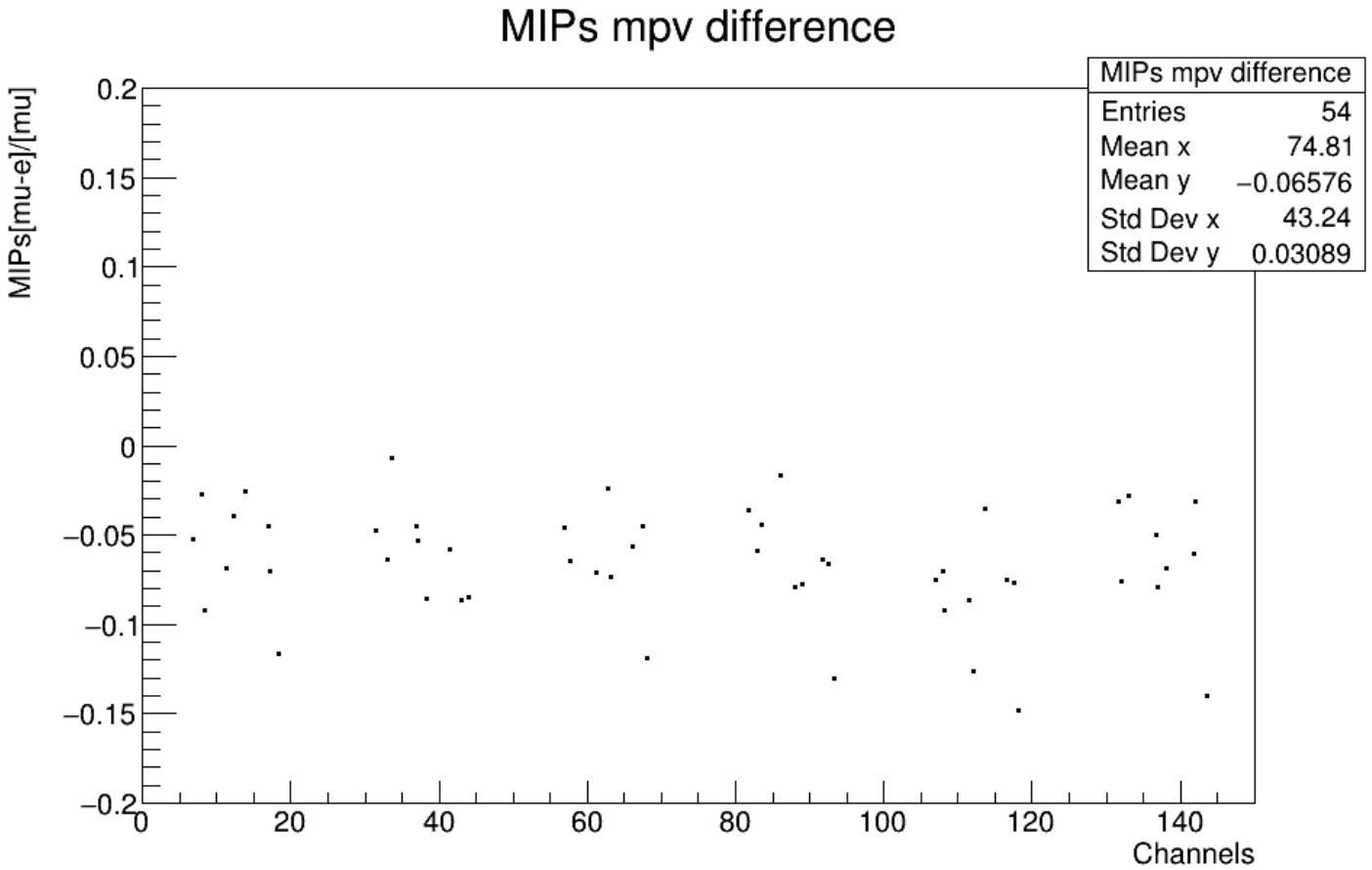


MIPs difference

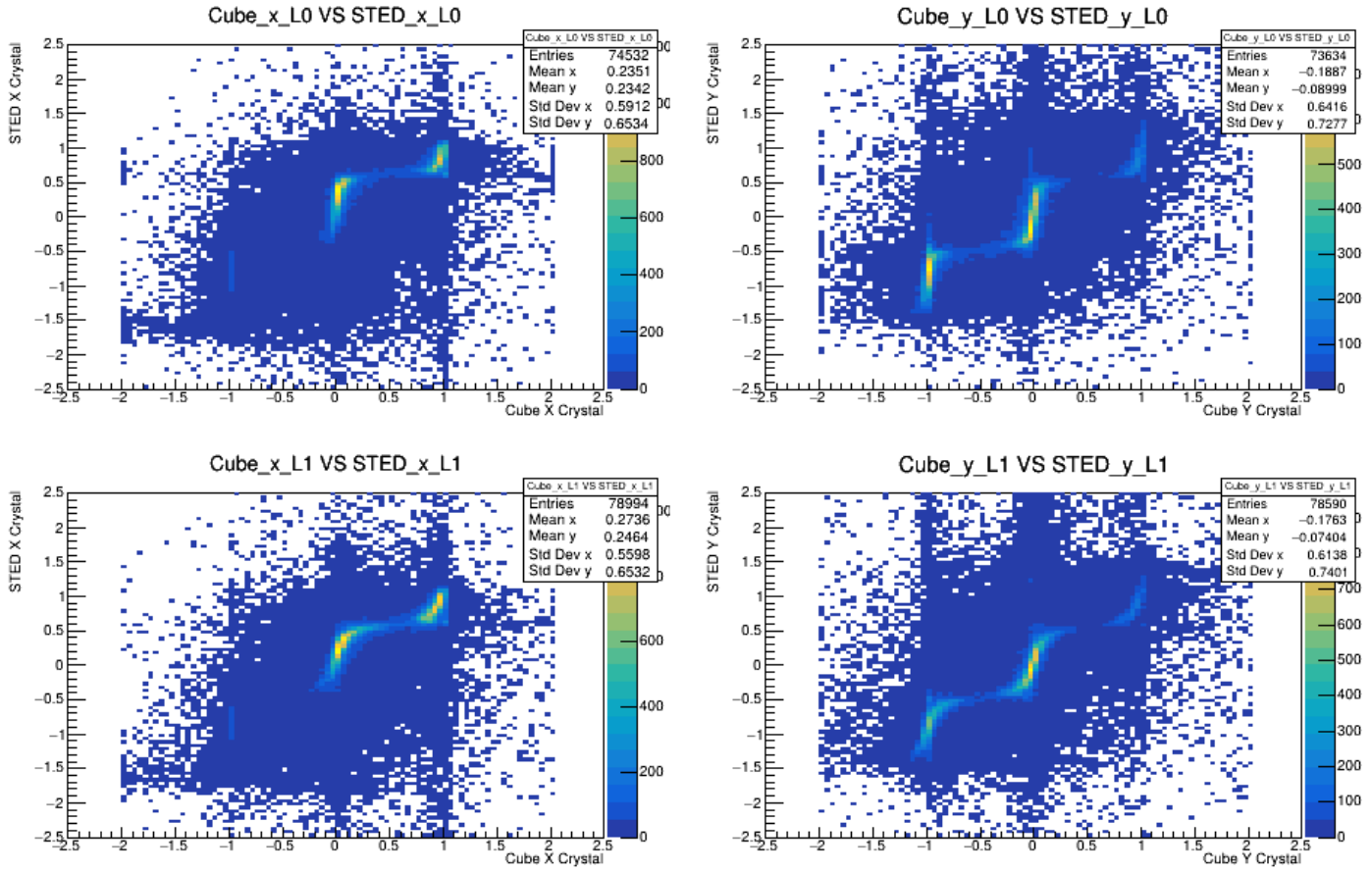


$$\frac{mpv[mu] - mpv[e]}{mpv[mu]}$$

~ 5 %

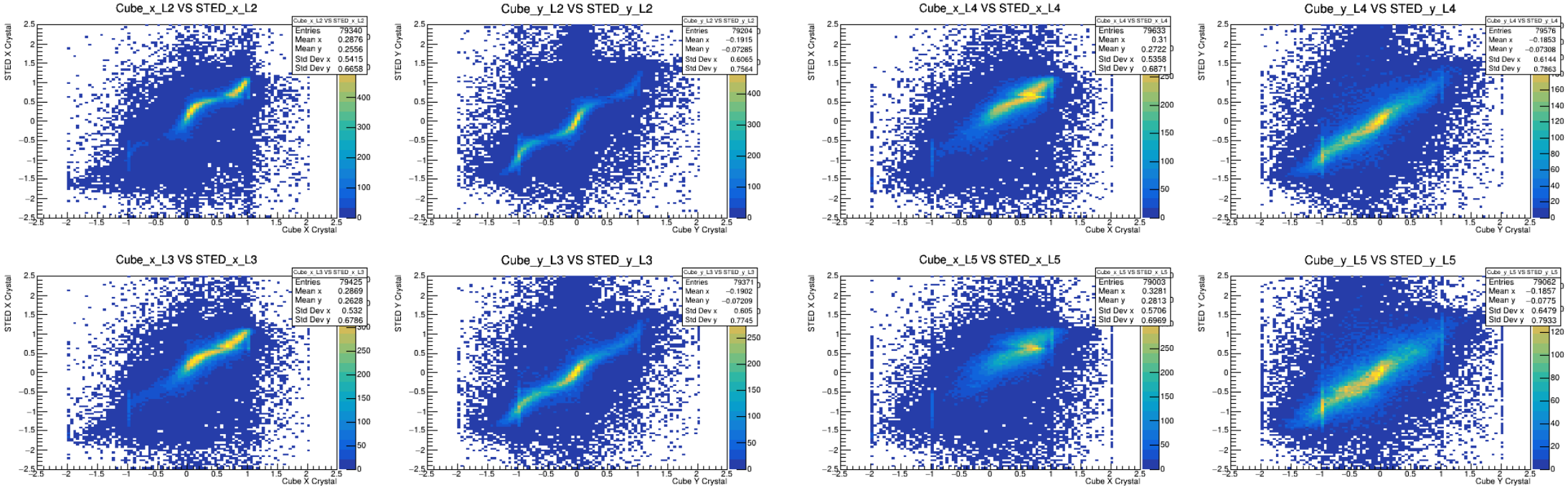


Cube VS STED consistency



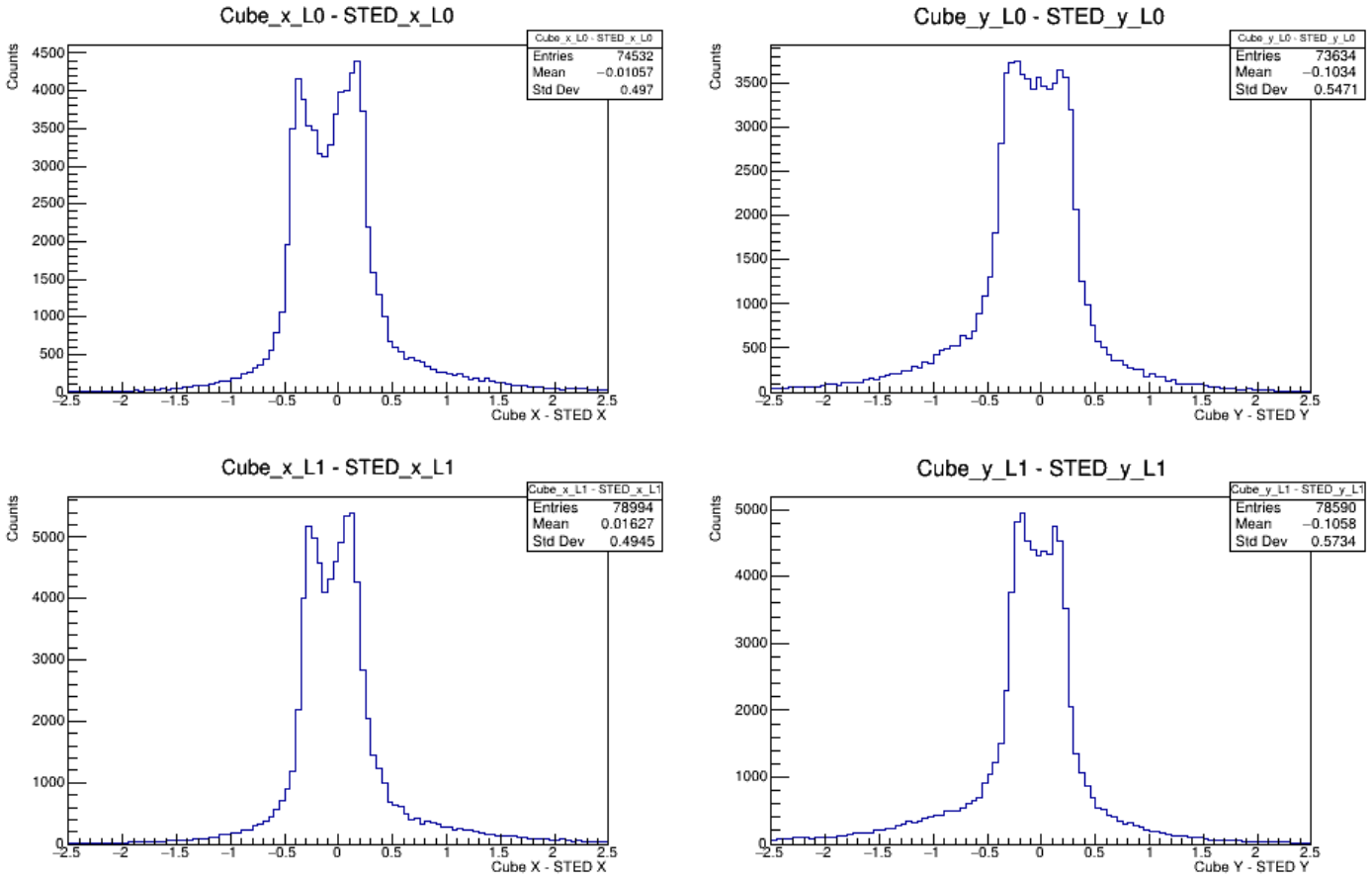
Blue: beam test, RunID20301

Cube VS STED consistency



Blue: beam test, RunID20301

Cube barycenter minus STED extrapolation



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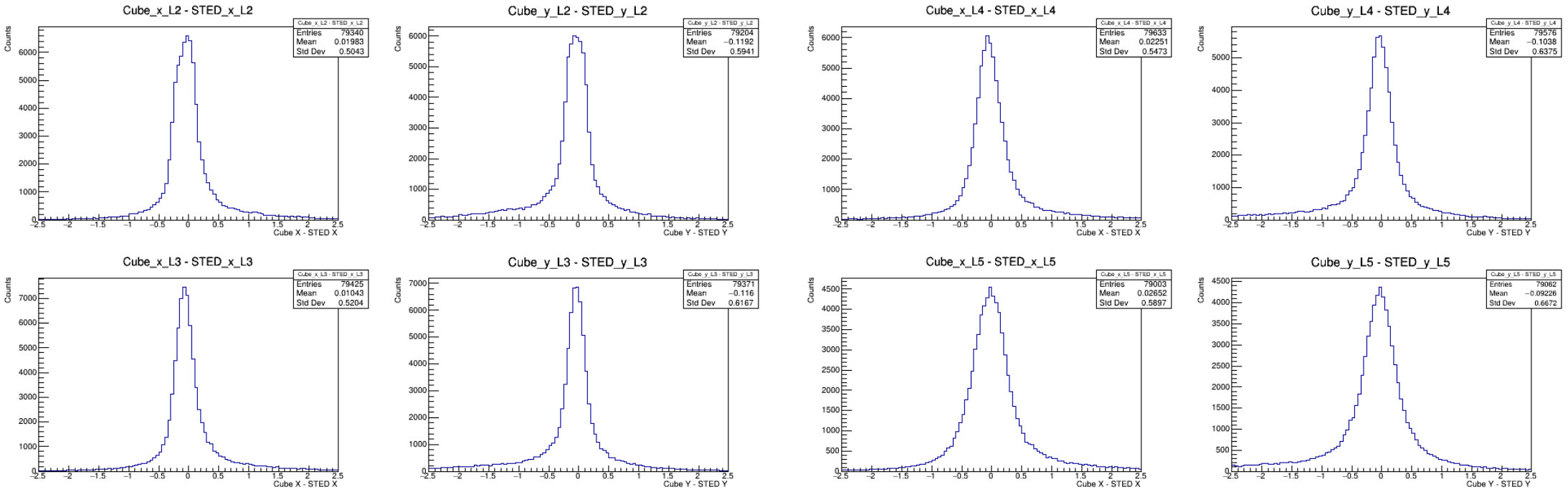
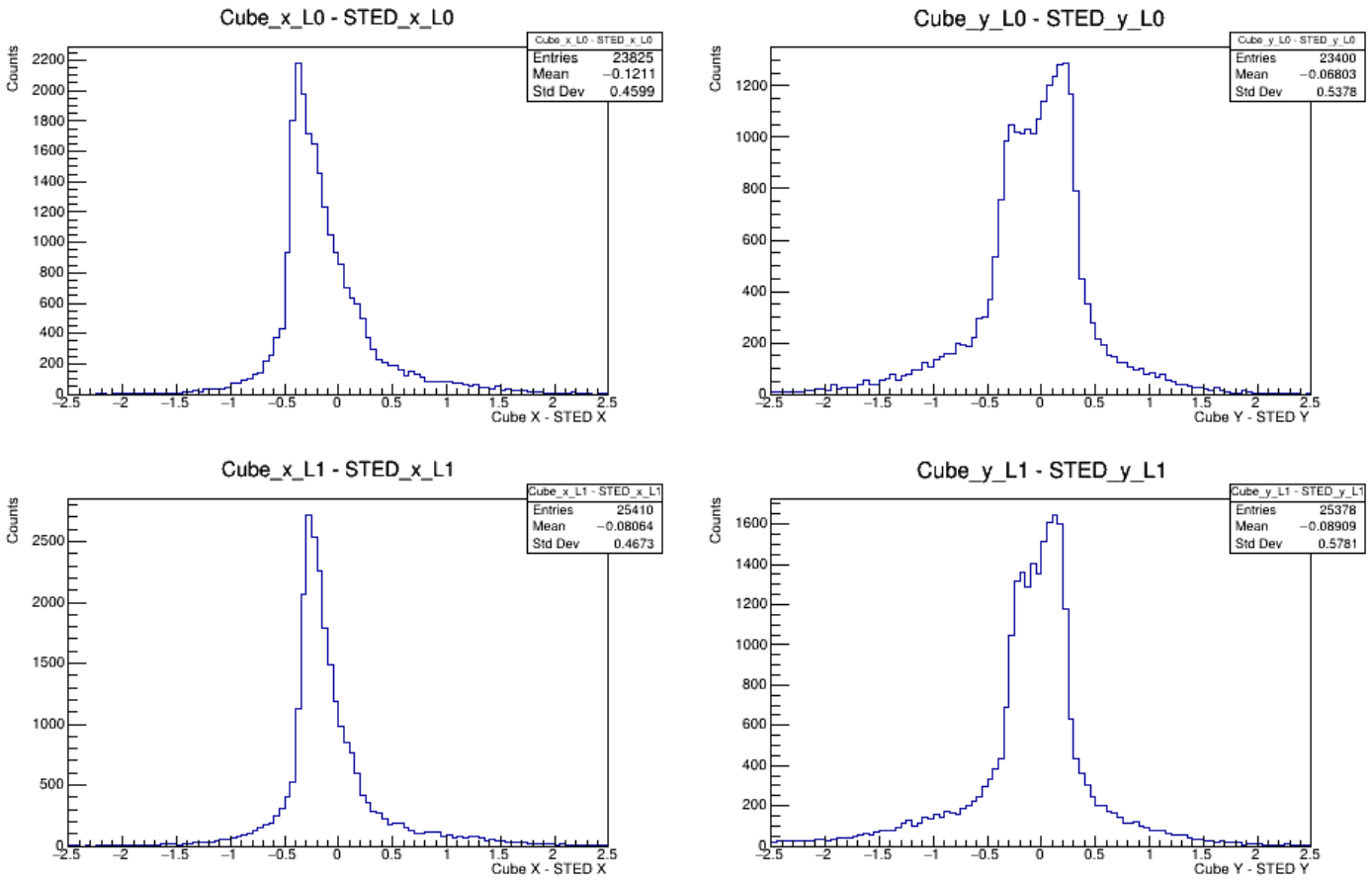
Cube barycenter minus STED extrapolation



Blue: beam test, RunID20301

Cube barycenter restrict to (-0.5,0.5)



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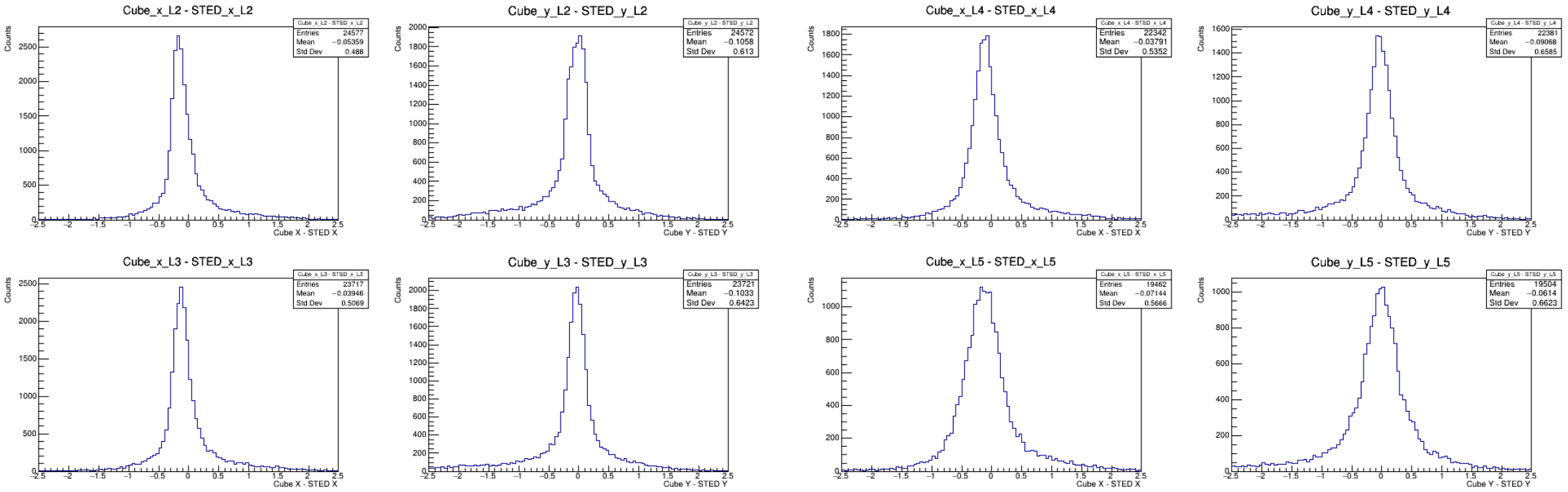
Cube barycenter restrict to (-0.5,0.5)



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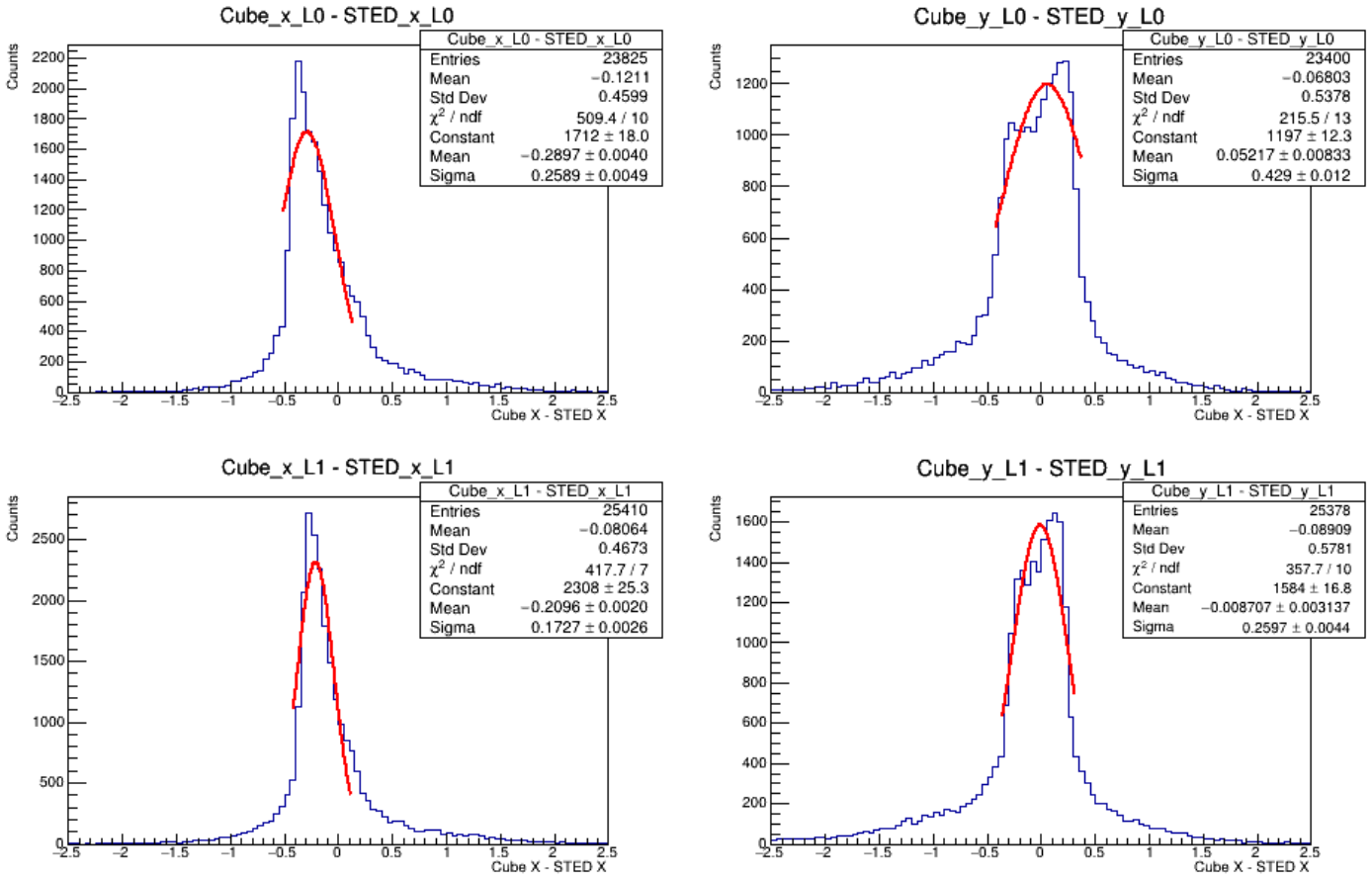
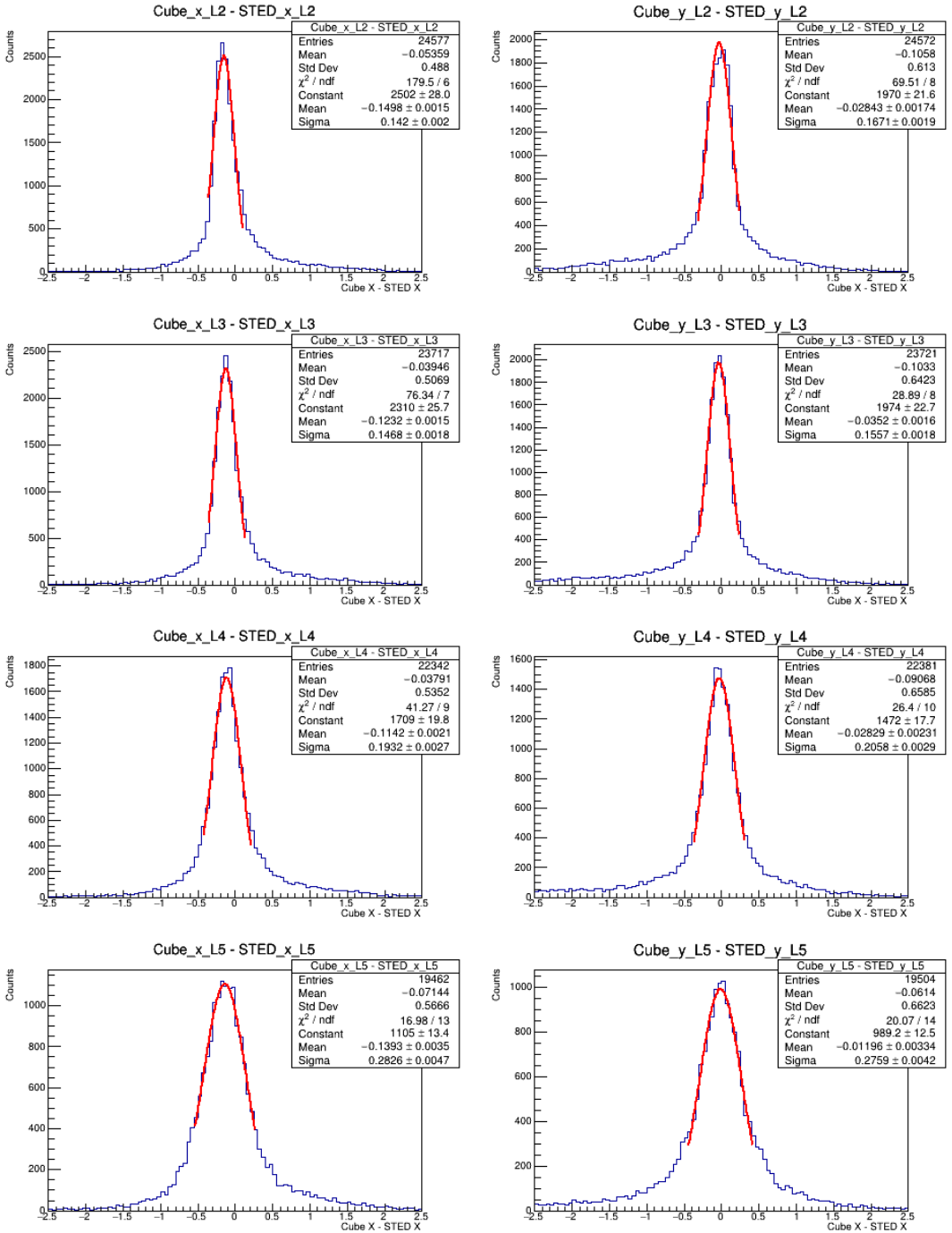
Cube barycenter minus STED extrapolation



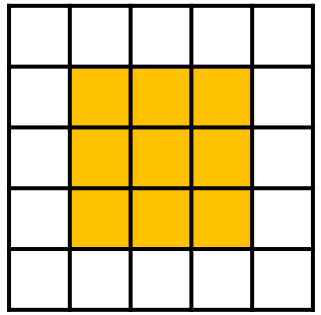
Blue: beam test, RunID20301

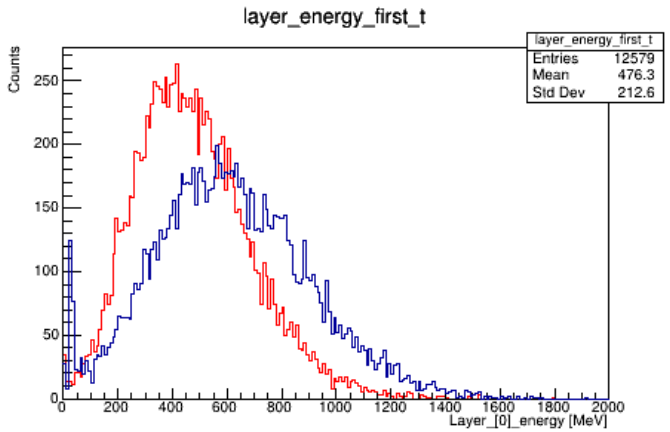


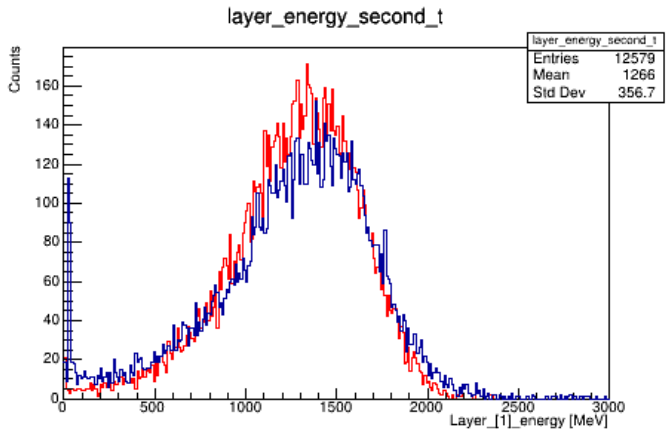
layer	X direction		Y direction	
	mean [mm]	sigma [mm]	mean [mm]	sigma [mm]
0	-9.443	8.440	1.701	13.985
1	-6.832	5.630	-0.284	8.467
2	-4.884	4.629	-0.927	5.449
3	-4.017	4.787	-1.148	5.077
4	-3.724	6.297	-0.922	6.710
5	-4.540	9.214	-0.390	8.993
6	-6.720	10.853	-0.087	11.351
7	-7.891	10.439	0.766	11.731
8	-9.019	8.818	-0.102	10.865
9	-9.728	8.782	0.757	10.407

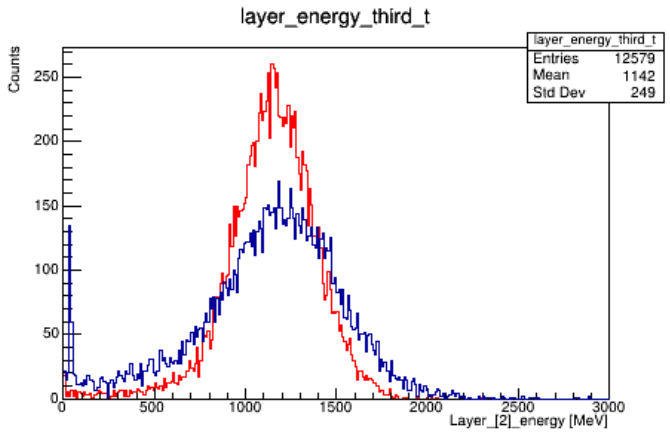
Blue: beam test, RunID20301
STED: X - 5 mm, Y - 1 mm

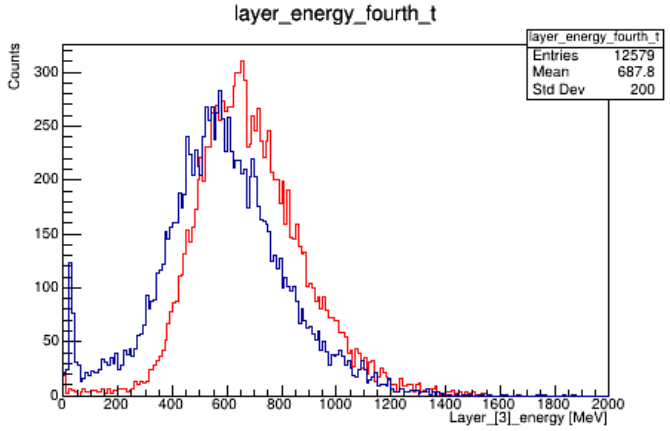
MIPs calibration update

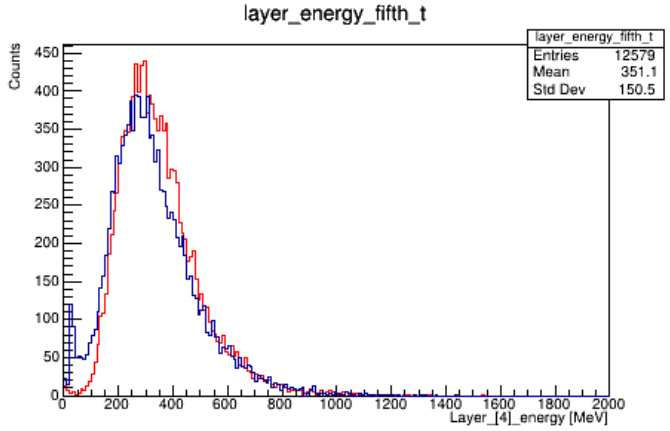


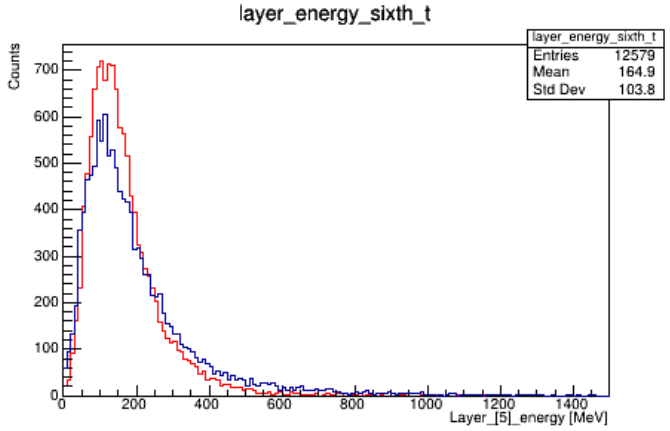






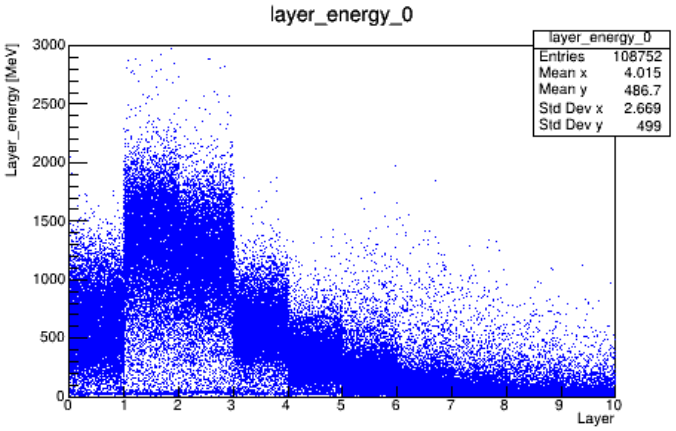


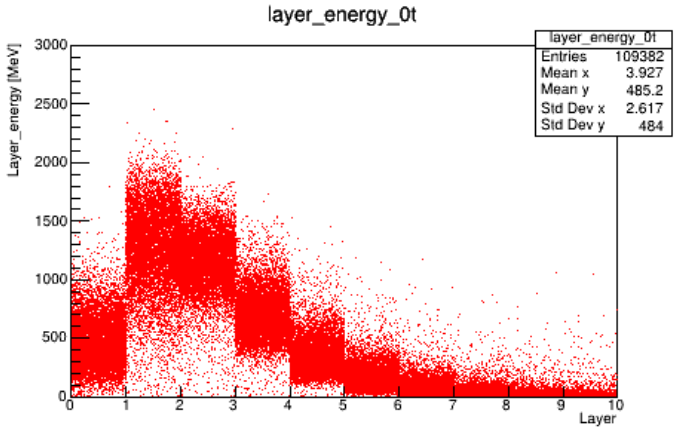


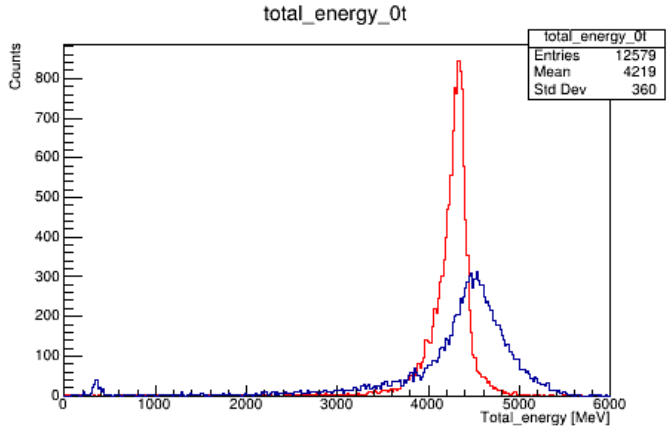


Blue: beam test, RunID20301; Red: simulation, entire prototype

MIPs calibration update







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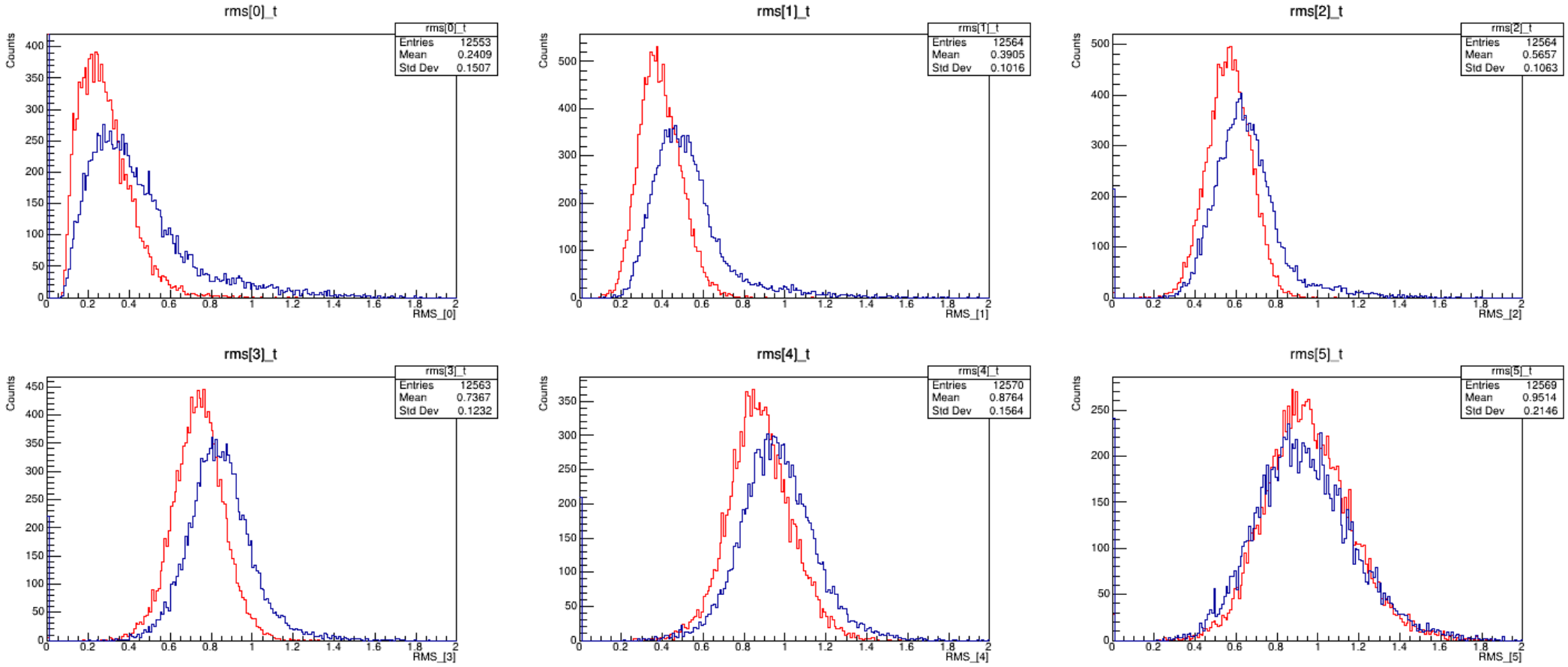
Energy distribution diverge



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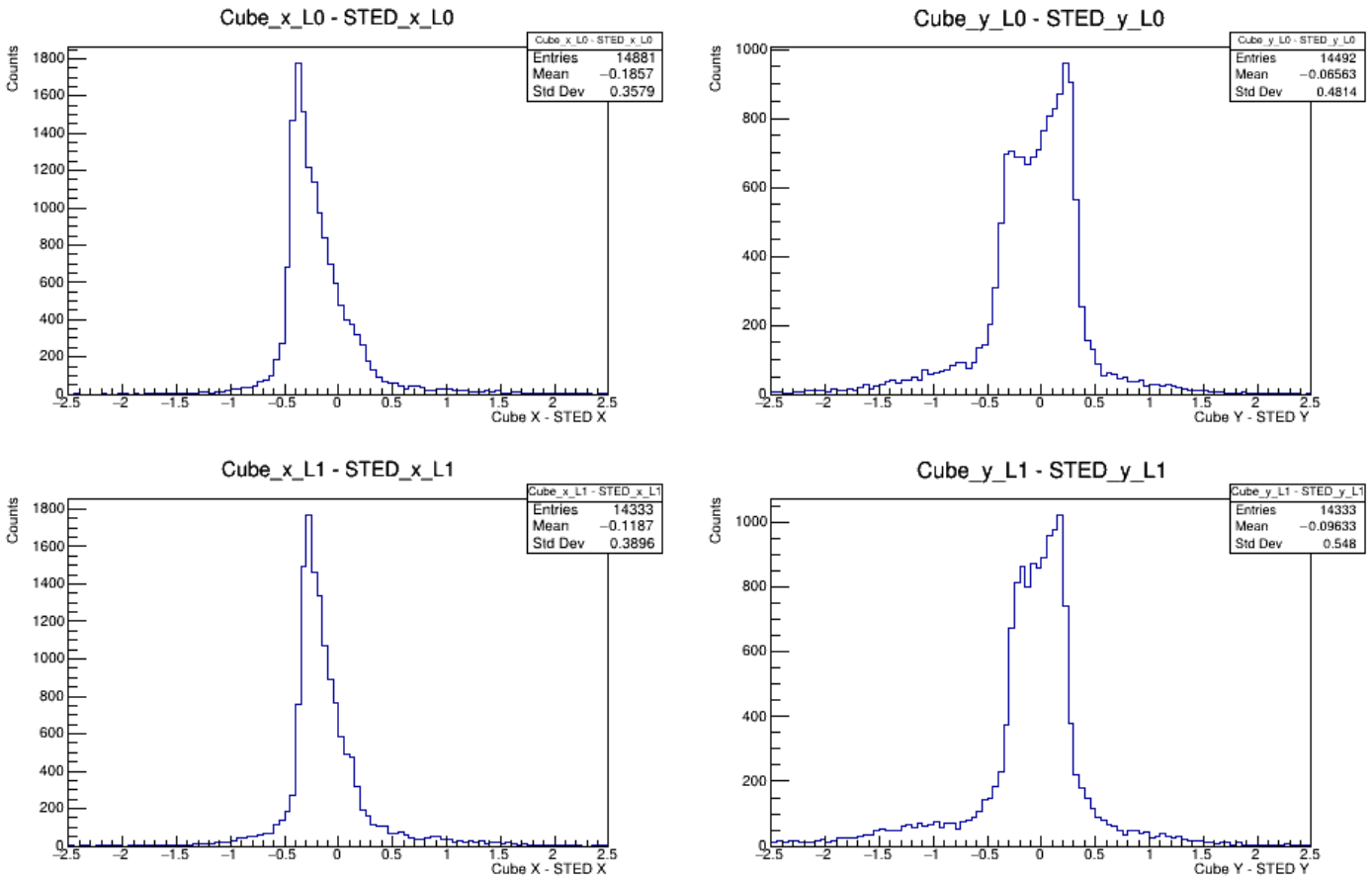
Cube barycenter restrict to (-0.2,0.2)



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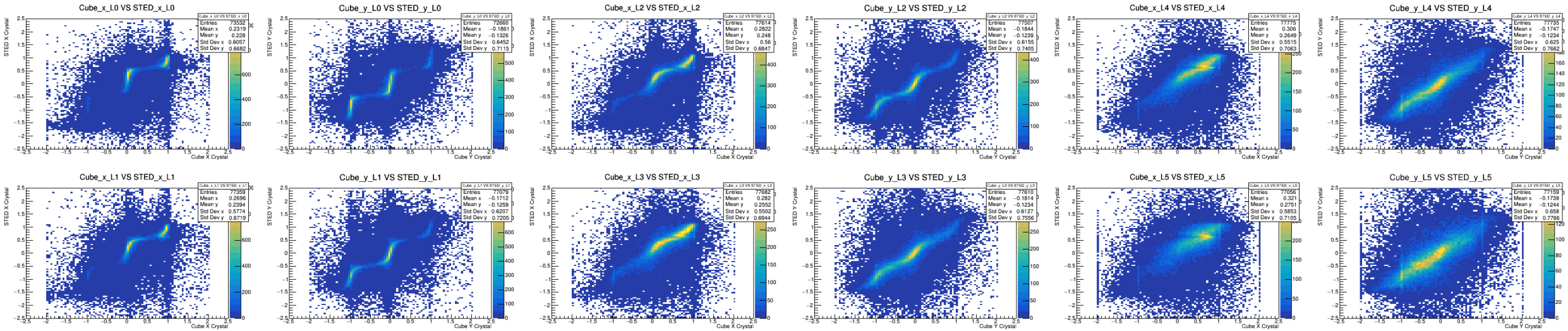
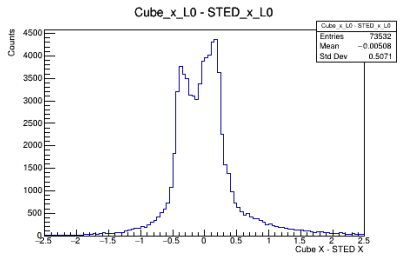
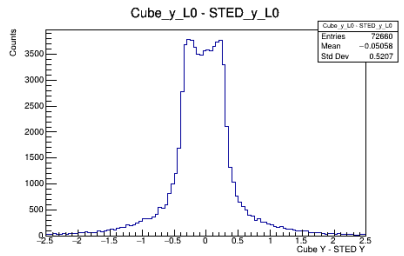
Cube VS STED consistency

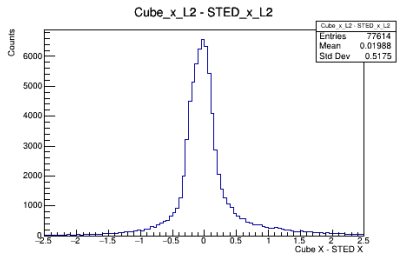


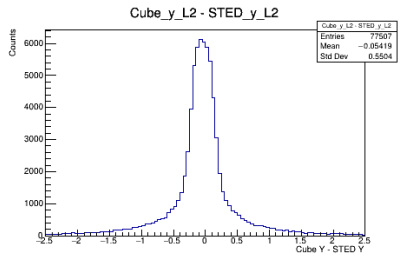
Blue: beam test, RunID20106

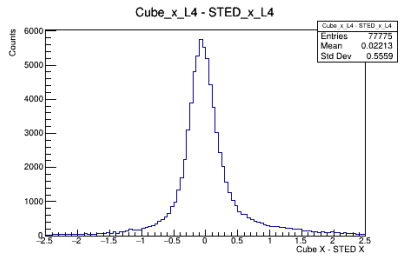
Cube barycenter minus STED extrapolation

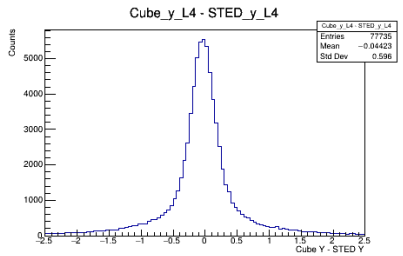


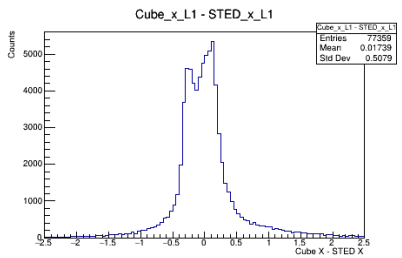


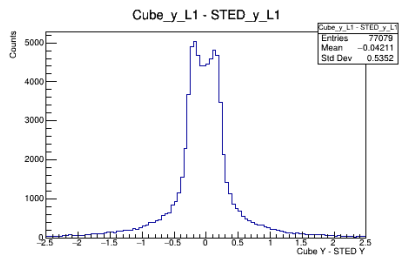


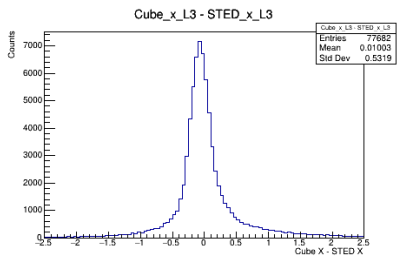


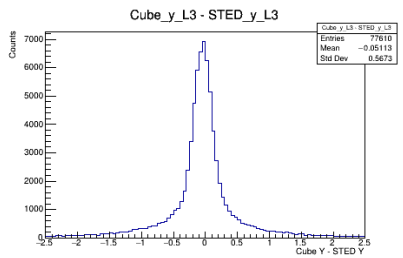


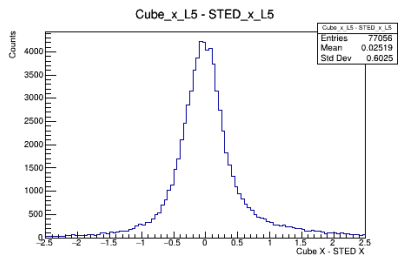


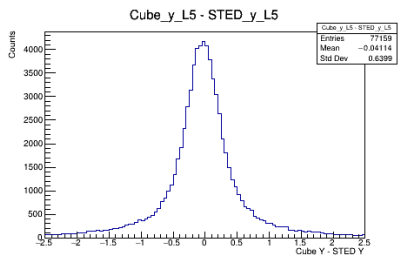












Blue: beam test, RunID20106