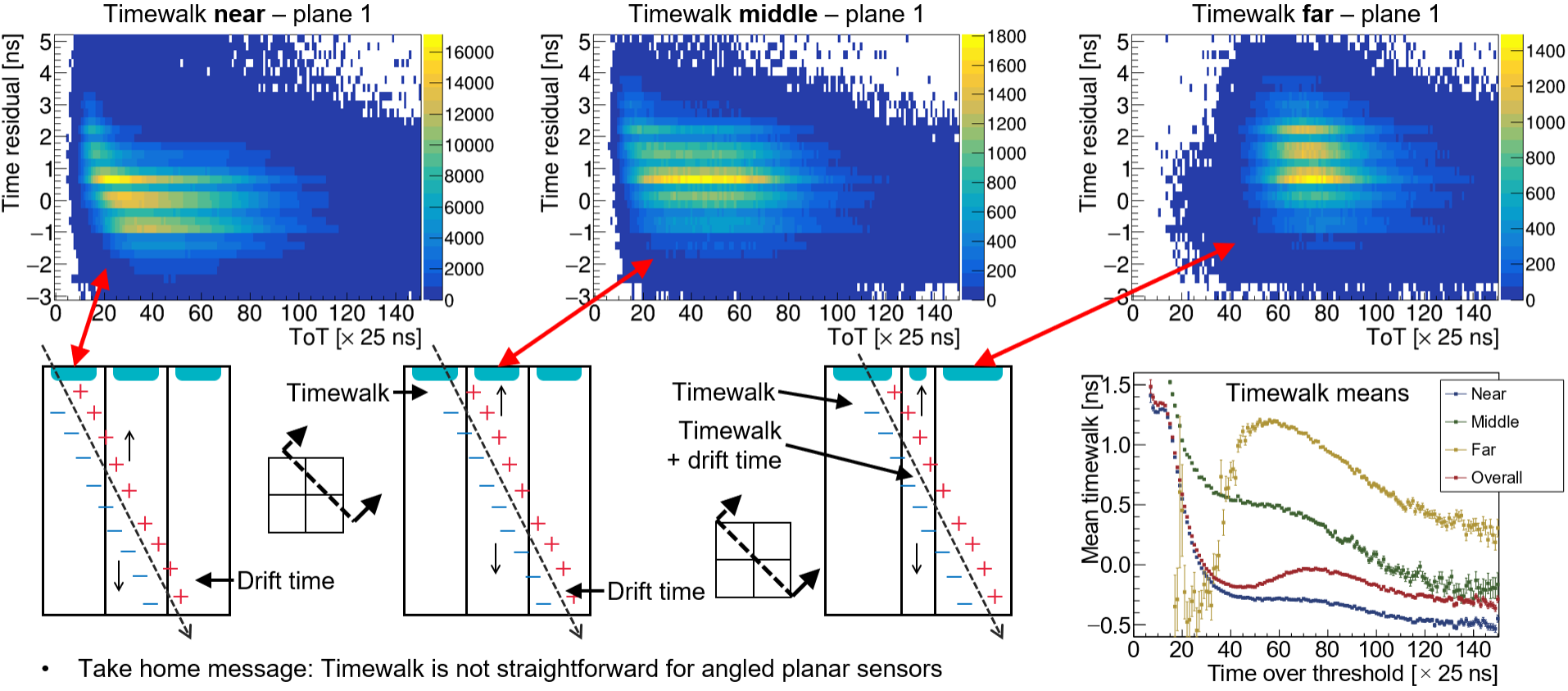
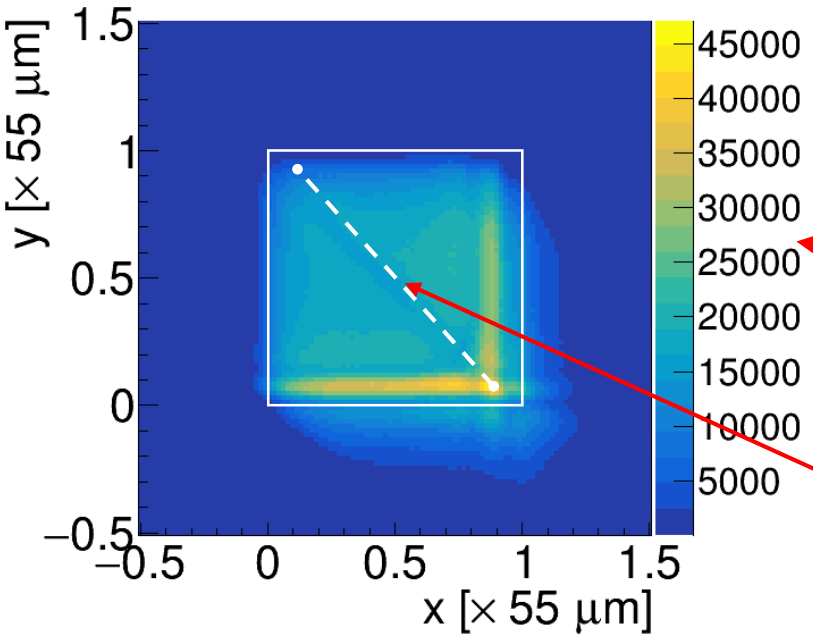
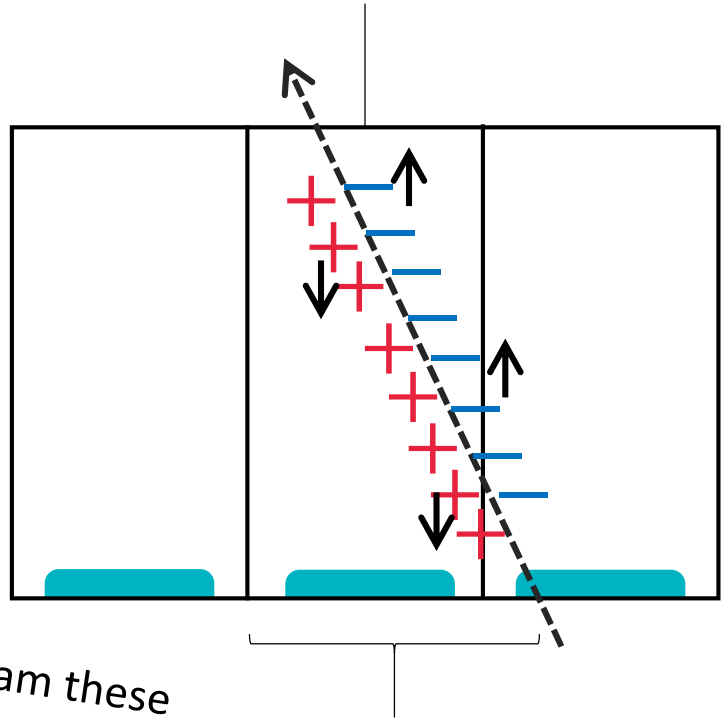
Timewalk and track geometry



- Take home message: Timewalk is not straightforward for angled planar sensors

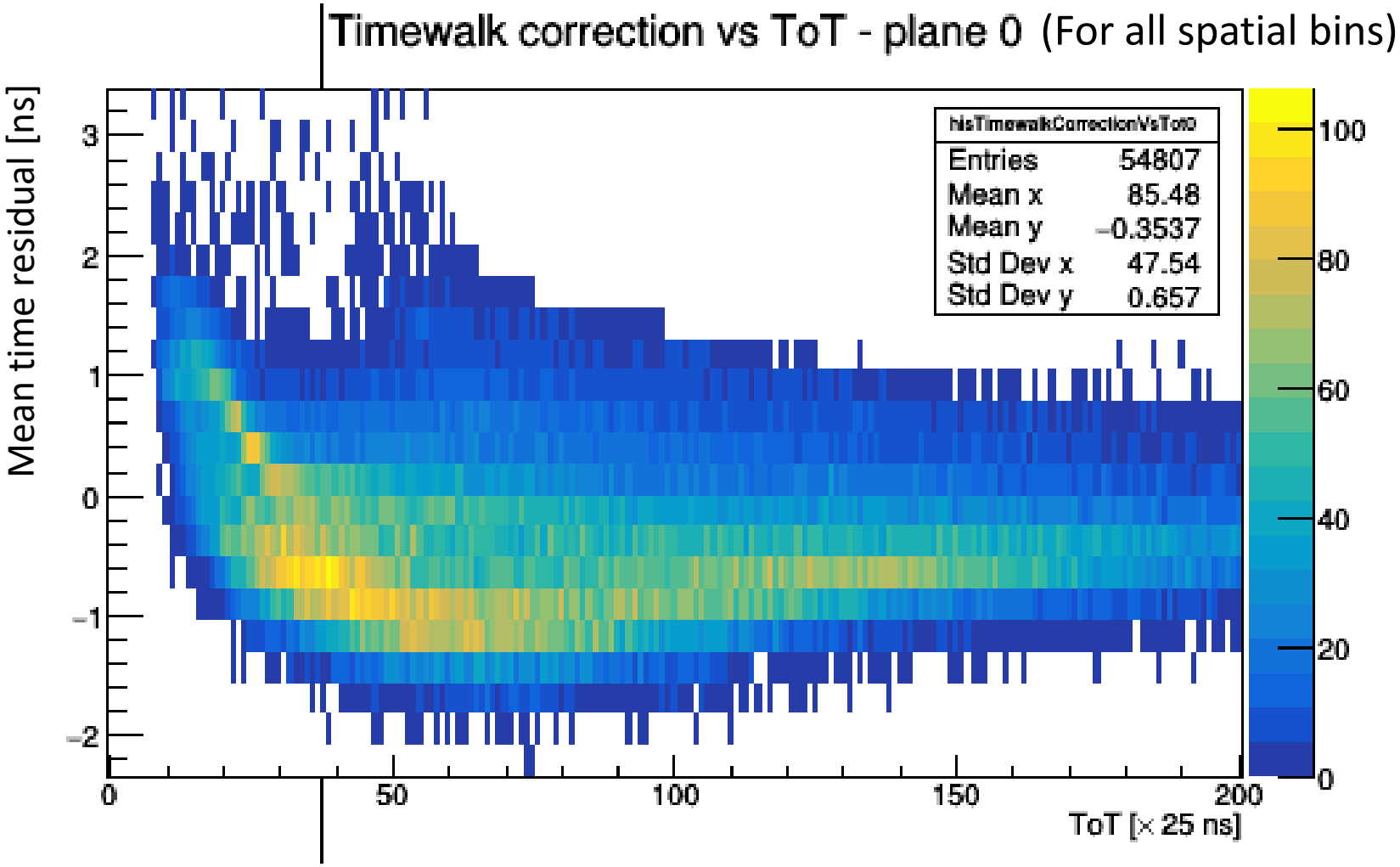
- Use track information to make a better timewalk correction
- Divide sensor surface into bins of $5 \times 5\ \mu m^2$
- Calculate a ToT-based timewalk correction for each spatial bin
- Takes into account drift-time and weighting-potential effects





Histogram these intersections

Example of a track projected onto the surface:
$\Delta x = -43\ \mu m, \Delta y = 47\ \mu m$

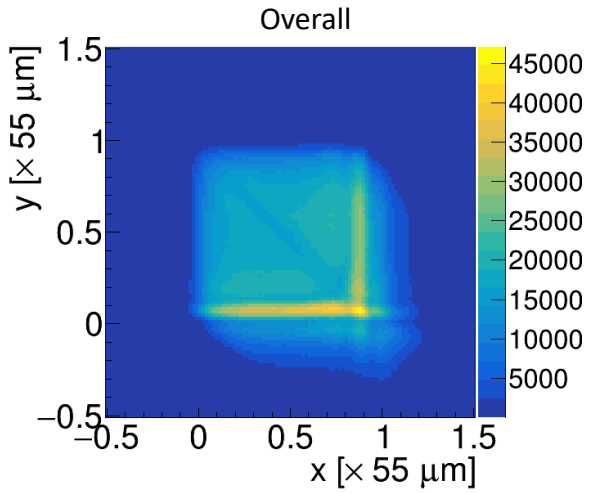

Timewalk correction vs ToT - plane 0 (For all spatial bins)
hisTimewalkCorrectionVsTot0
Entries 54807
Mean x 85.48
Mean y −0.3537
Std Dev x 47.54
Std Dev y 0.657
Mean time residual [ns]
ToT [× 25 ns]
3
2
1
0
−1
−2
0
50
100
150
200
100
80
60
40
20
0

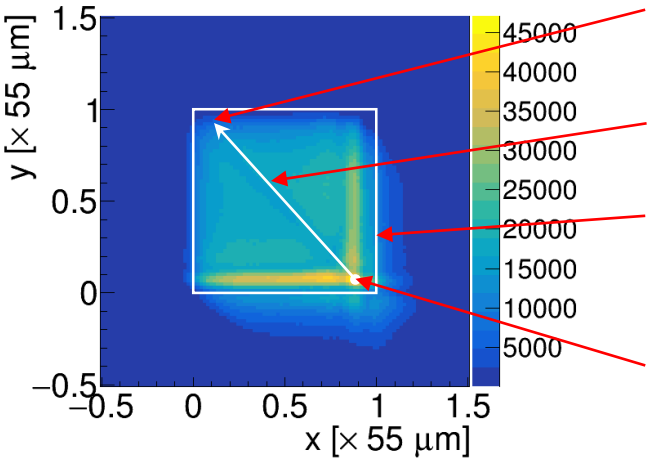
	Time resolution [ps]	
Plane	**Before calibration**	**After calibration**
1	939	671
2	1051	682
3	1032	704
4	1013	705
5	1035	689
6	1024	683
7	1018	709
8	1041	734
Track	**440**	**287**

Timewalk + pixel offset corrections

330 ps with the previous timewalk correction

Distributions of track-sensor intersection point relative to earliest hit – second plane





Track-sensor intersection furthest away from chip

Track projection:
$\Delta x = -43\ \mu\text{m}, \Delta y = 47\ \mu\text{m}$

Earliest hit in the cluster

Track-sensor intersection closest to chip (relative to the earliest hit). **This is the point that we are histogramming**