

Status of the FPCCD software

Physics and Software meeting

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Current Status of FPCCD software

- FPCCD digitizer
 - Energy deposit is approximated by Landau distribution.
- The pixel occupancy by pair-background was rechecked.
 - Threshold was set to 100 electrons.
- The resolution of VTX detector on μ^- (100GeV) was checked.
 - SiliconTracking processor in MarlinReco was used.

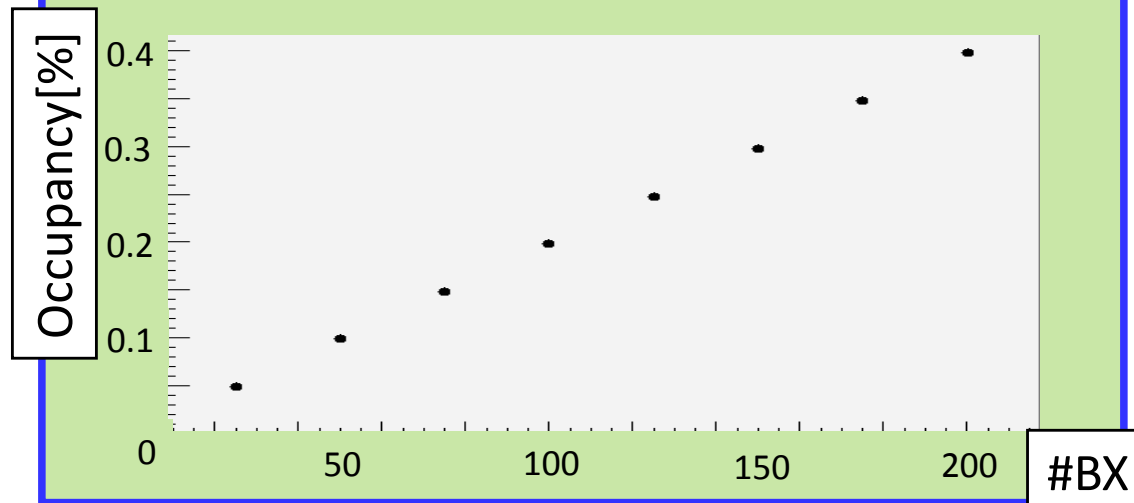
Estimation of pixel occupancy

- The pixel occupancy by pair-background was checked.

Background conditions

- Generator : Guinea Pig
- Beam parameter :
SB2009w/TF
- CM energy : 500 GeV
- Range cut : 0.1 mm
- **Threshold : 100 electron**

Pixel occupancy of the innermost layer vs #BX

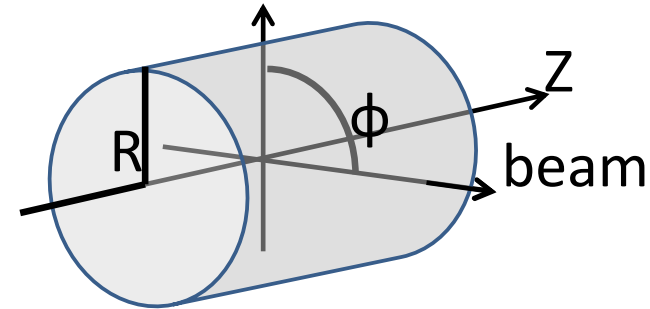


Expected pixel occupancy for 1train(1312BX)

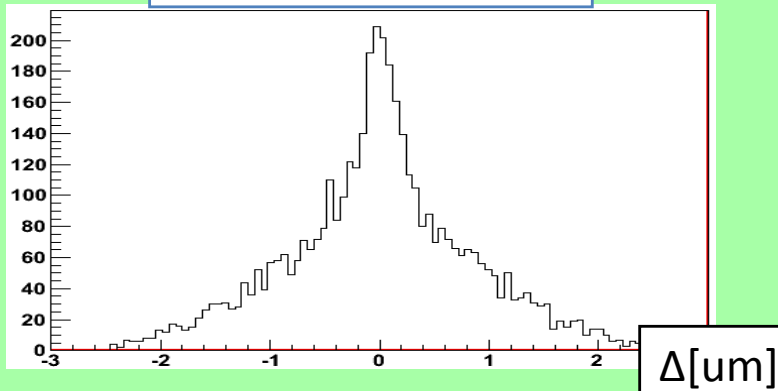
- **Innermost layer : ~2.6%**
- **second layer : ~1.4%**

Position resolution of each hit

- The difference between true hit and clustered hit.
 - μ - (momentum 100 GeV)
 - Innermost layer

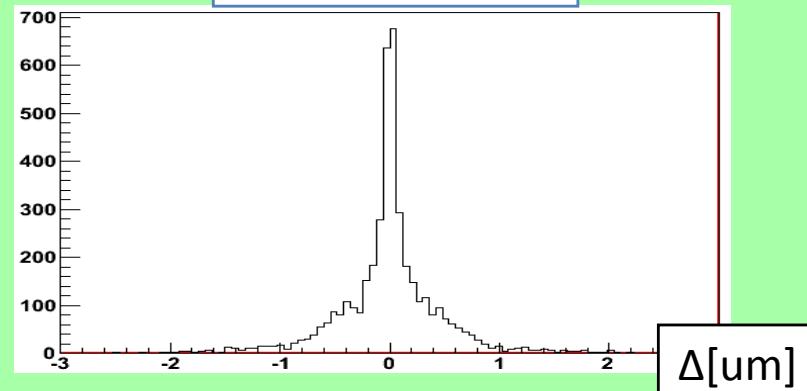


R- ϕ direction



$$\underline{\sigma_{R-\phi}} = 0.86 \text{ } \mu\text{m}$$

Z direction



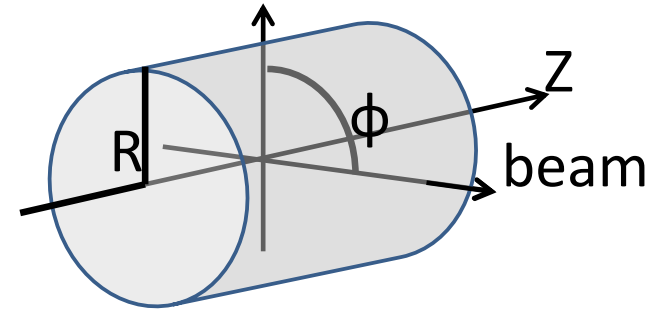
$$\underline{\sigma_Z} = 0.39 \mu\text{m}$$

Impact parameter resolution

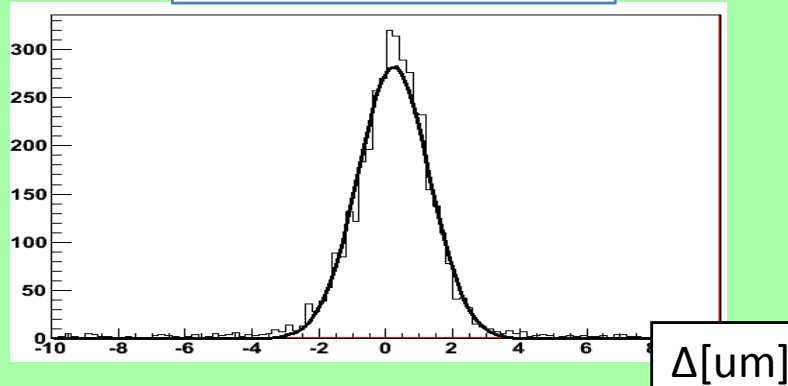
- The difference between true vertex and reconstructed vertex.

- μ - (momentum 100 GeV)

- $\sigma = 5 \oplus \frac{10}{p\beta \sin^{3/2} \theta} (\mu\text{m})$ is required.

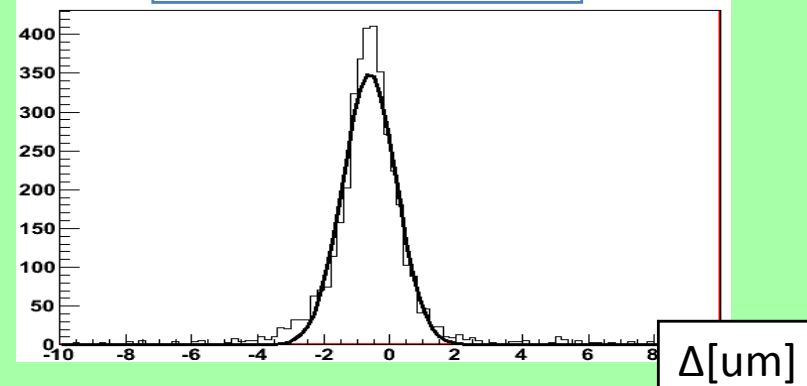


R- ϕ direction



$$\underline{\sigma_{R-\phi} = 1.1 \mu\text{m}}$$

R-Z direction



$$\underline{\sigma_{R-Z} = 0.82 \mu\text{m}}$$

FPCCD fills the required performance for 100GeV muon.

Summary/Plan

Summary

- The pixel occupancy by pair-background was rechecked.
 - Threshold was set to 100 electrons.
 - Innermost layer : $\sim 2.6\%$
 - second layer : $\sim 1.4\%$
- The resolution of VTX detector on μ^- (100GeV) was checked.
 - Position resolution
 - $\sigma_{R-\phi} = 0.86 \text{ um}$
 - $\sigma_z = 0.39 \text{ um}$
 - Impact parameter resolution
 - $\sigma_{R-\phi} = 1.1 \text{ um}$
 - $\sigma_{R-Z} = 0.82 \text{ um}$

FPCCD fills the required performance for μ^- (100GeV).

Plan

- The performance of VTX detector with pair-background will be checked.
- Algorithm to reject background hits based on the cluster shapes will be developed.