

Technical Update of the MVD Software

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PANDA Collaboration Meeting, Stockholm, 14.06.2010



① SDS Package

② MVD Update

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Situation

Several detectors are basically the same with:

- flat pieces of semiconductor
- pixel/strip like readout
- similar frontend electronics

Code situation: HYP and LMD copied MVD code.

Some unwritten rule of coding says:

Don't write code twice!

Solution

Introducing a new package in PandaRoot:

Semiconductor Detector System

- Extraction of the shareable MVD code.
- Inherit MVD, LMD & HYP from SDS

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SDS Contents

- Detector MC response
- Digitization classes for strip & pixel readout
- Charge digitization (only time over threshold, yet)
- Electronic noise
- Clusterfinders & hit reconstruction
- Parameter & I/O interaction with the framework
- Abstract interface via inheritance, virtual functions & strings

SDS Organisation

- libSds: Monte-Carlo, digitization, noise, parameters
- libSdsReco: clusterfinders, hit reco
- libPndData: data classes
- libGeneralTools: PndGeoHandling

MVD & LMD are modified accordingly, HYP not.

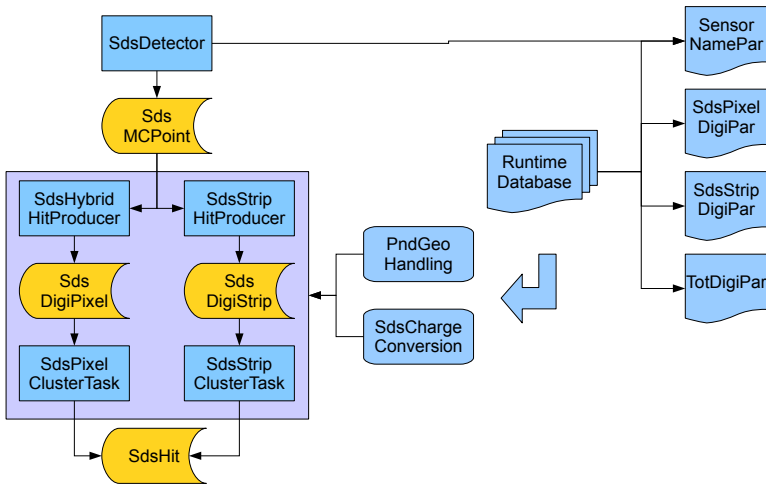
SDS Contents

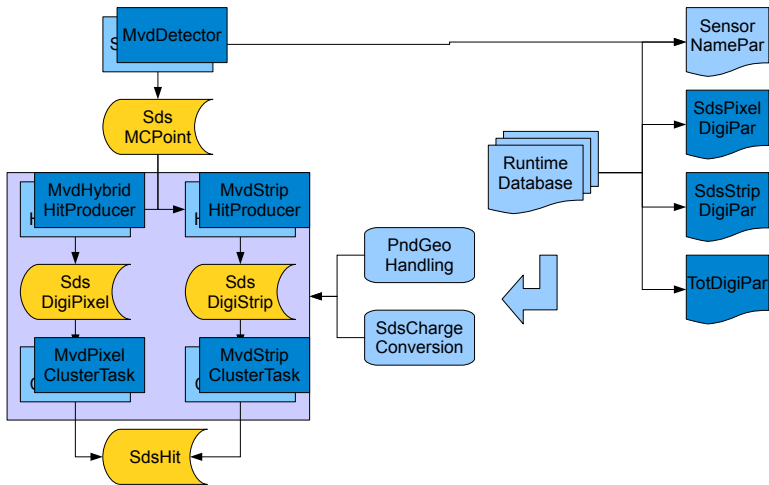
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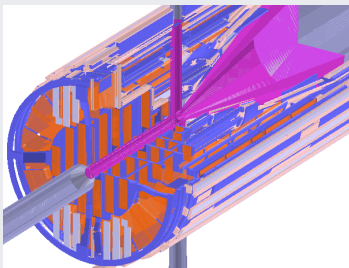
Geometry

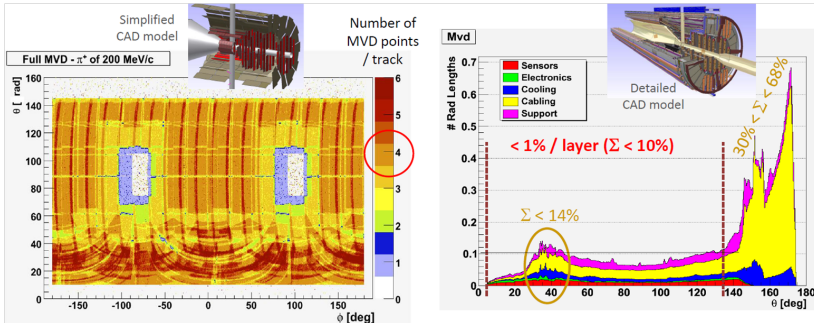
- Derived from the CAD model
- Updated sensor positions
- **Detailed** passive material, including
 - carbon frame
 - cooling pipes
 - cable routing
- Updated medium_pnd.geo table
- Optional additional forward disks (only “hovering” sensors + carbon)

Files in pandaroot/geometry:

- Mvd-2.1_FullVersion.root (default)
- Mvd-2.1_Sensitive.root (sensors only)
- Mvd-2.1_AddDisks_FullVersion.root (default + more forward disks)
- Mvd-2.1_AddDisks_Sensitive.root (only sensors + forward disks)

Documentation: <http://panda-wiki.gsi.de/cgi-bin/view/Mvd/MvdPublic>





Coverage Test

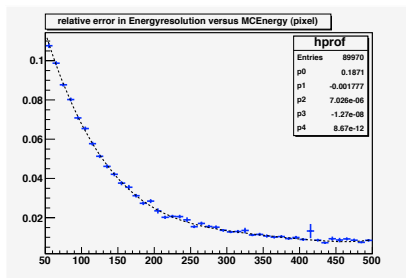
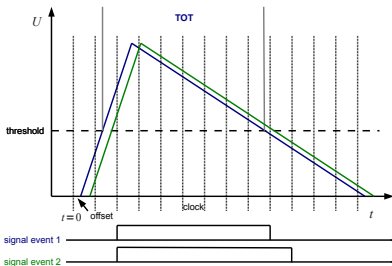
- 3-5 hits per track
- Holes at the Target pipe

Material budget

- Sensors: $2\% X_0$
- Complex routing at 40° : $14\% X_0$ max
- Barrel part: below $10\% X_0$

Charge Digitization

- Digis contain now digitized charge information
- Interface class `PndSdsChargeConversion` with virtual functions `DigiValueToCharge` & `ChargeToDigiValue`
- Implementations: `PndSdsIdealChargeConversion` and `PndSdsTotChargeConversion`
- More can be plugged in easily, if needed



Thanks for listening.