Pisa Instrument Analysis Activities

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SLAC
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Data

a) We have chosen (as was recommended in Eduardo's presentation "**Data Analysis Ideas for Workshop 4**" (IAG meeting 10 June 2005) "*data from integrated modules*". I.e., the last single tower test runs.

b) All data are accessible from http://glast.pi.infn.it/, in particular from the "tower grid" http://glast.pi.infn.it/database/towers/twrsmenu.html.

TkrFM	run id Pisa	run id SLAC
A	306000475	398000573
B	306000517	398000750
1	308002103	398000975
2	308001819	398000894
3	309000323	398001090
4	309000666	398001203
5	308002603	399002040

following Eduardo … Topic 1

1 - Evaluate TKR uniformity by

Plotting hit maps after basic selection (e.g. 1 track , good chi2)

Plotting the number of disconnected and partially disconnected channels

plotting hit efficiencies per plane

evaluating the stability of noisy channels during testing @ SLAC

comparing number of dead channels using cosmic rays and charge injection

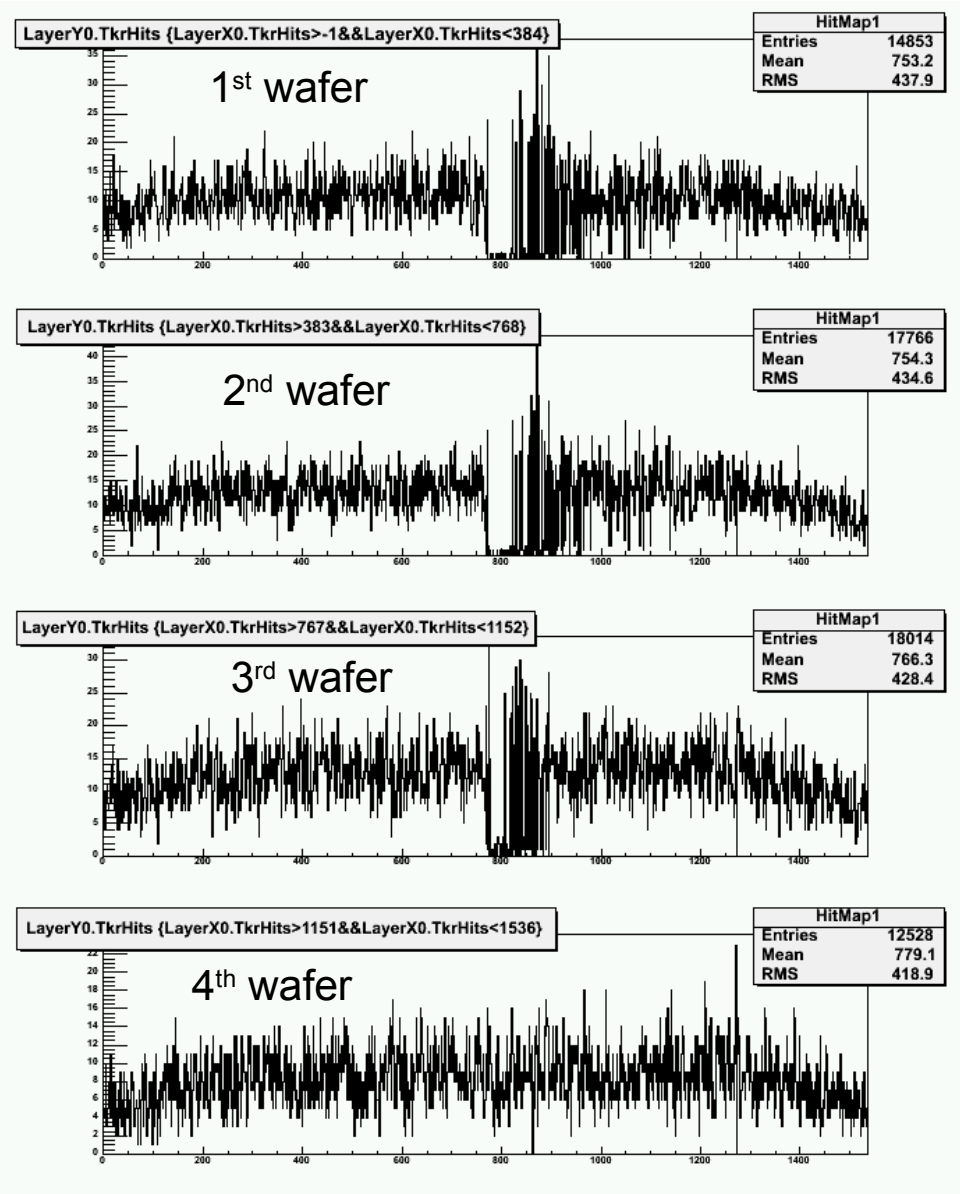
Dead/Noisy/Interrupted Strips

Strip number determination:

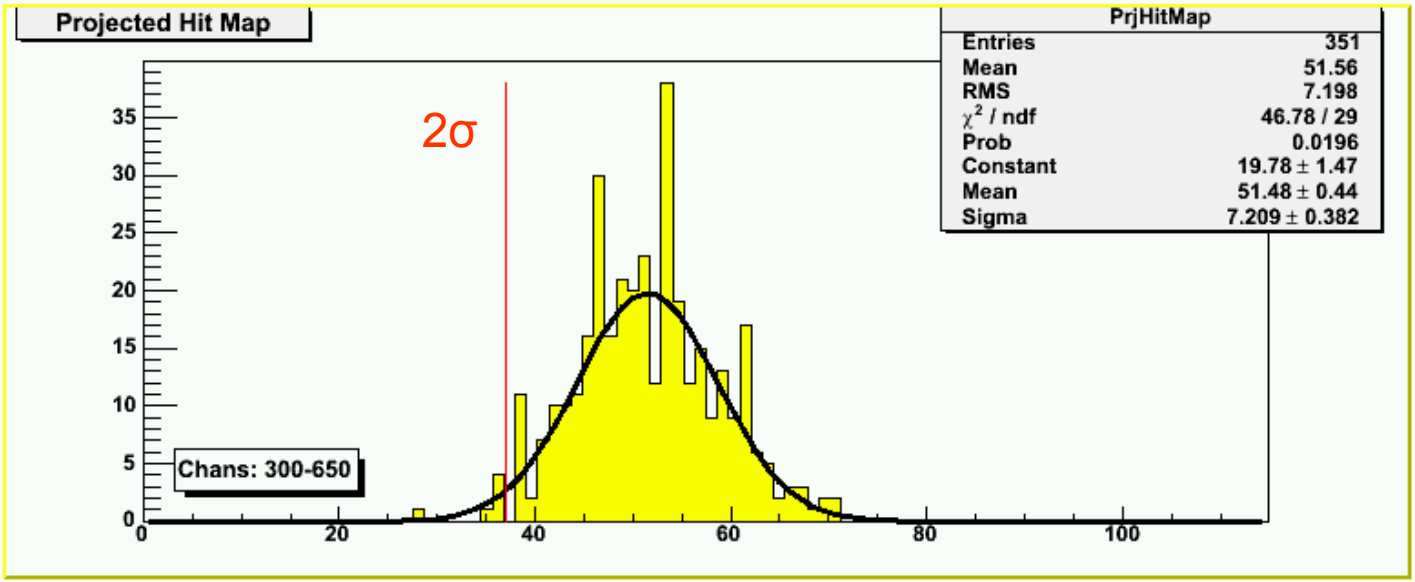
Dead: cut on channels with no entry (but not masked). Save method except for at the edge of the acceptance.

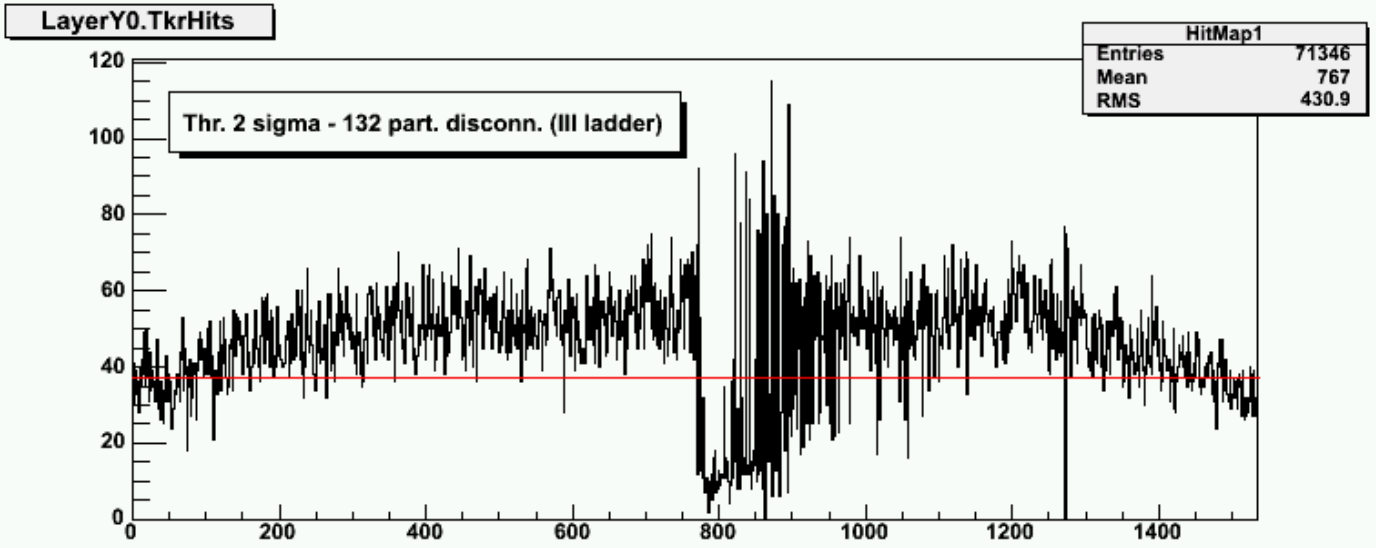
Masked: use a script which analyzes the TkrFM?_HotStrips.xml

Partially interrupted: thresholding on the hit map

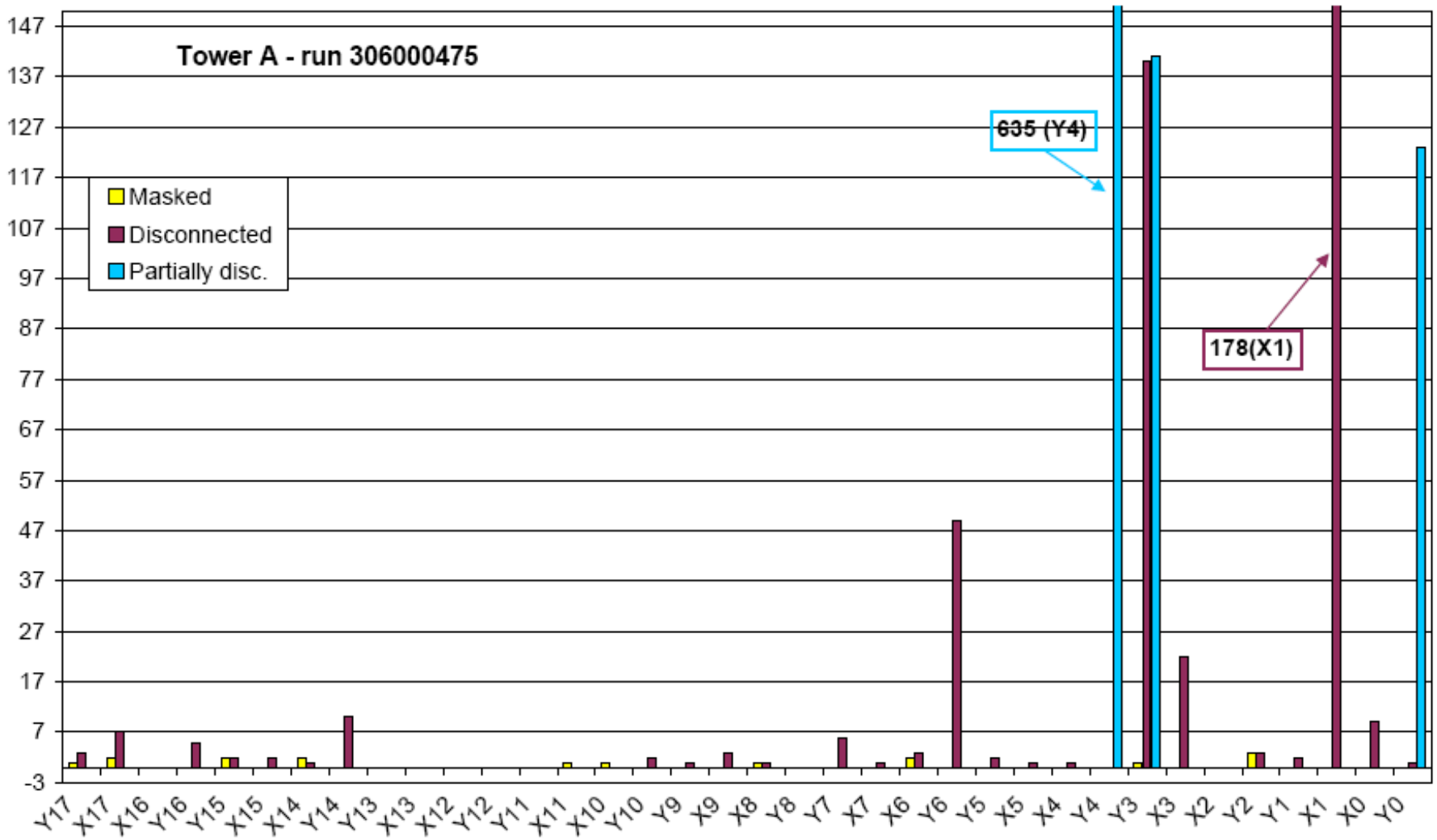


Dead/Noisy/Interrupted Strips (II)



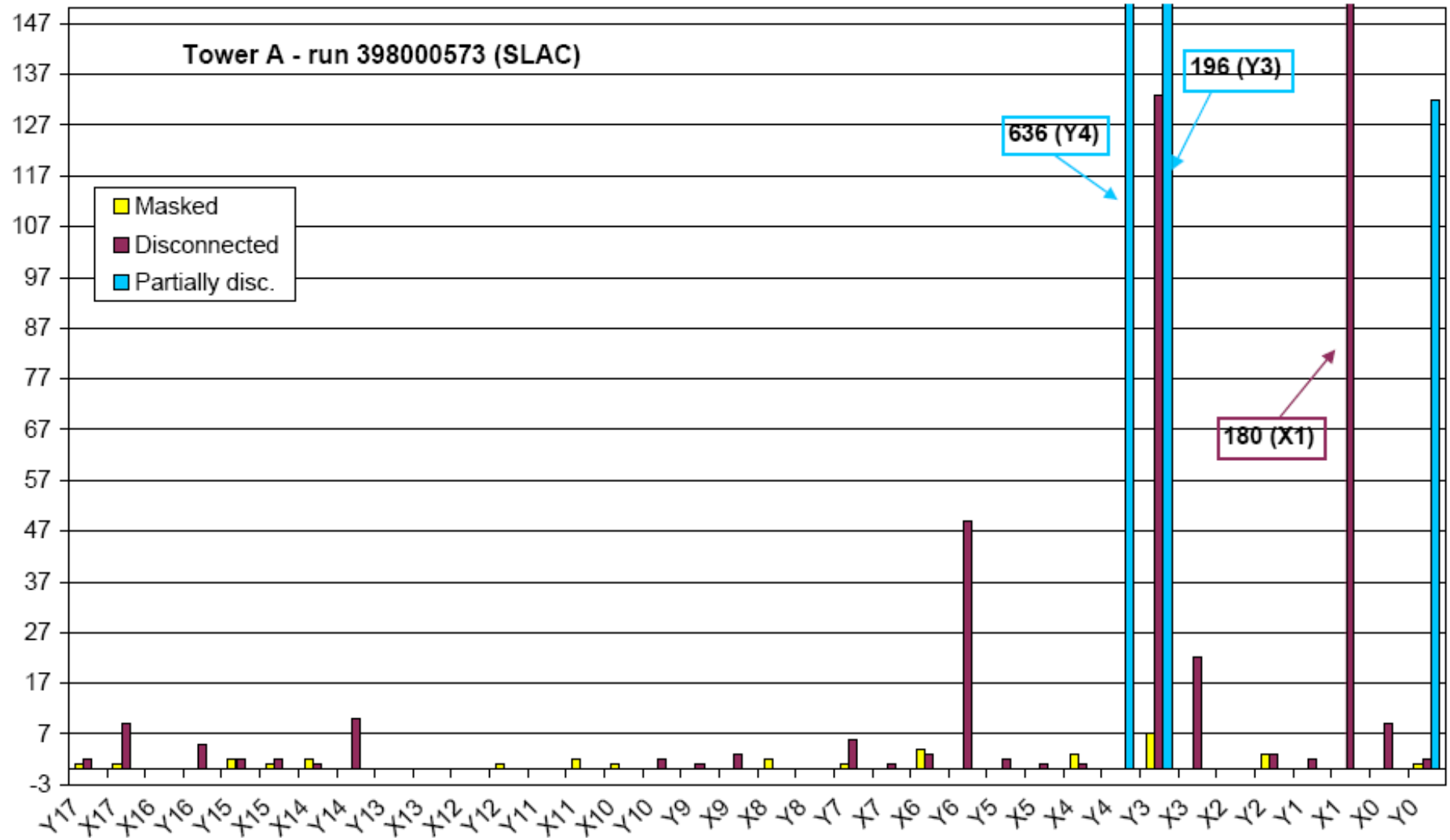


Dead/Noisy/Interrupted Strips (IIIa)



these plots and the excel files for all 7 runs (towers) are on the web page

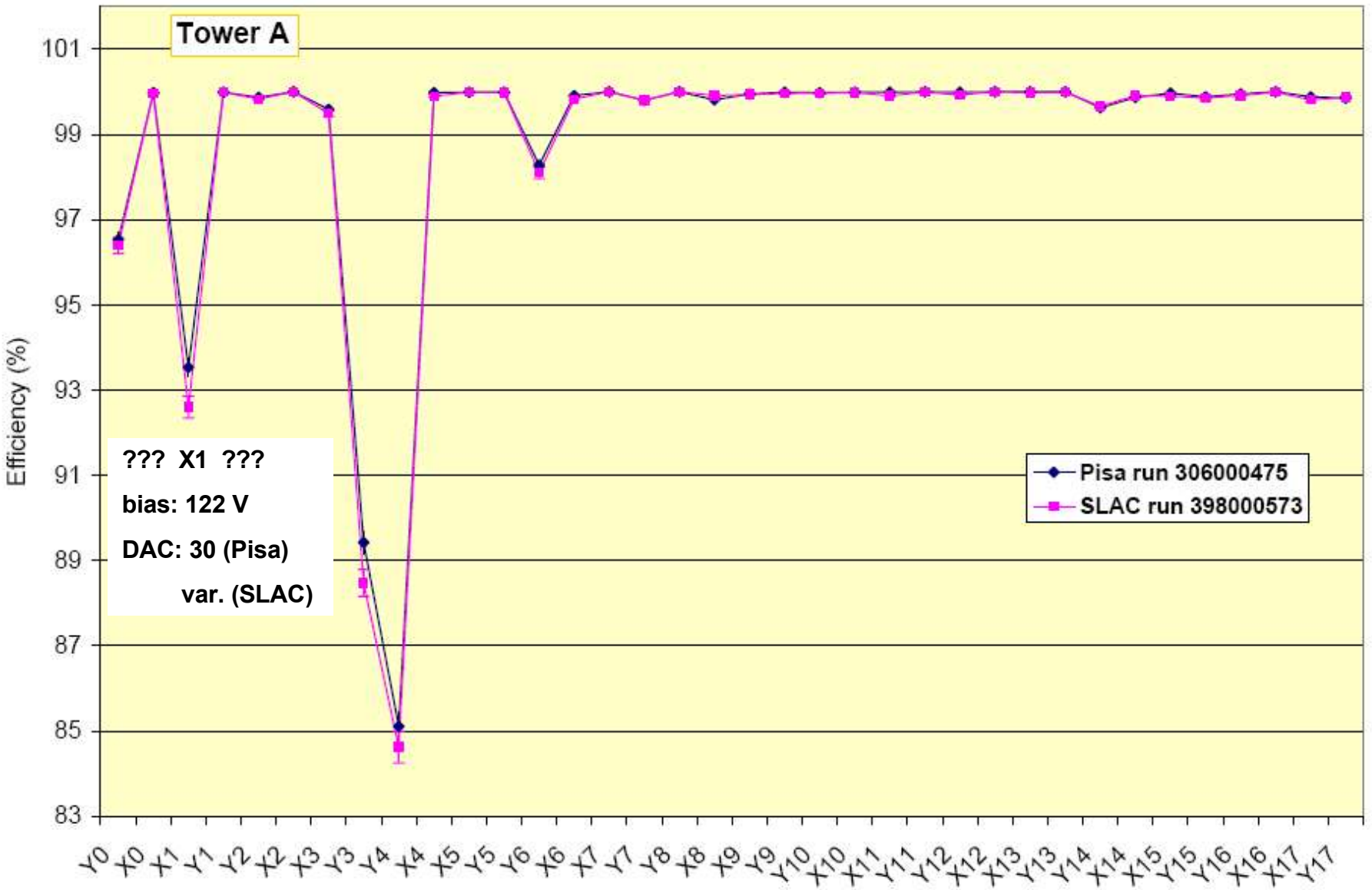
Dead/Noisy/Interrupted Strips (IIIb)



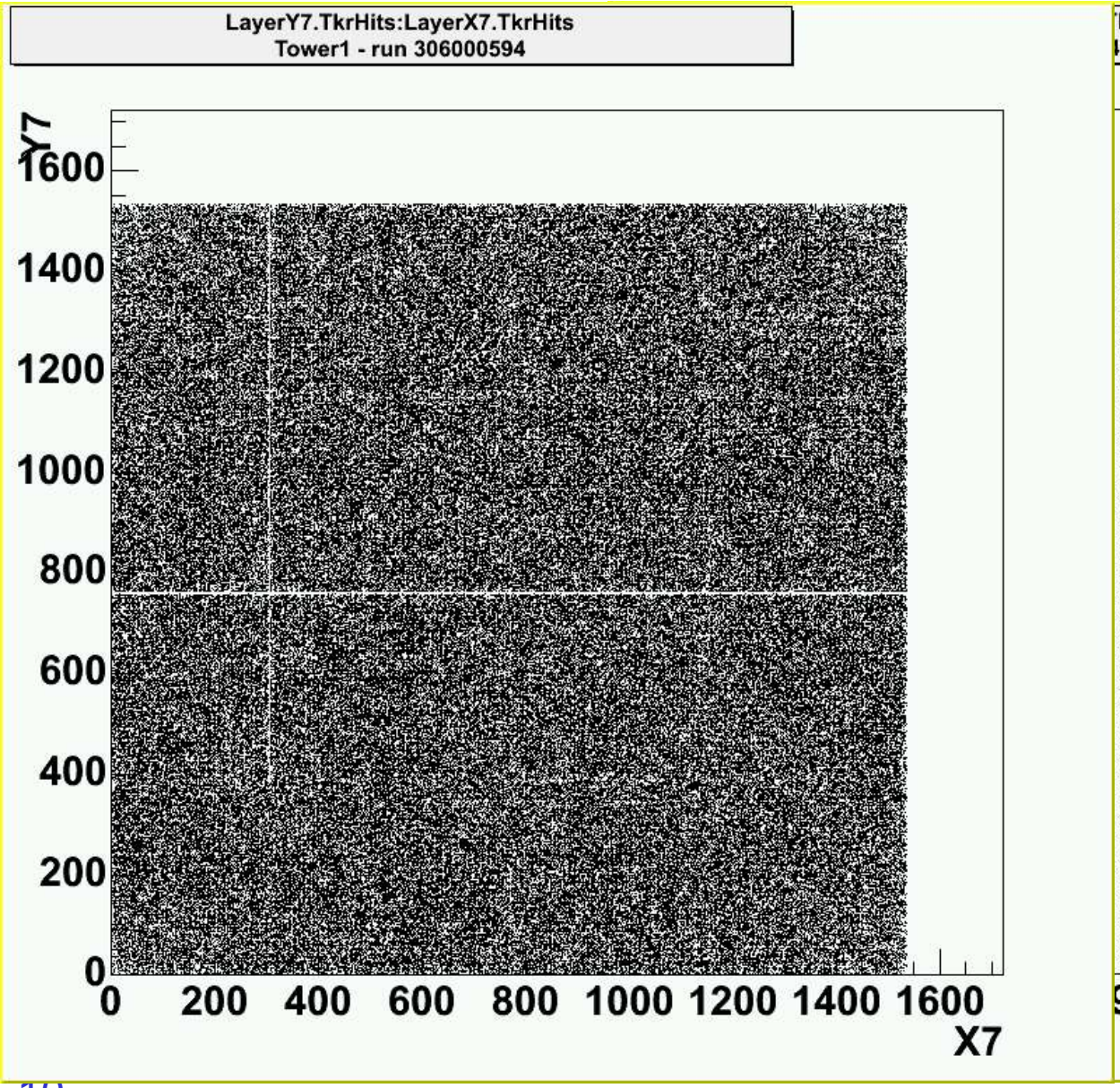
Dead/Noisy/Interrupted Strips (IIIc)

Plane	Strip classification	306000475	398000573
Y0	dead (d)	1	2
	noisy (n)	0	1
	interrupted (i)	123	132
	total (t)	124	135
Y3	d	140	133
	n	1	7
	i	141	196
	t	282	336
Y4	d	0	0
	n	0	0
	i	635	636
	t	635	636
X1	d	178	180
	n	0	0
	i	0	0
	t	178	180

Efficiencies



Dead/Noisy/Interrupted Strips (IV)



Topic 2

2 - Evaluate TKR TOT response by

- **comparing peak and width of TOT distributions for MIPs at different incident angles**
- **Make profile plots as a function of cos θ and φ**
- **Studying events that saturate the TOT. Are they consistent with showers? Can we have saturation from incident particles at large angle?**
- **Investigating whether noisy hits exhibit a TOT peak close to zero**

Topic 3

3 - Study noise in the TKR system by

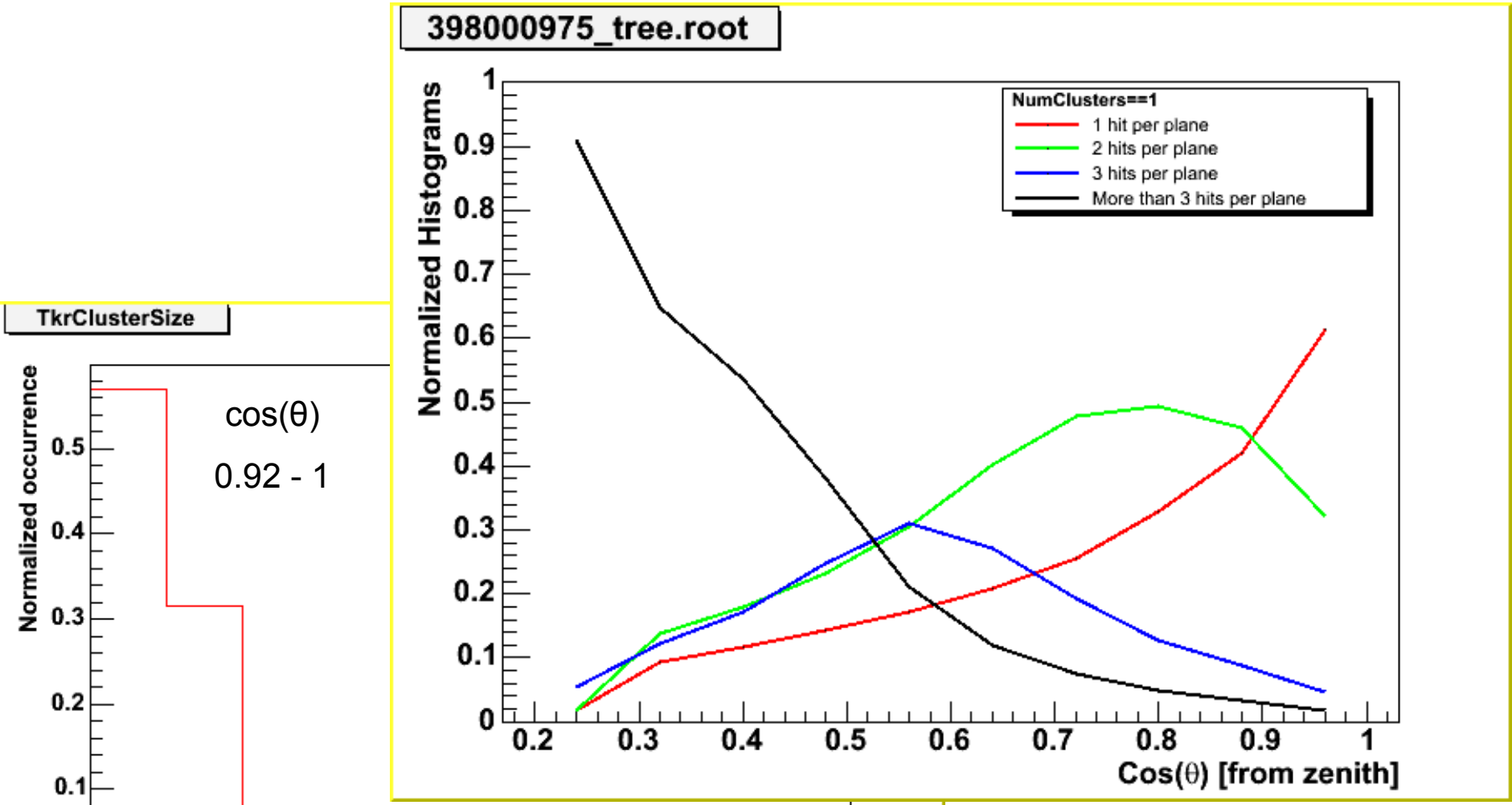
comparing ratios of events with 3 and 1 strip hits and/or strip clusters for MIPs at different incident angles

comparing ratios of events with 2 and 1 strip hits and/or strip clusters for MIPs at different incident angles

doing the same as above but for runs at different threshold settings

studying the distance of two clusters

Noise Occupancy

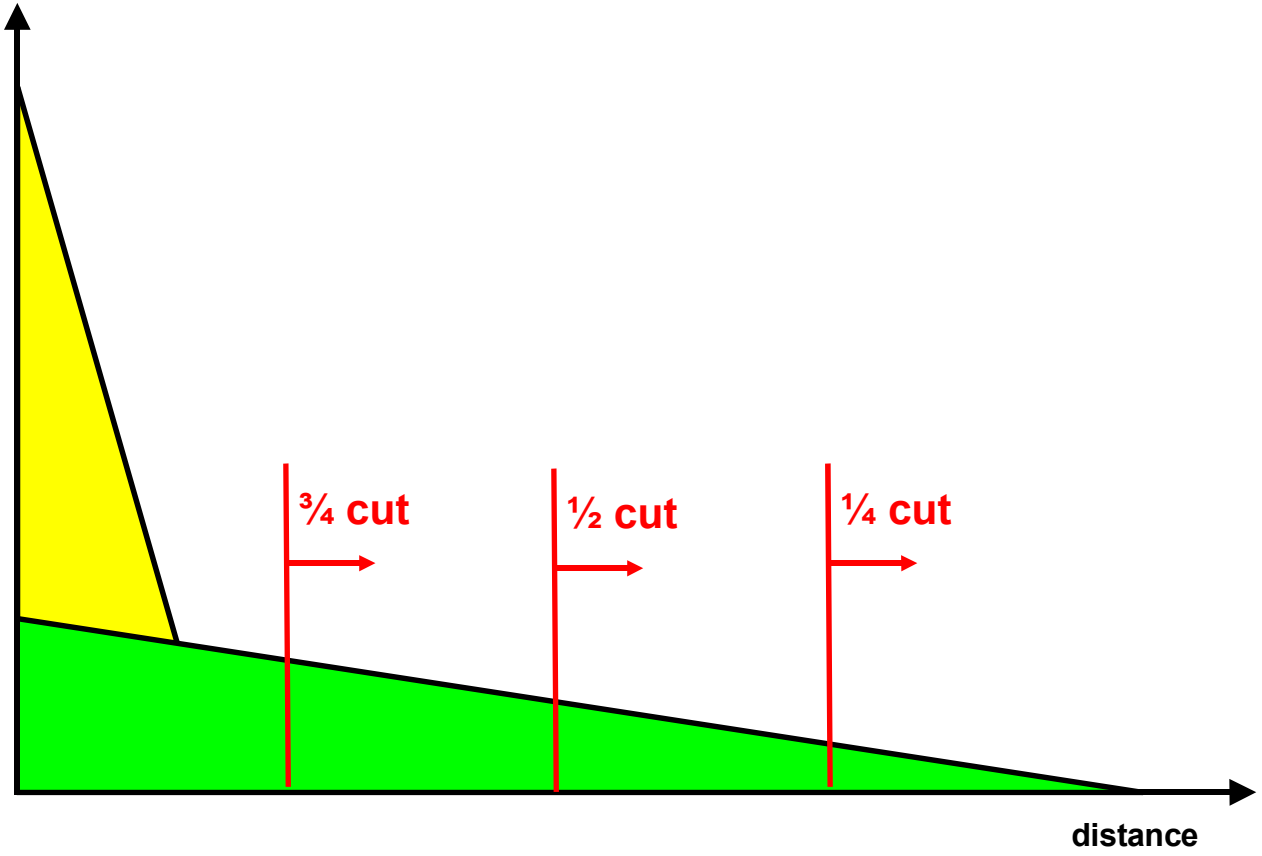


Noise Occupancy (II)

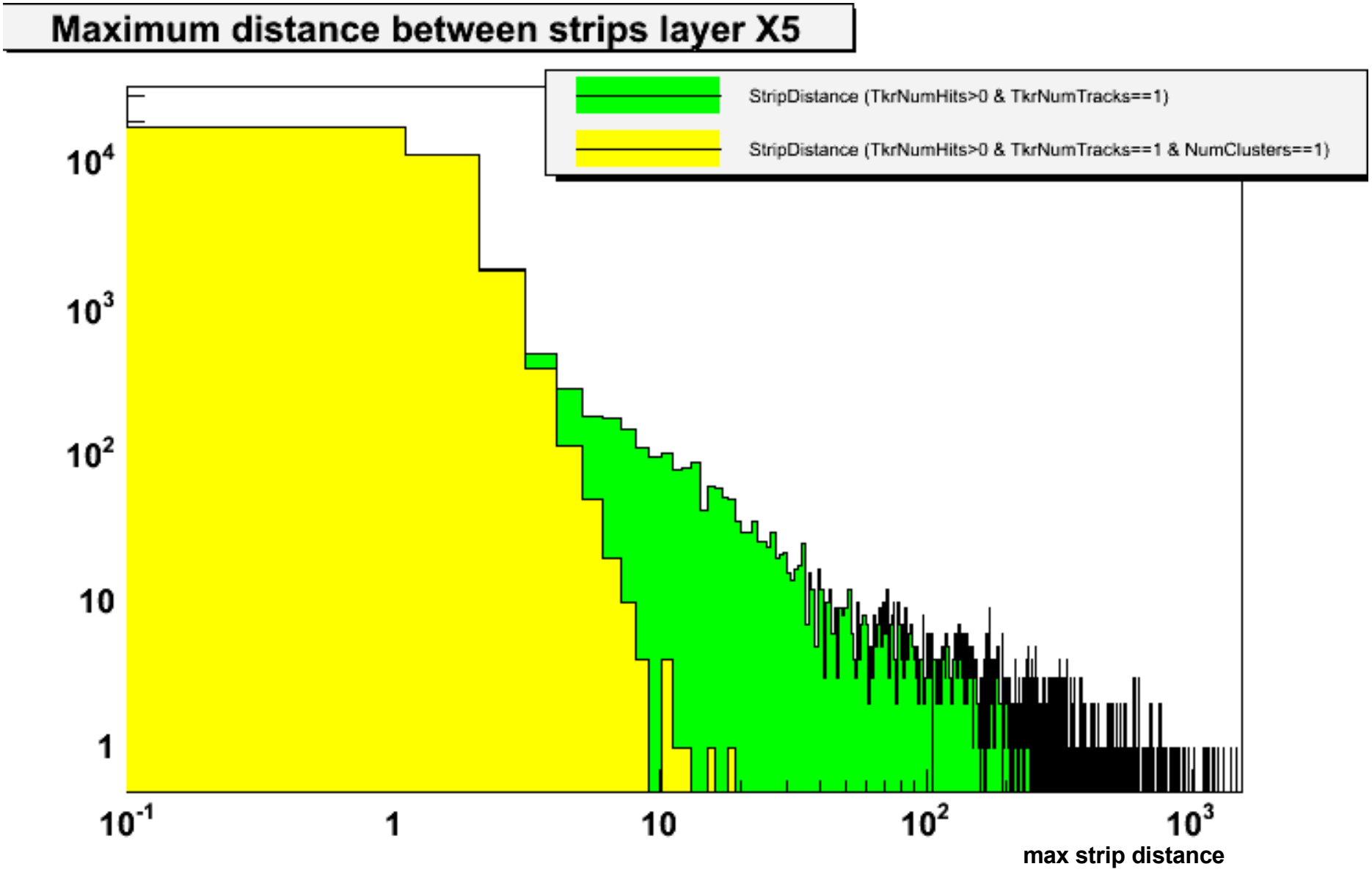
Look at the maximum distance of two clusters in a plane:

noise: triangular distribution

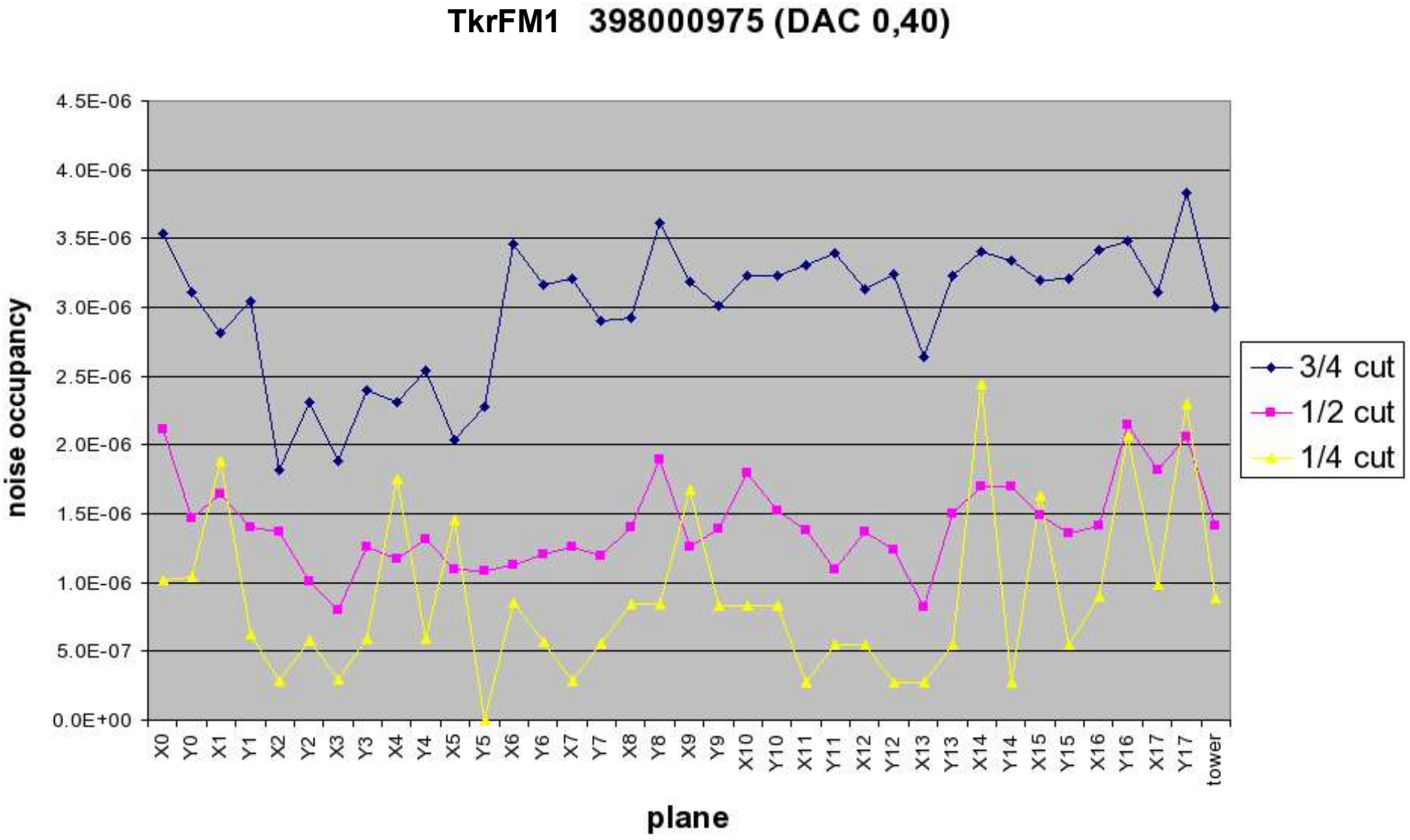
delta rays: grouped at small distances to the cluster on the track



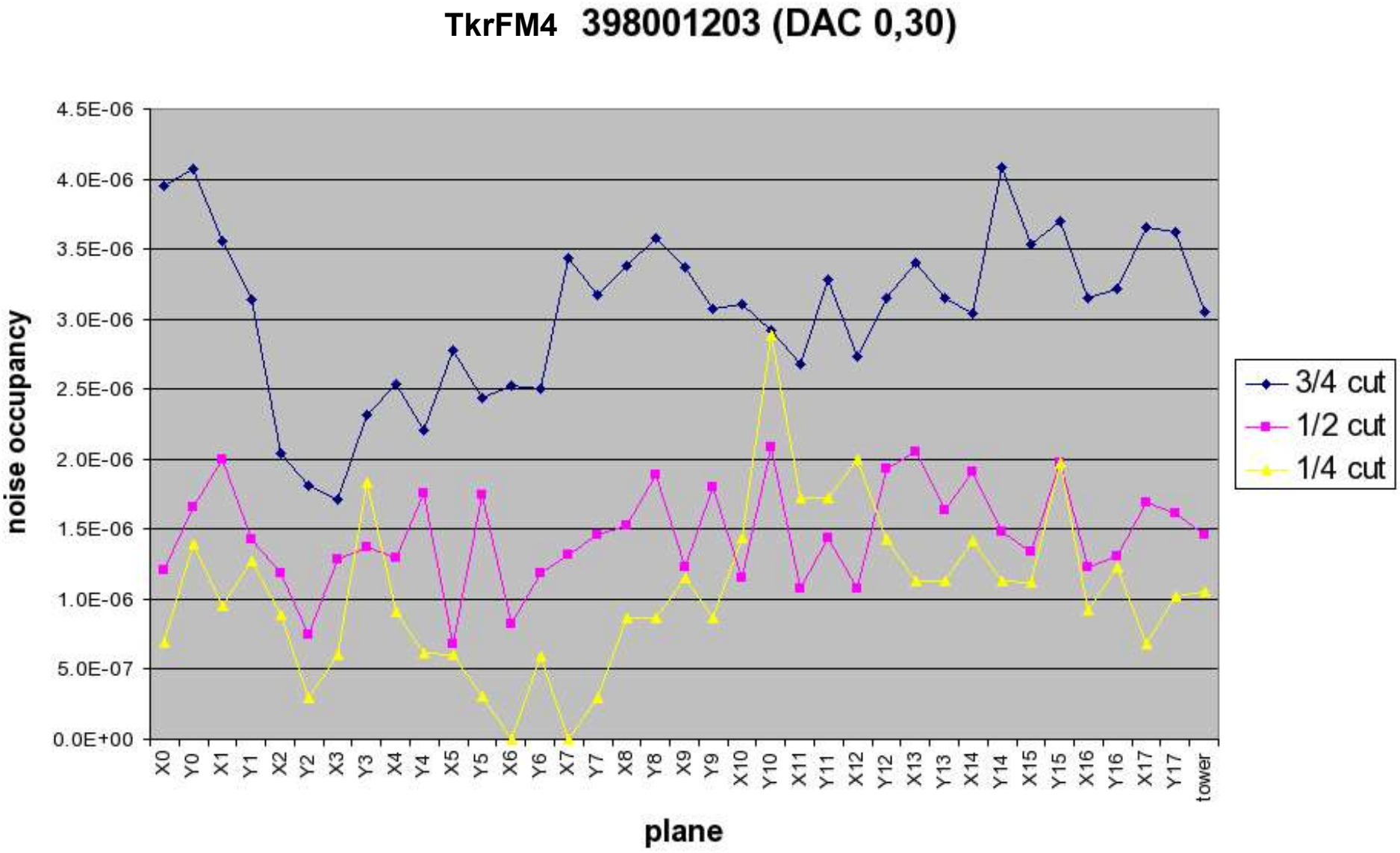
Noise Occupancy (III)



Noise Occupancy (IV)



Noise Occupancy (V)



Results 6

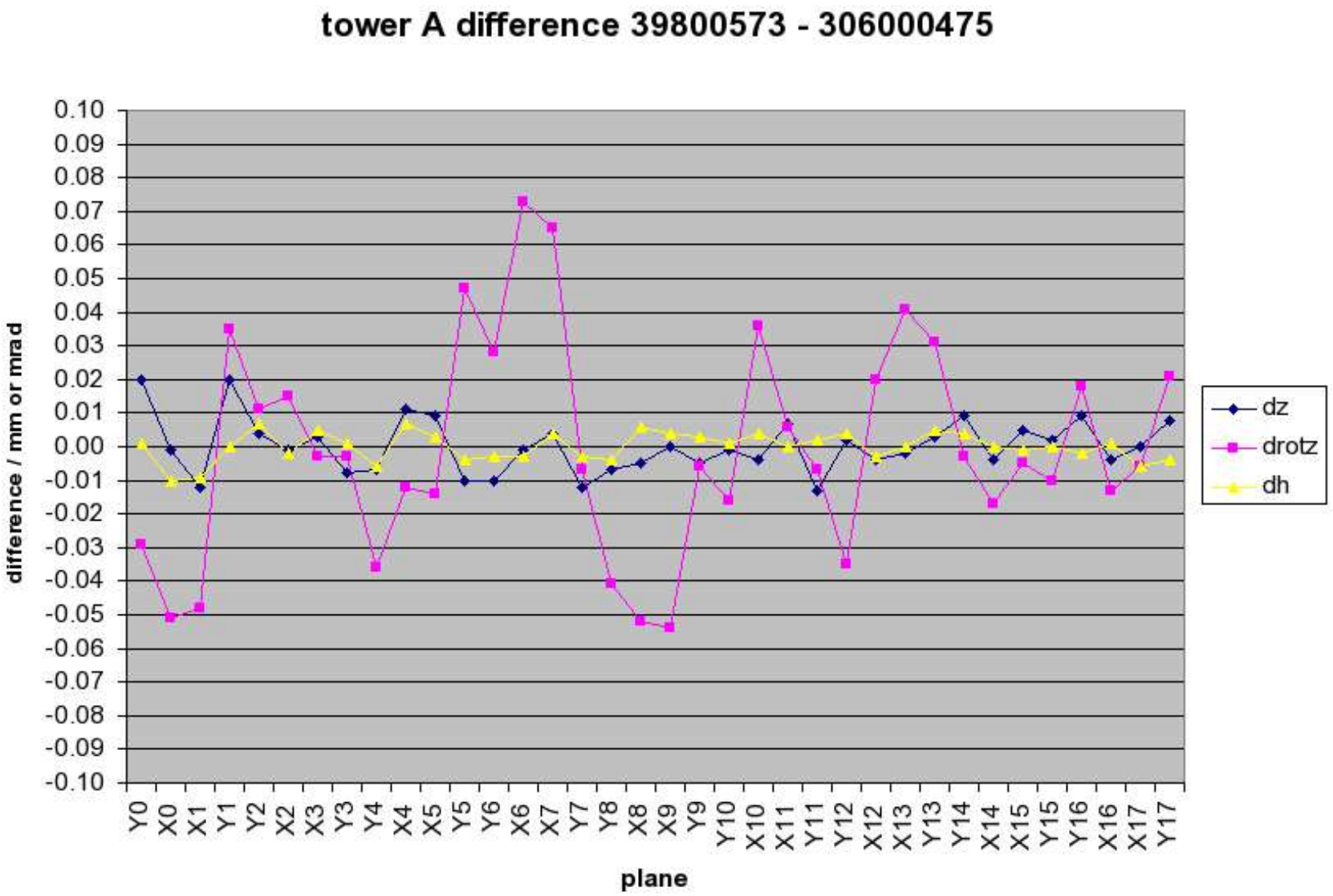
6 - Evaluate TKR inter tower alignment and intra tower alignment

Produce alignment constants apply to data and compare to MC distributions

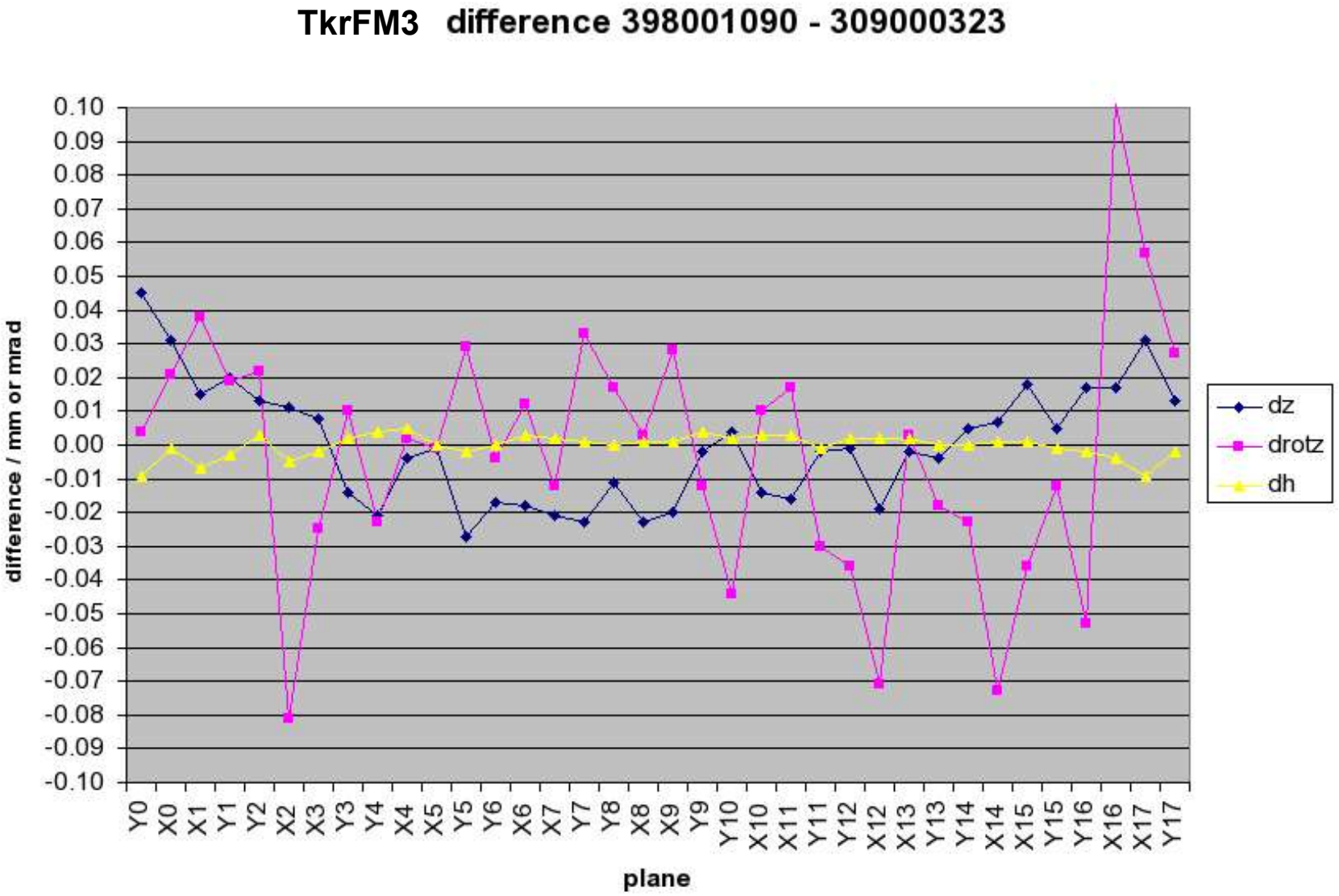
Do we need any information from the metrology measurements of the integrated towers at SLAC?

A HowTo on intra tower alignment will be given tomorrow!

Intra Tower Alignment



Intra Tower Alignment (II)



Conclusions

- Pisa started to work on IA
- What should be followed on?
- What has priority?