Status report on the SciTil detector

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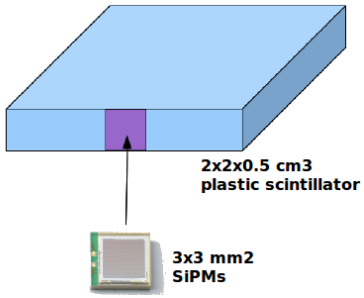
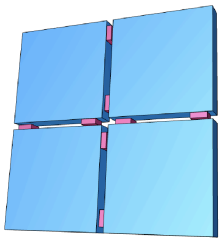
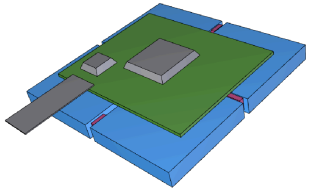
Scintillator Tile Hodoscope SciTil

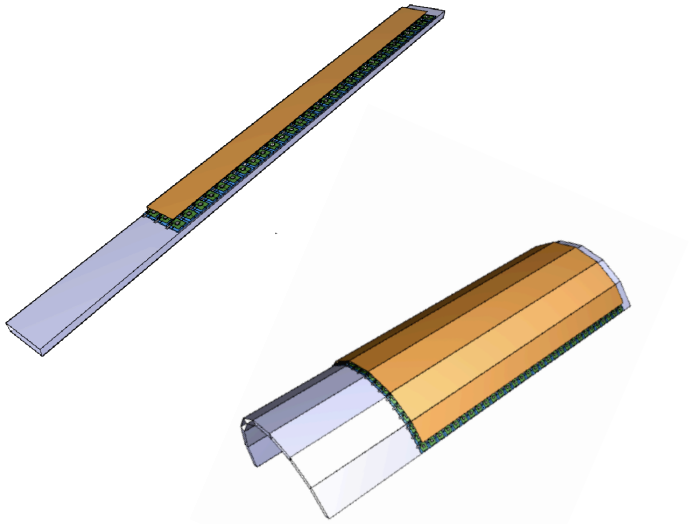
Timing Detector for PANDA

- Low material budget :1% radiation length
- Fast timing (100 ps)
- Preshower detector for detected photons
- charged/ neutral discrimination
- single input of charged multiplicity to 1° level event selection







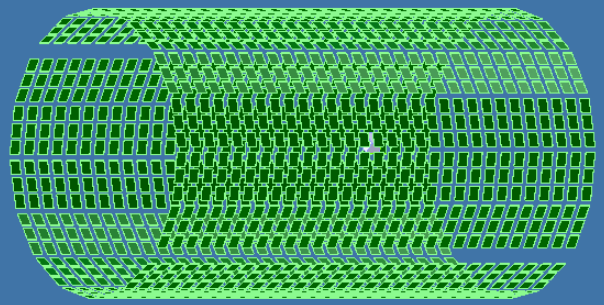


Proposal for a Scintillator Tile Hodoscope for PANDA

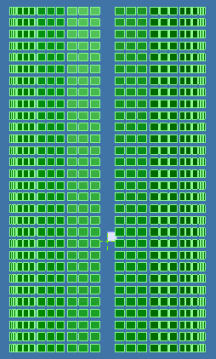
1. Four tiles arranged with their SiPMs for densest packing:
2. A quad module with a R&D PCB based on 8-channel readout ASIC and a data transfer chip.
3. Supermodule : 90 quad modules on top of a DIRC bar box.
4. Entire SciTil half barrel composed of 8 super-modules

Tech. Desing to be converted as Root Geometry

Same dimension as
previous tof barrel detector



Side view



Front view

Implementation on Pandaroot framework

Root Geometry : provided by T. Stockmanns
by using CadConverter program

Material : Polypropylene

Source code : **/trunk/scitil**

- PndSciT.cxx /h
- PndSciTPoint.cxx /h
- PndSciTHit.cxx/ h
- PndSciTProducerIdeal.cxx/h

Simulation Macro : **/trunk/macro/scitil**

- simulation macro : *sim_scit.C*
- fast analysis macro : *anaMCOpt.C*
- ideal hit production macro : *hit_scit.C*

SciTil source code : Detector Class

From the root geometry file : /geometry/SciTil_Barrel_woPCB.root

Source code : **/trunk/scitil/**PndSciT.cxx

```
// -----   Standard constructor   ------------------------------------------
        PndSciT::PndSciT(const char* name, Bool_t active)
          : FairDetector(name, active) {
            fSciTCollection       = new TClonesArray("PndSciTPoint");
            fVolumeID = -1;
            pvId=0;

            fListOfSensitives.push_back("SciTil");
```

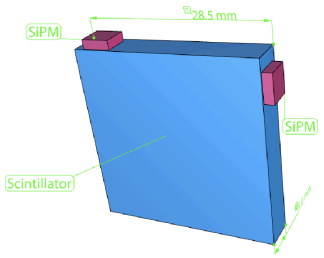
Simulation code : **/trunk/macro/scitil/sim_scit.C**

```
  FairDetector *SciT = new PndSciT("SCIT",kTRUE);
    SciT->SetGeometryFileName("SciTil_Barrel_woPCB.root");
    fRun->AddModule(SciT);
```

Stored Information as (Raw MC) Point and Hit Collection

PndSciTPoint.h

```
PndSciTPoint (Int_t trackID, Int_t evtID, Int_t detID,
              TString detName, TVector3 posin,
              TVector3 momin,  TVector3 posout,
              TVector3 momout,  Double_t tof, Double_t length,
              Double_t eLoss,Double_t charge,
              Double_t mass,  Int_t pdgCode)
```



PndSciTHit.h

Hit Position corresponds to the center point of each scintillating tile in the submodule

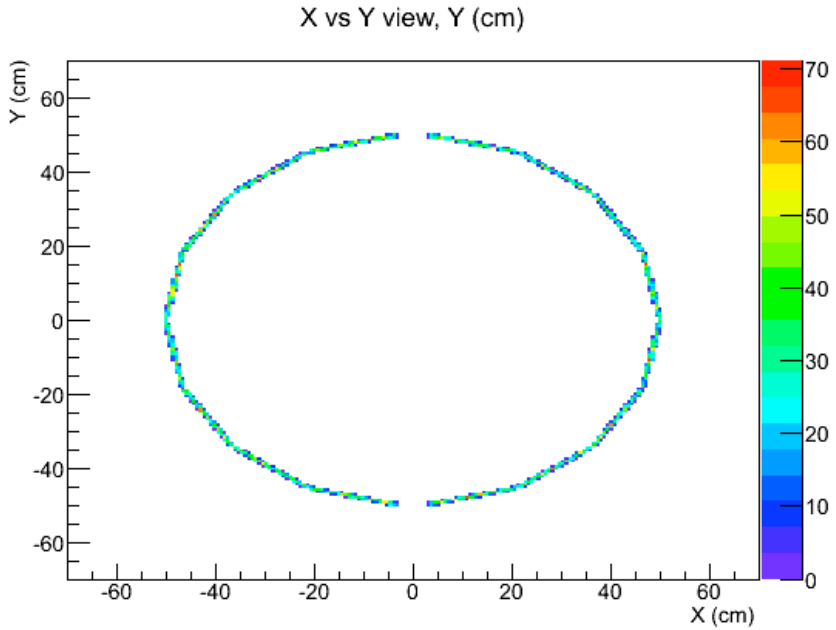
Time is smeared by the expected resolution of the detector ~ 100ps

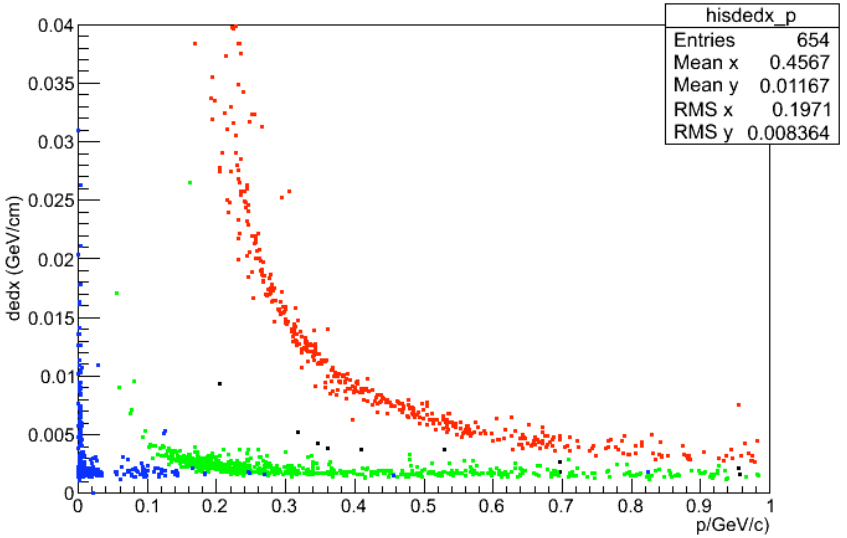
```
PndSciTHit (Int_t trackID,
            Int_t detID, TString detName,
            Double_ttime,Double_t dt,
            TVector3& pos,TVector3& dpos,Int_t index,
            Double_t charge);
```

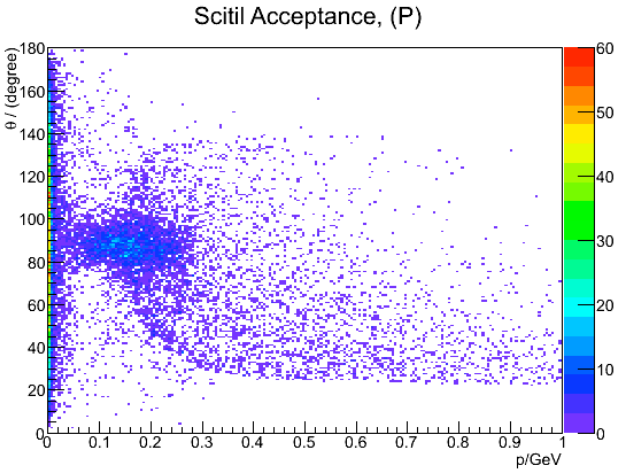
Raw MC information : SciTPoint

UrQMD generator

300 events, mult ~ 10 particles/event

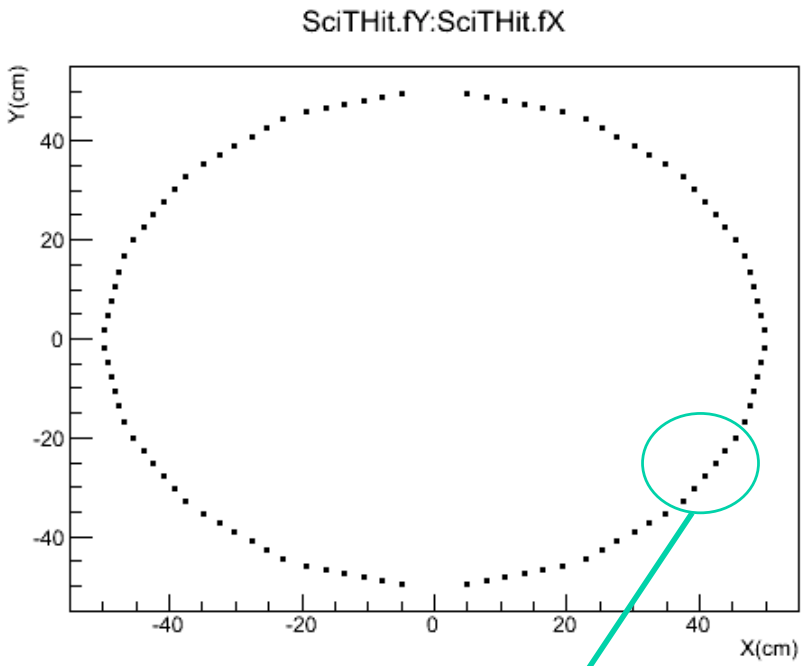




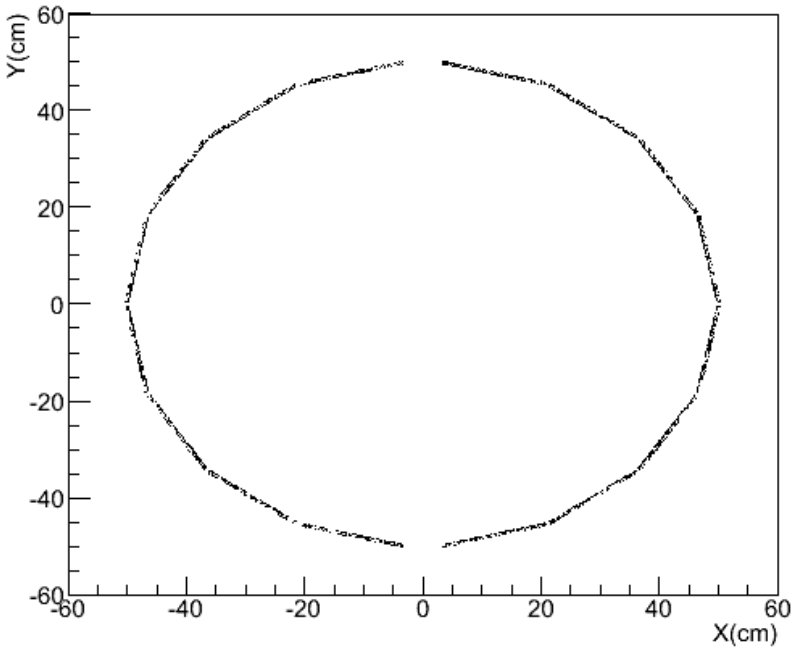


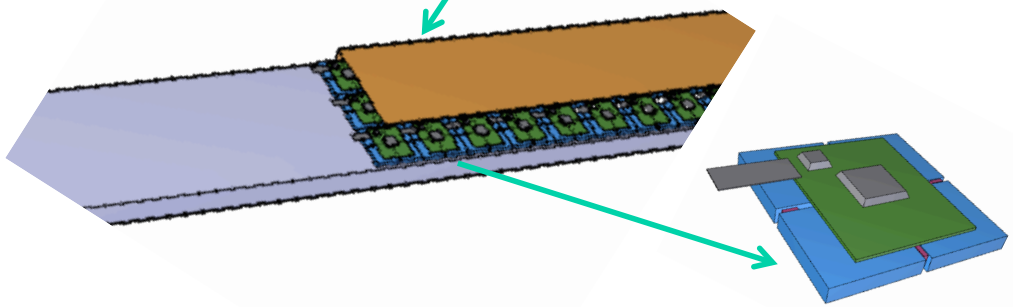
Ideal Hit Information

PndSciTHit.h



PndSciTPoint.h





Summary and Outlook

- A simple (only Scintillator tile, no electronic) geometry detector based on the Scintillator tile hodoscope detector proposal has been implemented within the Pandaroot Framework
- A more complex geometry, including R&D, is planned to be implemented as well
- A Root Macro to create the geometry is foreseen.
- In order to allow Time Based simulation, the inheritance of this detector class has to be done accordingly (See T. Stockmanns‘s Talk)