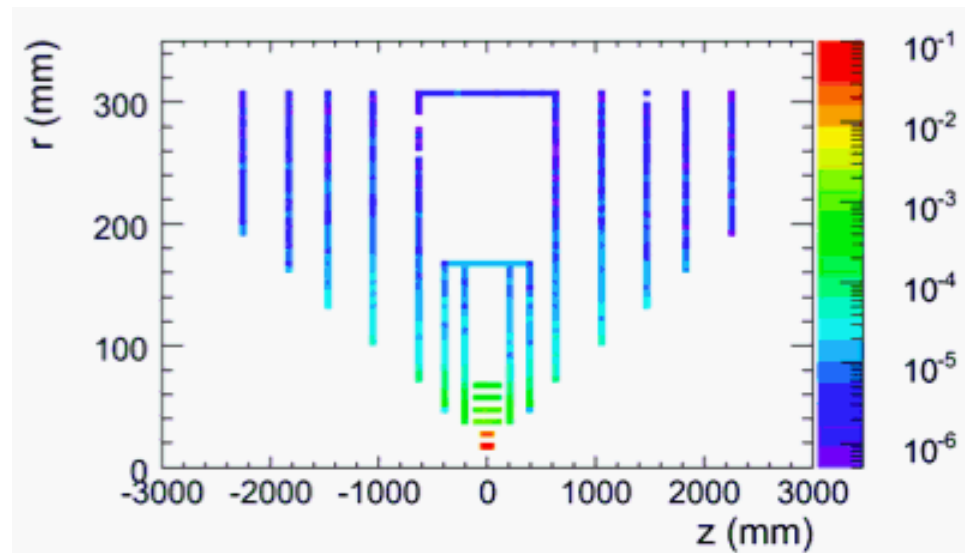# Background studies in the VXD: status and future plans
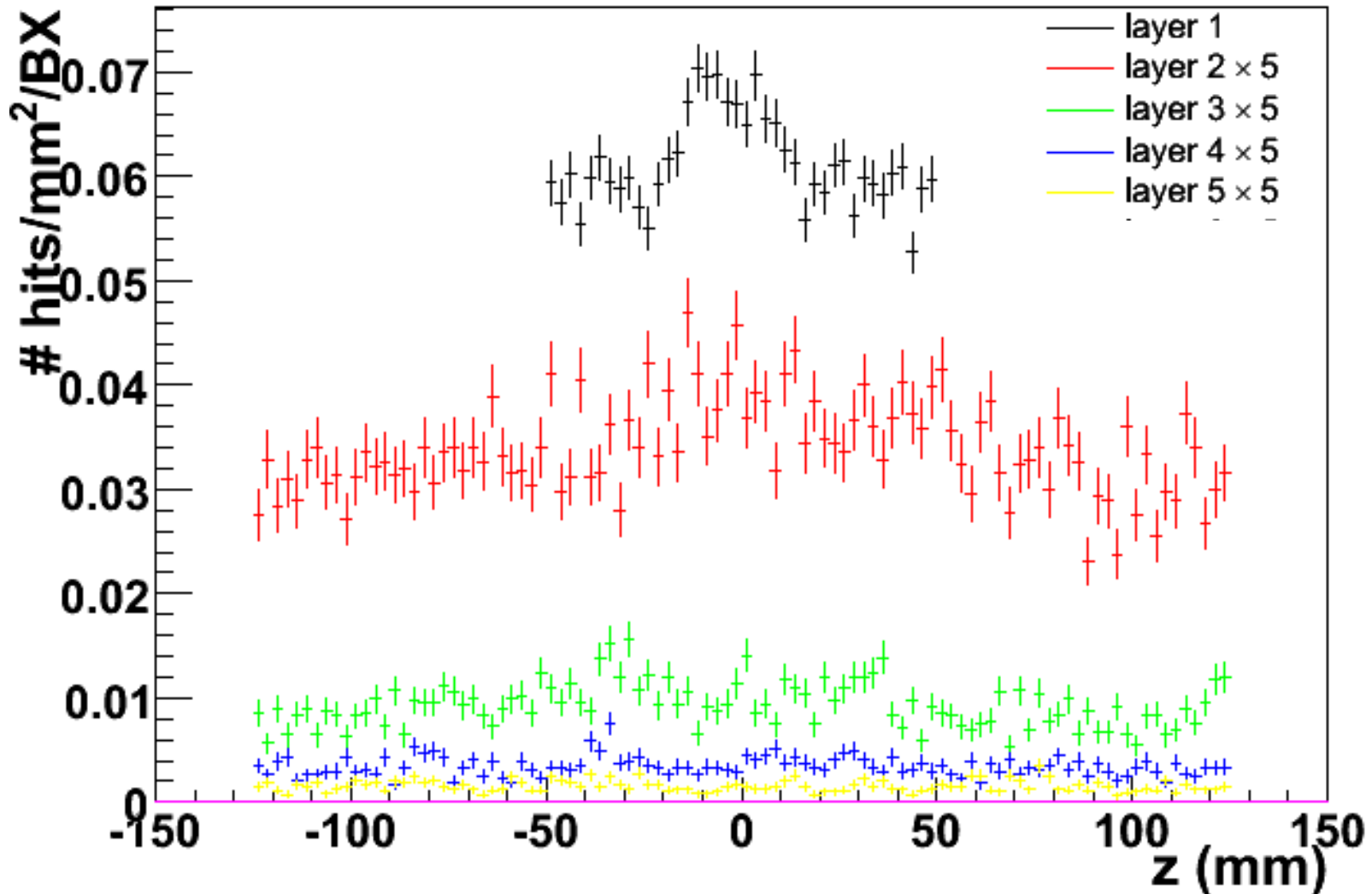

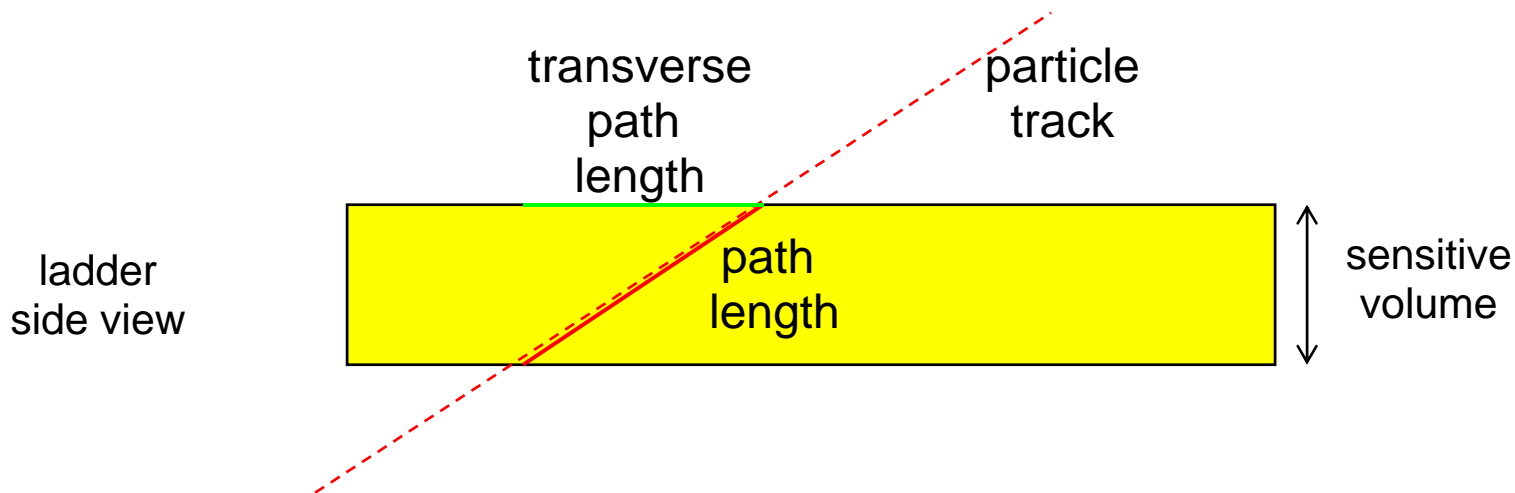R. De Masi, S. Aplin, F. Gaede, M. Winter, …

Present status

- Several studies from DESY, Strasbourg, Warsaw, … on the expected hit rate.

- First estimate of occupancy for two sensor types.

- Development of a detailed digitizer (Warsaw).

Hit rates
(LDCPrime_02Sc_p01 VXD-SL)

How to get to the occupancy…

transverse path length

particle track

ladder side view

path length

sensitive volume

seed pixels = pl_T / pitch size
pixels in cluster = 2 x #seed pixels + 4

… with two different options

	Standard parameters 50 μm epi		Modified parameters 15 μm epi larger clusters	
Layer	pitch (μm)	integration time(μs)	pitch (μm)	integration time(μs)
1	25	50	20	25
2	25	200	25	50
3	25	200	33	100
4	25	200	33	100
5	25	200	33	100

Layer	occupancy	occupancy
1	0.059	0.015
2	0.027	0.005
3	0.007	0.004
4	0.003	0.002
5	0.001	0.001

Seed pixel distributions

Standard mean = 4.7
Modified mean = 2.4

zoom
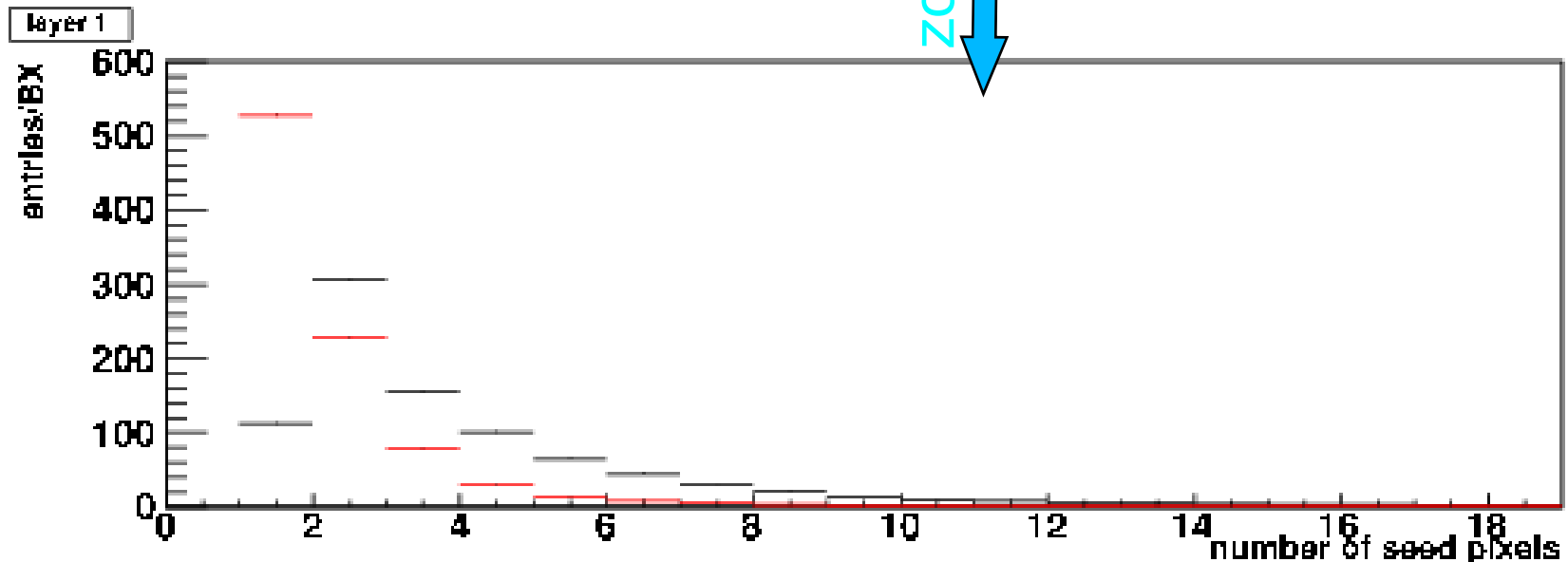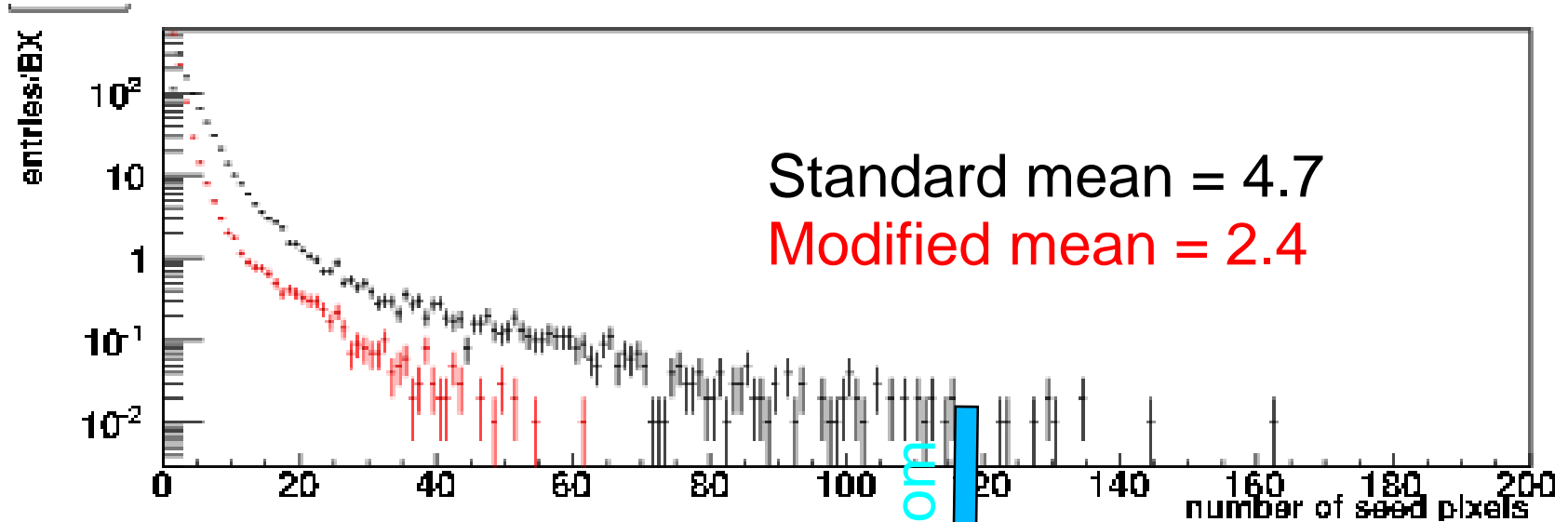
This implies …

• Occupancy ranges from ~6% to 1.5% (with anti-DID) not accounting for any safety factor.

• Its impact on the tracking efficiency needs to be investigated according to the IDAG request for June (and on heavy-flavour tagging later) .

• The present status of reconstruction software does not allow for a complete treatment of the bkg in a straight way.
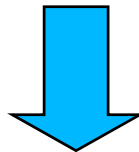
Address tracking issues and vertexing issues separately

Next steps

- Optimisation of tracking algorithm (ghost tracks).

- Hit to cluster conversion.

- BKG-physics clusters discrimination.

- Cluster-track association.

- Consequences on impact parameter resolution.

- Tagging.

- lowP, ….
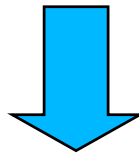
mid-term program
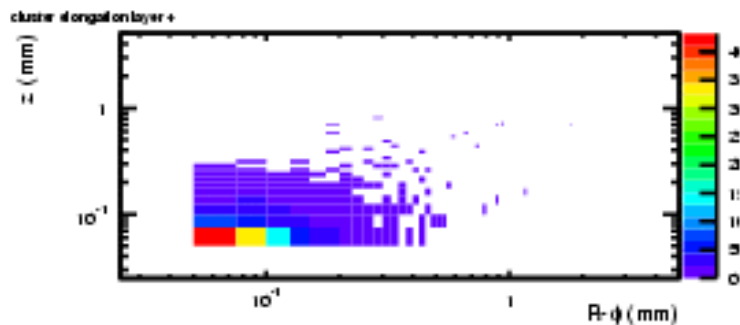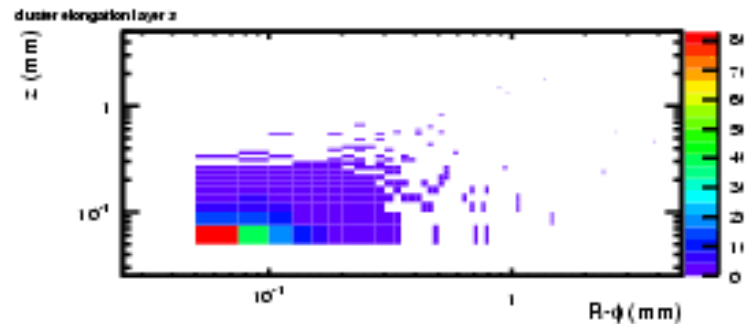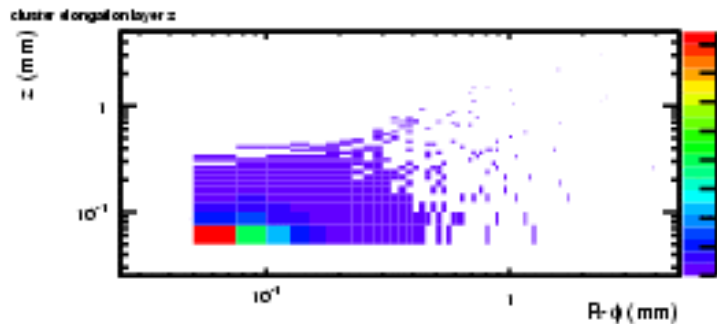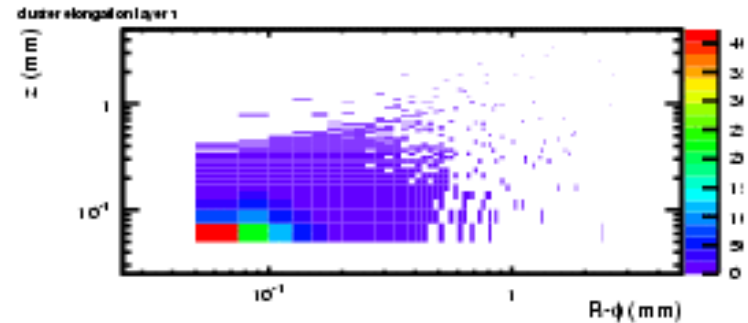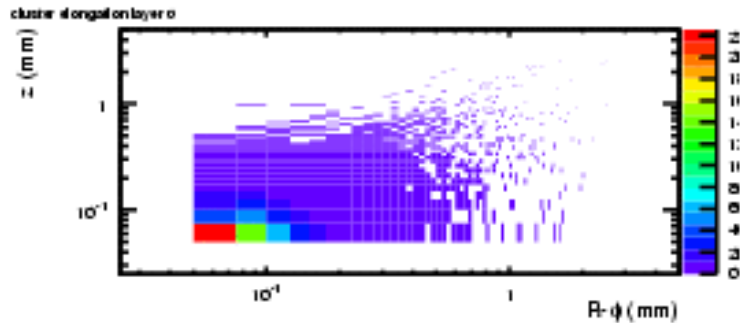
For the IDAG meeting

STEP0:

• Use of salt&pepper bkg hit distribution convoluted with realistic cluster dimensions.

• Preliminary study based on bkg clusters only in the innermost layer (against ghost tracks).
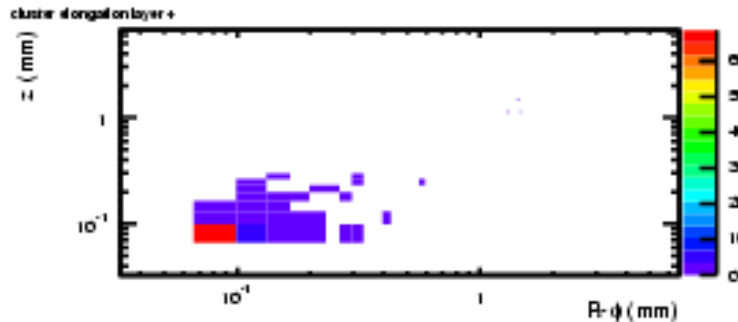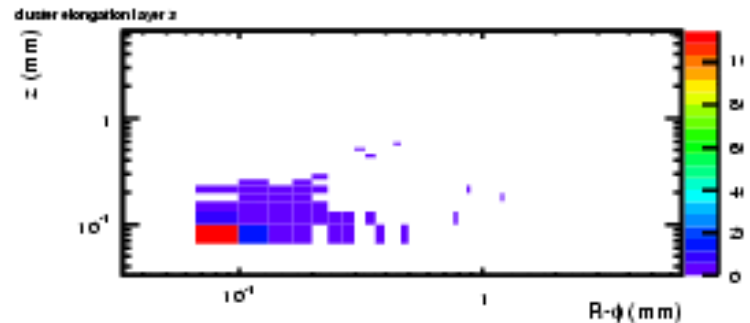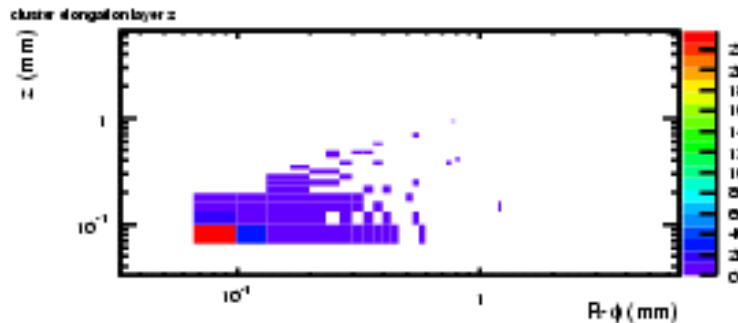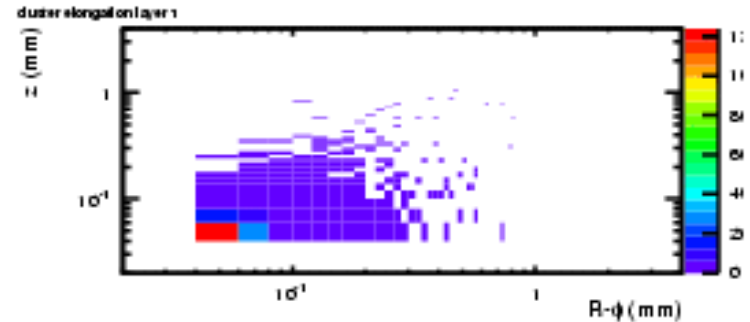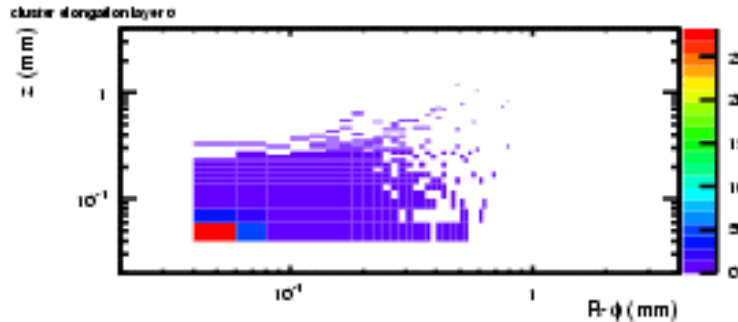
STEP1

• Overlay GuineaPig hit with realistic cluster dimensions.

SL or DL geometry?

Cluster dimensions (standard)

Cluster dimensions (modified)

To be discussed

- Goals & timelines.

- Task sharing.