

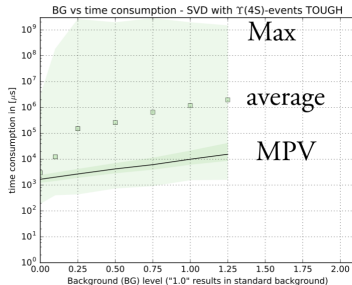
Two side clusters correlation for space point reconstruction

A. Bożek

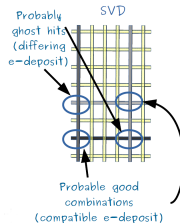
IFJ PAN, Kraków

1. 3D Space point
2. Desy Beam test data

SVD 3D hit reconstruction



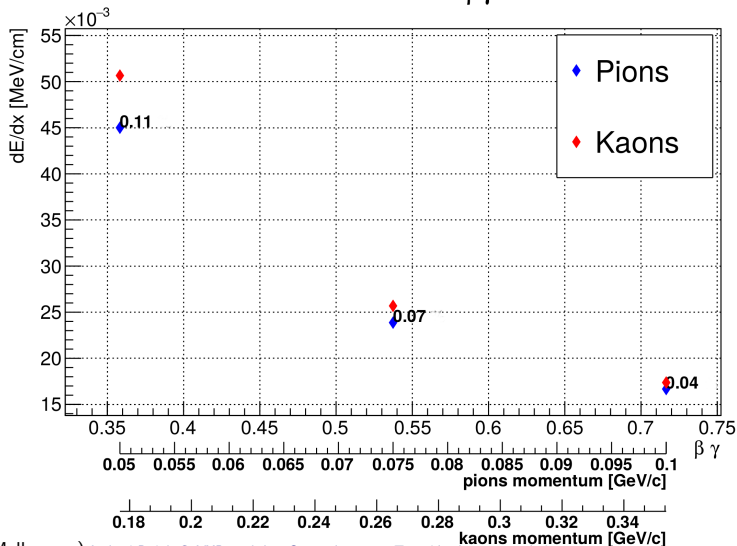
- 25% of increase in BG $\rightarrow \approx 4$ times higher track finding timing
- New SVD track finder (December) employs Space point which is the combination of clusters from both side
- Formation of the Space point is implemented, but we need to apply cuts to reduce combinatorial ,
- we can use correlation in timing and charge from both side,
- work on cuts from simulations are on going,
- study on DESY beam test data is necessary



Energy lost in SVD

Universality check in reconstructed hits reconstruction

Reconstruction: dE/dx vs $\beta\gamma$ for π and K

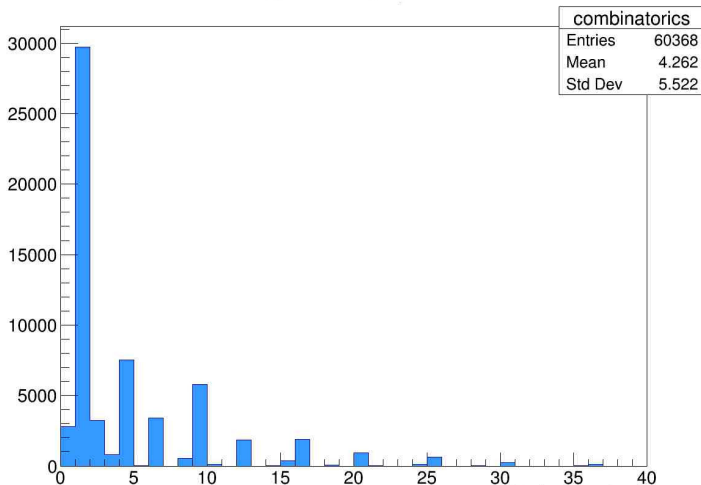


DESY beam test analysis

- Several people/groups did analyze the last DESY BT data,
- most of them were concentrated on tracking efficiency,
- we can try first choose the correct clusters without tracking,
- then use them for tracking → unfortunately no production level tracking software uses yet Space points yet.

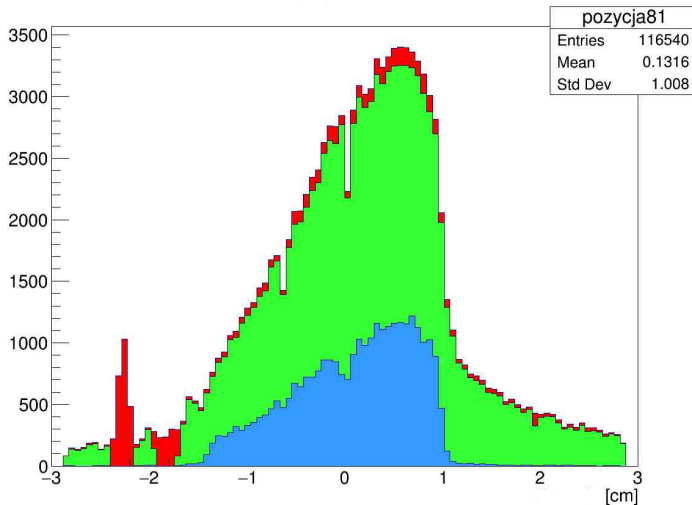
Combinatorics on single dssd

Number of possible 2D hits combination in the DSSD with beam passing through



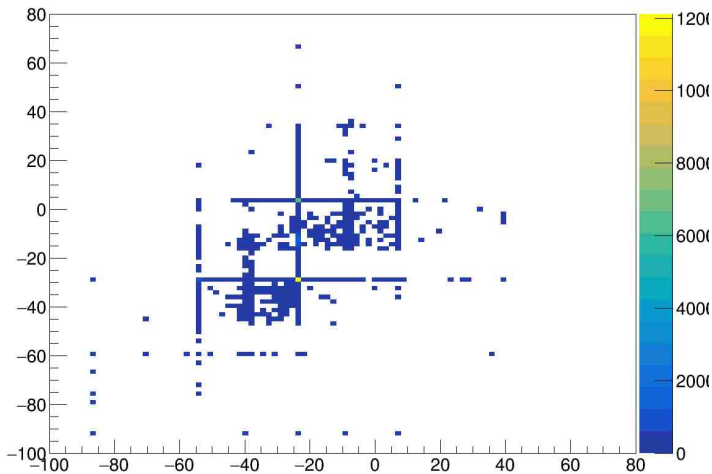
Beam spot position on single side dssd

before hot spots and sanity cuts before requiring only single hit on each side



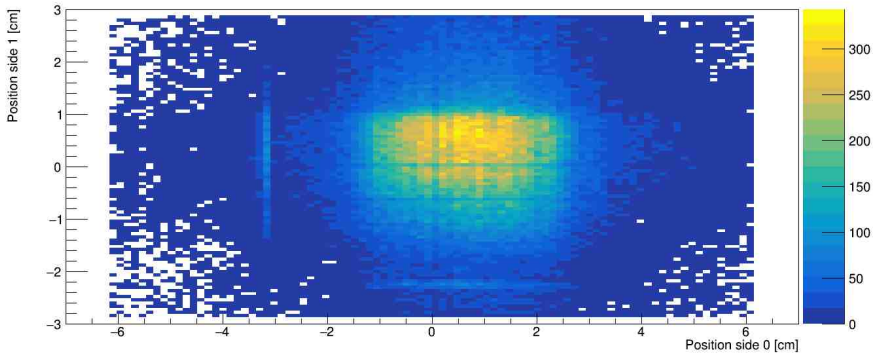
timing correlation

Time correlation

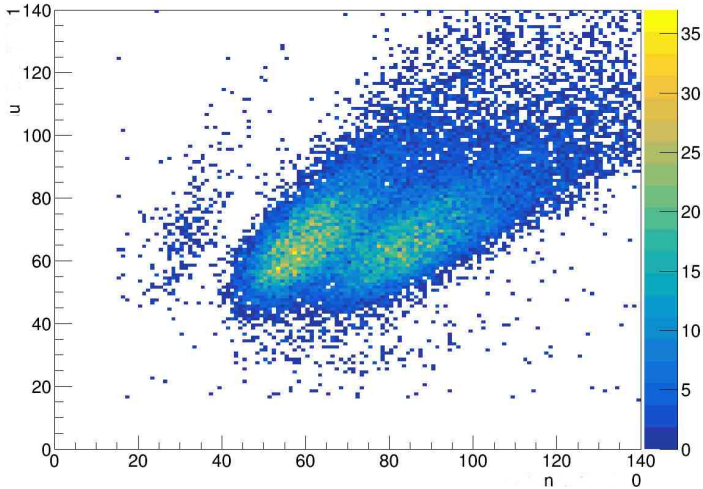


Beam profile

Beam profile

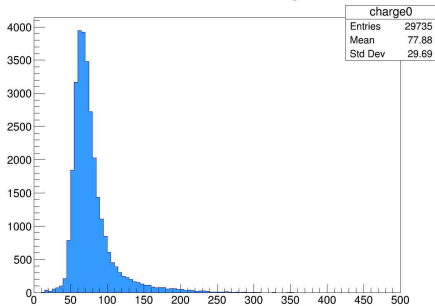


Cluster charge correlation



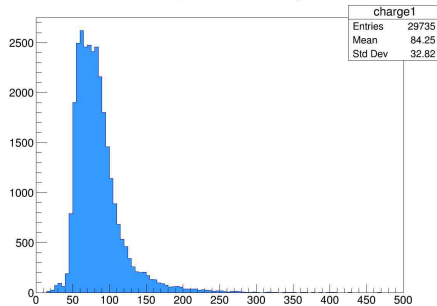
Cluster charge distribution correlation

0



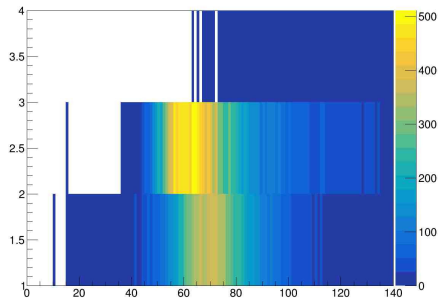
V side

1

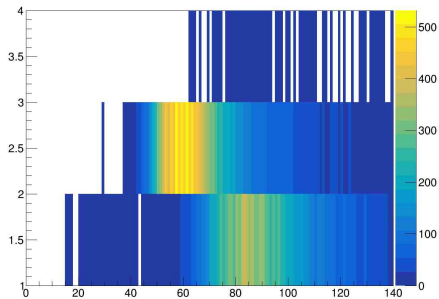


U side

Cluster charge distribution vs cluster size



V side

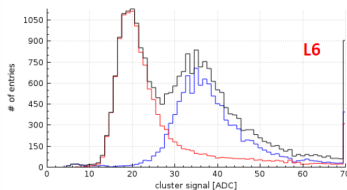
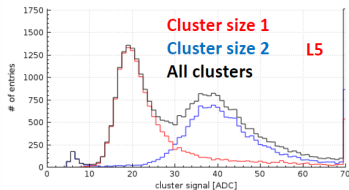
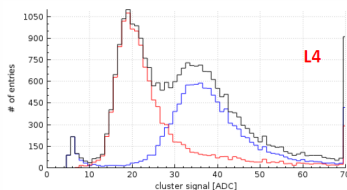
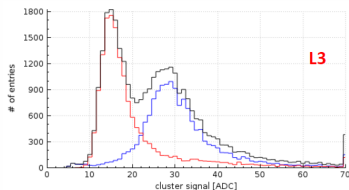


U side

Cluster reconstruction

SVD Signal-to-Noise (n-side)

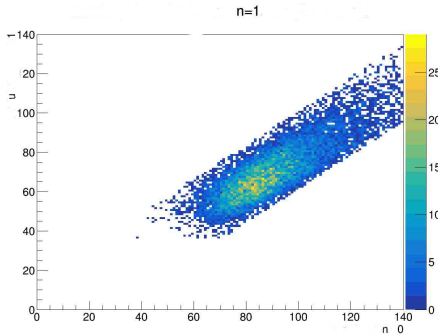
n-side ~ 14...38



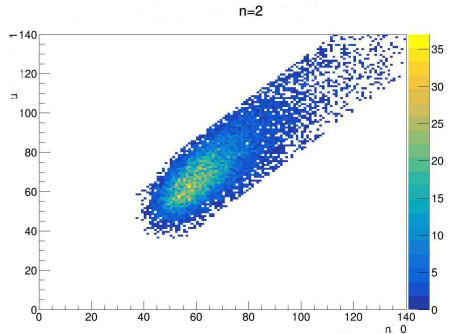
C.Marinas

presentation ...

Cluster charge correlation



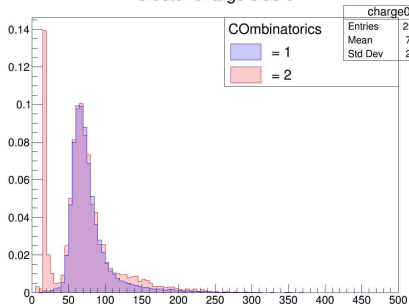
cluster size 1



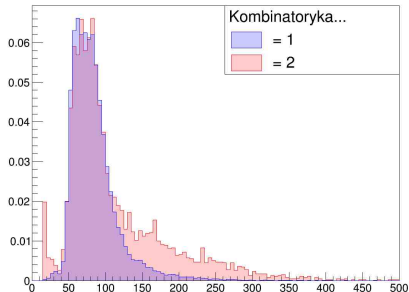
cluster size 2

Cluster charge distribution vs # of hits

Cluster charge side 0



Cluster charge side 1

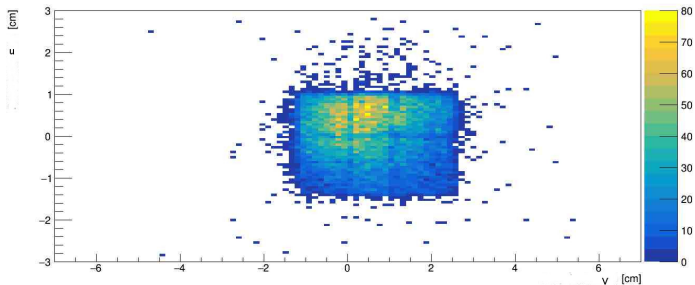


v side

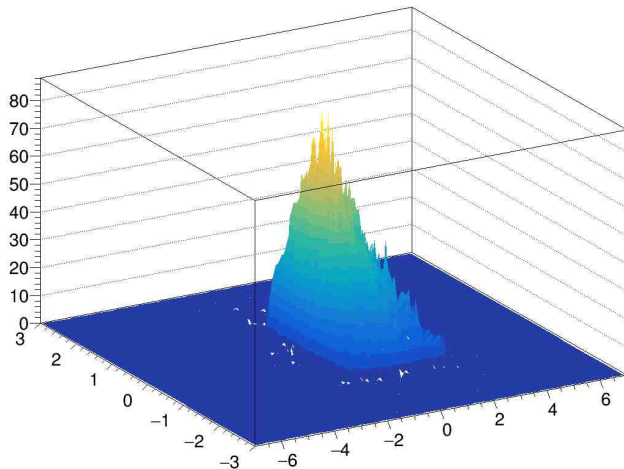
u side

In case of additional noisy cluster on one side (comb.=2), we have $\approx 25\%$ noise/ additionally wrongly reconstructed clusters (taken into account in normalization comb=2)

Beam profile after cuts



Beam profile after cuts



Conclusions

- Desy beam test, cluster reconstruction for 3D space point reconstruction
 - charge for single strip clusters is larger and (especially u side)
 - should be checked with newer clustering algorithm
 - we can have a clean sample of clusters without bias from tracking (although low efficiency)
 - only over MIP particles in the beam, we cannot simulate
- we cannot confirm Giacomo's finding that charge calibration is different for different layers (?)
- to do list:
 - correction for timing
 - clustering for "single strip" clusters
 - crosscheck efficiency on BT data
 - comparison with simulation.

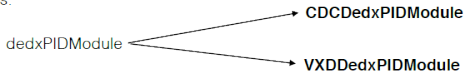
backup

Energy loss in SVD

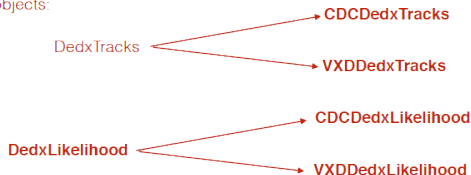
Overview of proposed dE/dx reconstruction changes

- Currently, all dE/dx reconstruction tasks, including determination of likelihood values are performed in one module
 - includes measurement in the CDC, SVD (and PXD)
- The reconstruction in CDC should be separated from silicon
 - two very different detectors
 - separate calibration procedures

Modules:



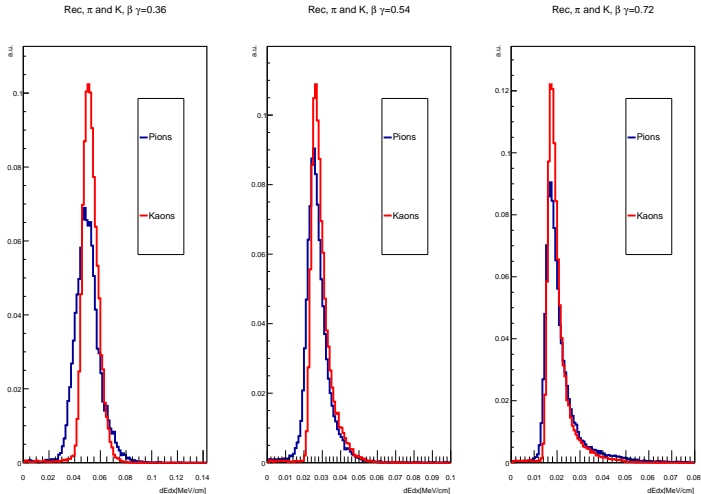
Dataobjects:



Energy loss in SVD

Energy lost after the reconstruction, universality check:

- each particle should have same energy deposit for same $\beta\gamma$



Energy loss in SVD

Energy lost after the reconstruction, universality check:

- each particle should have same energy deposit for same $\beta\gamma$

