

# SVD Simulation

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# Outline

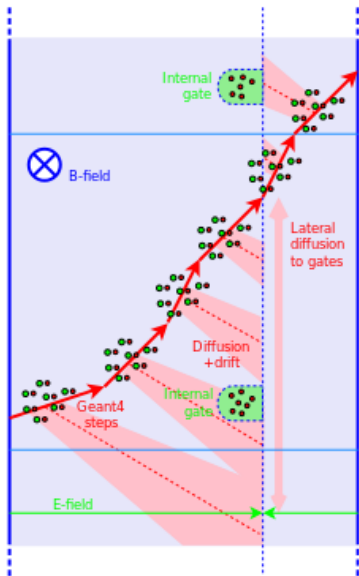
**SVD simulation**

**VXD misalignment**

**SVD Validation**



# VXD simulation



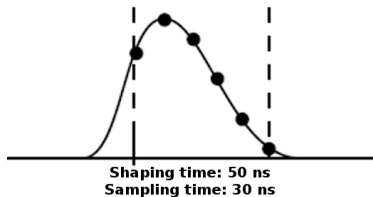
## Data re-organization:

- Merge PXDSimHits to compound objects (Martin Ritter, summer 2014)
  - Merge Geant4 steps forming nearly linear segments into a single SimHit
  - Save detailed energy deposition profile along the segment



Figure : Simulation of charge transfer in a silicon

# SVD simulation



**Figure :** SVD APV25 samples taken in a single strip readout

## Data re-organization:

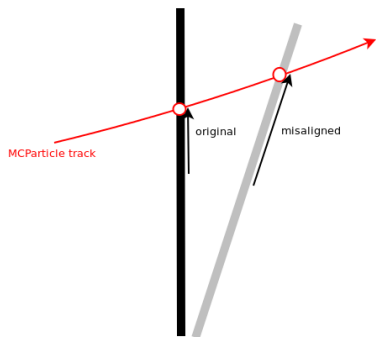
- Merge SVDDigits to contain all APV25 waveform samples
  - 6 APV samples per SVD digit rather than one
    - More efficient storage
    - More efficient processing
  - Requires uncomplicated changes in several basf2 modules
  - Backward incompatible. I will circulate the patch for people to see the effects beforehand.

## SVD hit time reconstruction

- Determine SVD hit time from the waveform signals on clustered strips
- Important for SVD occupancy studies (currently we cheat by looking at MC data)
- Tightly bound with SVD digits format so waiting in the pipeline.



# VXD misalignment



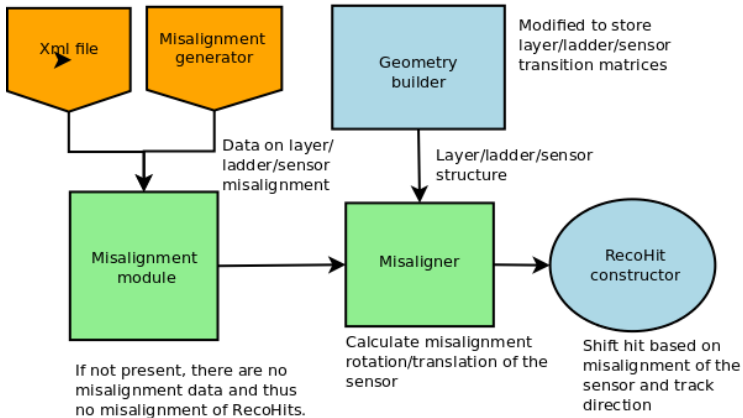
**Figure :** When geometry differs from expected, we observe shifts in measurements.

## Misalignment

- Use a different geometry in simulation and reconstruct in nominal geometry to test alignment procedures.
- For economy, it is convenient to distort a simulation in nominal geometry to mimic a result with a distorted geometry
  - Simulate in nominal geometry
  - Shift hits on sensors to imitate a different geometry
- To apply misalignment, we need to:
  - Calculate the correction to 3D transformation for the sensor plane.
  - Calculate the shift of the cluster position (this requires MC information, as it depends on track direction)



## VXD misalignment implementation



**Figure :** Misalignment implementation



# SVD Validation

## Validation

- The validation framework provides a set of plots and numerical values to quickly check the validity of simulation and reconstruction.
- The main purpose is to have constant control over quality of simulations
- It is also an important development tool, especially with extensive changes to the software.

## Validation in SVD

- SVD does not currently have its validation tools (pxd does)
- **Daniel Cervenkov** from Prague is now finishing the task and will commit his first version shortly (by B2GM)



# Conclusions

- VXD simulation working, additional features are being added
- SVDDigit format will be changed after the B2GM to not interfere with analyses targeted to the conference.
- VXD misalignment will be committed later this week.
- SVD validation tools will be committed by B2GM.





# Thanks

Thank you for attention.

