Task Timing Studies

	Avg time/ev (s)		Trk-weight avg time/ev (s)	
	Real Time	CPU Time	Real Time	CPU Time
PSA	3.407 (62.7%)	2.785 (66.9%)	4.142 (58.0%)	3.32 (60.7%)
HitClustering	0.221 (4.1%)	0.098 (2.4%)	0.383 (5.4%)	0.171 (3.1%)
SM	0.012 (0.2%)	0.002 (0.0%)	0.014 (0.2%)	0.004 (0.1%)
RiemannTracking	1.795 (33.0%)	1.276 (30.7%)	2.6 (36.4%)	1.972 (36.1%)
Total time	5.435	4.161	7.139	5.467

Inside PSATask

	Avg time/ev (s)		Trk-weight avg time/ev (s)	
	Real Time	CPU Time	Real Time	CPU Time
PSATask	3.407	2.785	4.142	3.32
PSA Analyzer	3.223	2.667	3.32	3.128

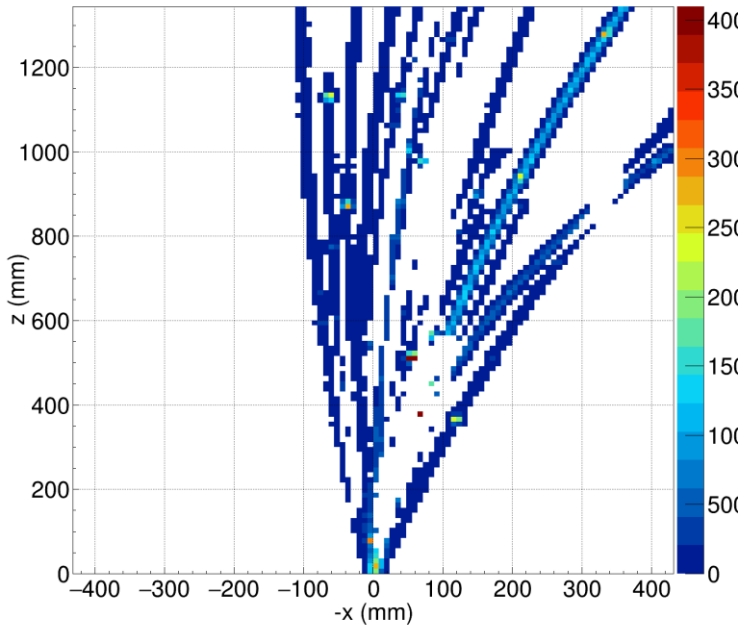
- We already waste 0.8 s (~20% of real time) between starting the PSATask and the PSAAnalyzer → removing the logger printouts will partially take care of this
- One simulated event with 175 particle tracks hits 8800 pads
  - Average time spent to analyze one pad: ~0.4ms
  - Average time spent to analyze the event: ~3.5s

- We need to lower this by a factor or 10 ☹

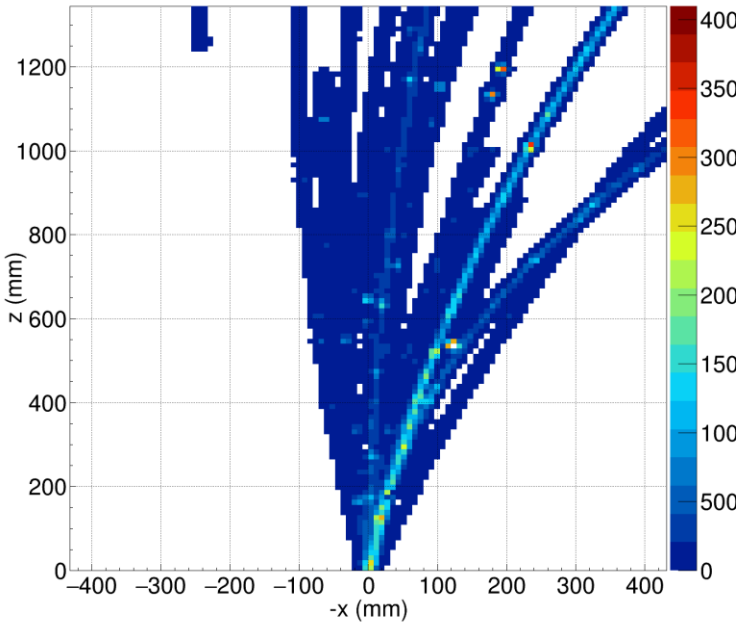
Drastic Solution

- We look for pads with only one peak and compare

1 hit per pad



original



Task Timing Studies for 1 Hit/Pad

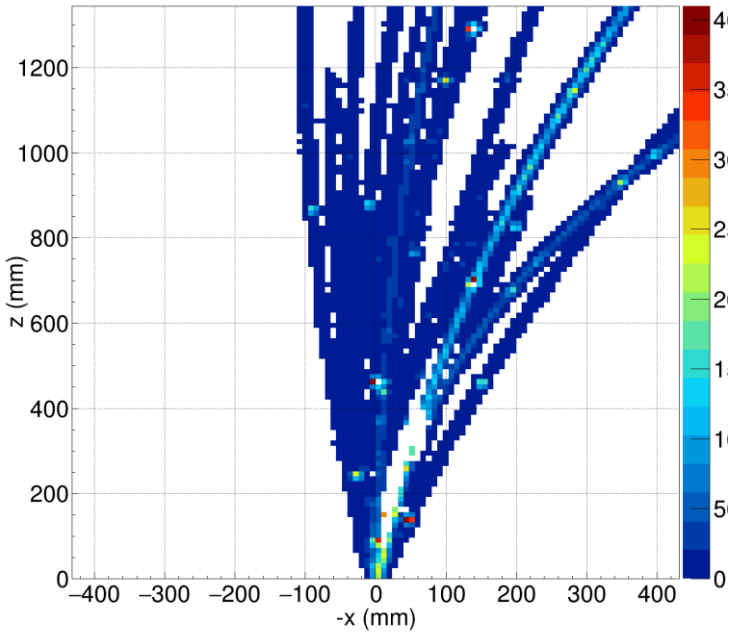
	Avg time/ev (s)		Trk-weight avg time/ev (s)	
	Real Time	CPU Time	Real Time	CPU Time
PSA	4.092	3.001	4.632	3.5
HitClustering	0.024	0.013	0.034	0.016
SM	0.01	0	0.01	0
RiemannTracking	0.628	0.298	0.668	0.316
Total time	4.754	3.312	5.344	3.832

- Reduction of the total reconstruction time by 25% (mostly RiemannT)
- Loss in track definition in the higher density regions (closer to vertex)
- The speed of PSA can be improved with c.o.g. algo (to be done)

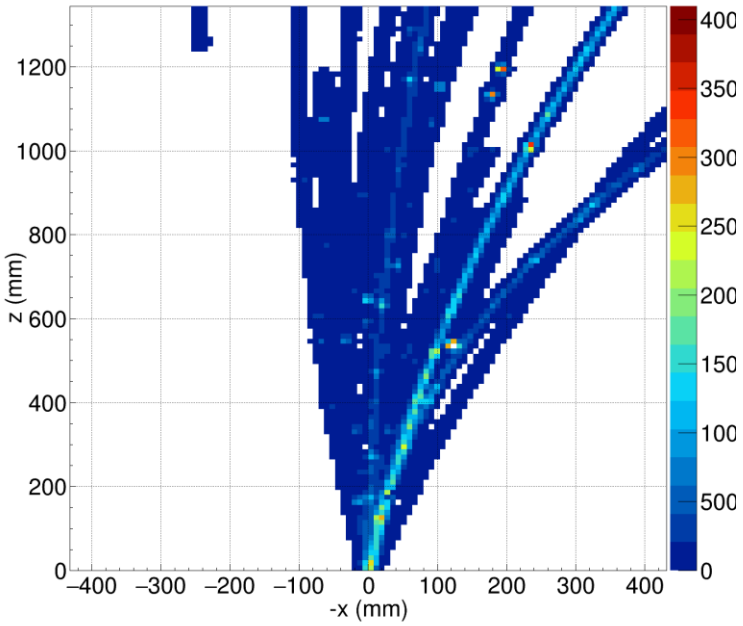
Less Drastic Solution

- Pads with 1 or 2 pulses

1 or 2 hits per pad



original



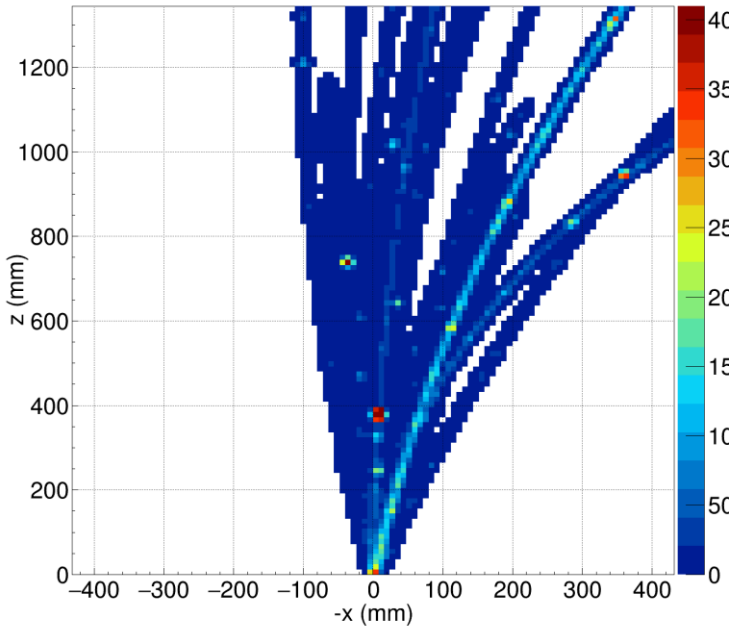
Task Timing Studies for 1-2 Hit/Pad

	Avg time/ev (s)		Trk-weight avg time/ev (s)	
	Real Time	CPU Time	Real Time	CPU Time
PSA	4.070	2.932	4.721	3.437
HitClustering	0.098	0.042	0.119	0.053
SM	0.01	0	0.01	0
RiemannTracking	1.413	0.849	1.707	1.049
Total time	5.591	3.823	6.558	4.540

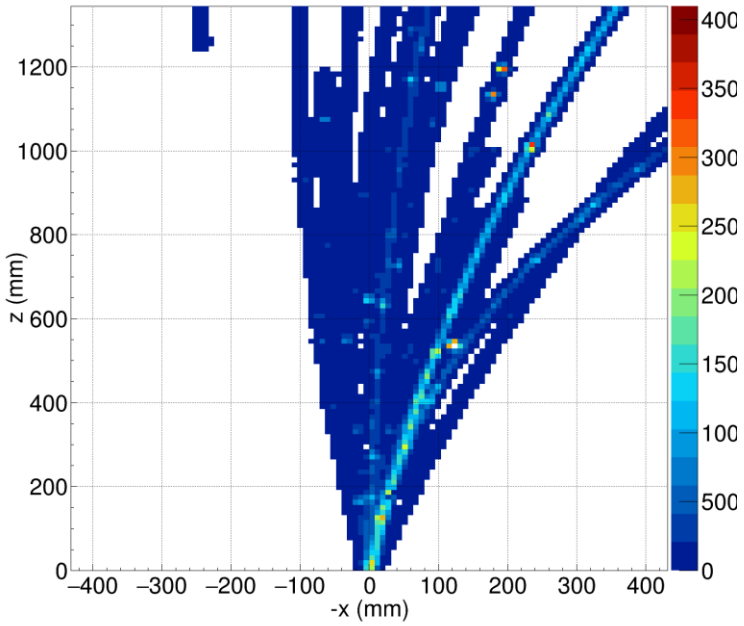
- Reduction of the total reconstruction time by 10% (mostly RiemannT)
  - Most of the trajectories are well defined
- Better track definition in the higher density regions (closer to vertex)
- To speed up → hybrid solution: c.o.g. for 1 pulse, fit for 2 pulses (to be done)

PSASimple: finds ONE maximum for each pad

PSASimple



original



Task Timing Studies using PSASimple

	Avg time/ev (s)		Trk-weight avg time/ev (s)	
	Real Time	CPU Time	Real Time	CPU Time
PSA	0.018	0.012	0.021	0.013
HitClustering	0.088	0.039	0.115	0.053
SM	0.01	0	0.01	0
RiemannTracking	1.054	0.645	1.299	0.859
Total time	1.170	0.696	1.445	0.925

- This solution is perfect for the online viewer we are close to 1ev./1s
- The main tracks are reconstructed and no holes in the hit map are present