
Subject: Access to clusters properties

Posted by [Ronald Kunne](#) on Tue, 10 May 2011 06:56:49 GMT

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Good morning!

I have two questions on access to clusters properties.

The PandaRoot version I use currently is 11787, dated 5/5/11.

Thanks in advance,

Ronald Kunne

1) What is the simplest way to access the contents of the individual crystals, that make up a cluster?

My goal is to distinguish between clusters consisting of one or two gammas, i.e. pizeros.

I would like to do something like this:

```
TString inPidTPCFile = "pid_tpccombi.root";
```

```
TFile *inFile = TFile::Open(inPidTPCFile,"READ");
```

```
TTree *lhe=(TTree *) inFile->Get("cbmsim") ;
```

...

```
TClonesArray* cluster_array=new TClonesArray("PndEmcCluster");
```

```
lhe->SetBranchAddress("EmcCluster",&cluster_array);
```

...

```
// loop over events
```

```
NTevents=lhe->GetEntriesFast();
```

```
for (Int_t j=0; j< NTevents ; j++){
```

```
    lhe->GetEntry(j); // kinematics
```

```
// loop over clusters
```

```
    Int_t nclusters= cluster_array->GetEntriesFast();
```

```
    for (Int_t nc = 0; nc < nclusters; nc++) {
```

```
        PndEmcCluster *cl = (PndEmcCluster *)cluster_array->At(nc);
```

```
// access to energy and moments of cluster
```

```
    Double_t Energy = cl->energy();
```

```
    Double_t Z20 = cl->Z20();
```

```
    Double_t Z53 = cl->Z53();
```

```
    Double_t LatMom = cl->LatMom();
```

```
// (hypothetical) loop over crystals in this cluster
```

```
    Int_t ncrystals= crystal_array->GetEntriesFast();
```

```
    for (Int_t nx = 0; nx < ncrystals; nx++) {
```

```
        ...etc...
```

```
    }
```

```
}
```

}

2) The above method gives me access to the moments Z20, Z53 and LatMom.
How do I get access to *all* the moments available in

/emc/EmcData/PndEmcXCIMoments.h ?

Subject: Re: Access to clusters properties
Posted by [Dima Melnychuk](#) on Tue, 10 May 2011 09:22:27 GMT
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Hi Ronald,

My suggestions would be the following:

1) I assume that loop over crystals in individual cluster is loop over PndEmcDigi, which given cluster contain.

So instead

```
Int_t ncrystals= crystal_array->GetEntriesFast();
    for (Int_t nx = 0; nx < ncrystals; nx++) {

        ...etc...
    }
```

it would be

```
std::vector<Int_t>::const_iterator digi_iter;

const std::vector<Int_t> digiList = cl->DigiList();

for (digi_iter=digiList.begin();digi_iter!=digiList.end(); ++digi_iter)
{
    PndEmcDigi *digi = (PndEmcDigi *) DigiArray()->At(*digi_iter);

    // Whatever operation with digi
}
```

2) To access other cluster properties available in /emc/EmcData/PndEmcXCIMoments.h you should create object of this class and then access its methods.

In macro/emc/dedicated/reco_analys.C it is shown for PndEmcClusterEnergySums class and for PndEmcXCIMoments everything is similar.

At least you should add file containing PndEmcDigi TClonesArray

```
lhe->AddFriend("cbmsim", "digi_emc.root");  
TClonesArray* digi_array=new TClonesArray("PndEmcDigi");  
lhe->SetBranchAddresses("EmcDigi",&digi_array);
```

```
PndEmcXCIMoments xclmoments(*cl, digiArray);
```

```
// Whatever Zernike moment you need  
xclmoments.AbsZernikeMoment(1, 1);
```

Dima

Subject: Re: Access to clusters properties
Posted by [Ronald Kunne](#) on Tue, 10 May 2011 11:05:07 GMT
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Hi Dima,

Thanks for the info. I looked through your collection of macros and found an easy solution there. I got 1) to work as I described above with the following for the "hypothetical loop":

```
Int_t ndigi= digi_array->GetEntriesFast();  
Double_t digiEsum=0;  
for (Int_t i=0; i<ndigi; i++) {  
    PndEmcDigi *digi=(PndEmcDigi*)digi_array->At(i);  
    Double_t digi_energy=digi->GetEnergy();  
    digiEsum+=digi_energy;  
}
```

After the loop the sum over the digi energies is equal to the cluster energy as it should. I found this method in your /macro/emc/dedicated/digi_analys.C

2) does work indeed for

```
PndEmcClusterEnergySums esum(*cl, digi_array);  
(which is the example in your reco_analys.C).
```

But when using instead

```
PndEmcXCIMoments mom(*cl, digi_array);  
I get the error message: "gGeoManager does not exist" with root ending without a crash.
```

But with access to the digis I can calculate my own moments anyway.

Greetings,
Ronald Kunne
