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## Subject: Mvd Development Status

Posted by [Ralf Kliemt](#) on Mon, 14 May 2007 15:05:34 GMT

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Hello everyone,

This thread will cover the development communication for the PANDA Mvd in PandaRoot. I'll try to update this first post to have a summary what is done and what is next. Comments on the code itself shall be the central part of the discussion here.

Here is a list of items [09/2008], which have to be done:

### Digitization

implement root based geometry file	[DONE]
channel mapping	[DONE]
frontend emulation	[DONE]
parameter definitions & database	[DONE]
noise emulation	[DONE]
timestamp ordering for digis	[RK]
multiple hit digi merging	[RK]

### Cluster Reconstruction

alignment	[ - ]
channel back-mapping	[DONE]
cluster finding	[DONE]
output data structure	[partly done/additions needed] (genfit compatible)
Ideal reconstruction	[RK (done) is it needed]
timeordered clusterfinding	[RK]

### Tracking/Pattern recognition

ideal track finding	[DONE]
conformal mapping?	[ - ]
riemann algorithm	[DONE]
local PID	[DONE]

### Event mixing

event time distance sampling	[ - ]
electronics delay & clock	[ - ]

More has to come during the discussion.

The following macros are a bit old. They will be revised.

Mvd MC simulation (Geant Transport)

Toggle Spoiler

macro/mvd/runMvdSim.C

```
gSystem->Load("libMvd");
```

```
...
```

```
CbmDetector *Mvd = new MvdDetector("MVD", kTRUE);
```

```
Mvd->SetGeometryFileName("MVD14.root");
```

```
Mvd->SetVerboseLevel(0);
```

```
fRun->AddModule(Mvd);
```

The output data are MvdPoint objects (inherited from CbmPoint).

To access them manually you might want to have a look into macro/mvd/anaMvdSim.C.

Mvd Digitization

Toggle Spoiler

The Mvd Digitization is almost done. There is only a nice Parameter handling missing and the hard coded values have to be removed. To use the digitization with both Pixel and Strip detectors put the corresponding hitproducers into your macro.

```
//
=====
// ===== Hit Producers =====
//
=====
=====

// ----- MVD Strip hit producer -----
double topPitch=0.004921,
      botPitch=0.0042969,
      orient=TMath::Pi()*(0.5),
      skew=TMath::Pi()*(-0.5),
      threshold=0., noise=0.;
int topFE = 10, botFE = 4, nrFEChannels = 128;
MvdStripHitProducer* mvdHitProd
  = new MvdStripHitProducer(topPitch, botPitch, orient, skew,
                           topFE, botFE, nrFEChannels, threshold, noise);
mvdHitProd->SetVerbose(iVerbose);
fRun->AddTask(mvdHitProd);

// ----- MVD Pixel hit producer -----
Double_t lx=0.01, ly=0.01, threshold=000, noise=00;
MvdHybridHitProducer* mvdPixProd = new MvdHybridHitProducer(lx,ly,threshold,noise);
mvdPixProd->SetVerbose(iVerbose);
fRun->AddTask(mvdPixProd);

//
=====
```

```

==
// ===== End of HitProducers =====
//
=====
==

```

There will be later a combined task for everything, including the parameter readout from an external ascii file. The output are MvdDigiPixel and MvdDigiStrip data containing mainly Channel and Frontend numbers and Charge.

## Mvd Reconstruction

### Toggle Spoiler

There is a factory switching the different types of Reconstructions. So far there is only the "Simple" Clusterfinder which is under construction now.

However there is the Monte-Carlo-Clustering there which generates MvdClusters directly from the MvdPoints and which applies a gauss smearing. Here is how you shall use it:

```

gSystem->Load("libgenfit");
gSystem->Load("libtpc");
gSystem->Load("libtpcreco");
gSystem->Load("librecotasks");
gSystem->Load("libMvd");
gSystem->Load("libMvdReco");
...
// ----- Ideal Cluster Producers -----
MvdIdealRecoTask* mvdirec = new
MvdIdealRecoTask(0.01,0.01,0.005);//(SigmaX,SigmaY,SigmaZ)
mvdirec->SetVerbose(iVerbose);
fRun->AddTask(mvdirec);

```

The libraries have to have this particular order until librecotasks doesn't depend on the libtpcreco anymore. Following the tpc example I made a second library, libMvdReco, which depends on libMvd, libgenfit and librecotasks.

The output are MvdCluster and the three parameters are the smearing in the local sensor system with z being the sensor thickness.

## Mvd Tracking

### Toggle Spoiler

The ideal tracking is started. But we need still some communication with the tracking group and we have to see how to put this together with the GEANE stuff.

```

gSystem->Load("libgenfit");
gSystem->Load("libtpc");
gSystem->Load("libtpcreco");
gSystem->Load("librecotasks");

gSystem->Load("libMvd");
gSystem->Load("libMvdReco");

```

...

```
MvdIdealTrackingTask* mvdmcitrk = new MvdIdealTrackingTask();  
fRun->AddTask(mvdmcitrk);
```

Thoughts on PID

Toggle Spoiler

Tobias Baldauf, a student at Dresden, made a task for doing some particle identification on  $dE/dx$  for only Mvd Monte-Carlo Points. It is like a MC truth based trackfinding combining the energyloss information.

The corresponding task is MvdIdealPidTask and the Output is MvdPidCand objects.

```
gSystem->Load("libgenfit");  
gSystem->Load("libtpc");  
gSystem->Load("libtpcreco");  
gSystem->Load("librecotasks");
```

```
gSystem->Load("libMvd");  
gSystem->Load("libMvdReco");
```

...

```
Double_t trunc=0; //switch for different treatments of calculating the  $dE/dx$  mean for a Track  
MvdPidIdealTask* mvdpid = new MvdPidIdealTask(trunc);  
fRun->AddTask(mvdpid);
```

Have fun, Ralf.

## File Attachments

1) [Mvd\\_software\\_layoutstatus.jpg](#), downloaded 1977 times

## MVD Process Layout (Status Sep. 2008)

