P̄ANDA Backward Electromagnetic Calorimeter Studies with BaBar-like framework

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Outline

To do list

- Simulation physics:
  - Comparison new histos with old ones.
- Analysis signal/background separation.
- Single e^+ or e^-
- Single π^0 simulation.

Simulation physics

Last report shows results which could be a bit wrong, the analysis module was not checked. The analysis had to be repeated.
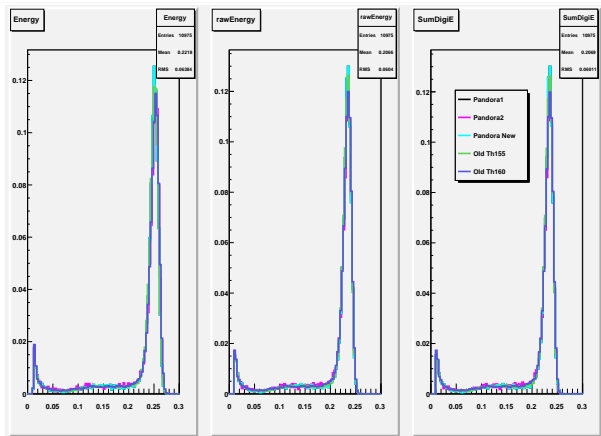
- Two cases have been simulated:
  - Using the testrelease "/data/puru2/maria/emcstudies0.17.0" at Bochum.

  - 250 MeV, $\phi=45^{\circ}$, $\theta=155$, No dead material:
    - bogusSingleGam1.tcl; simapp1.tcl; EmcBwStudyApp1.tcl.
    - RUNNUM: 123456; Nevents: 10000; geometryFile: "PANDAConfStraightCrystals.xml"
    - OUTPUT: "/home/moraespi/Treball/Panda/EmcBwStudies/SinglePhotonDiffVariables/ PhysicsAnalysis/pandora3.root"

  - 250 MeV, $\phi=45^{\circ}$, $\theta=160$, No dead material:
    - bogusSingleGam2.tcl; simapp2.tcl; EmcBwStudyApp2.tcl.
    - RUNNUM: 123457; Nevents: 10000; geometryFile: "PANDAConfStraightCrystals.xml"
    - OUTPUT: "/home/moraespi/Treball/Panda/EmcBwStudies/SinglePhotonDiffVariables/ PhysicsAnalysis/pandora4.root"

Check of the analysis module

The consistency of the analysis module which is used for the extraction of the physics values: "EmcBwStudy.cc" has been cheched. The result called pandora3.root show the results at Bochum.

Results can be found at:

"/home/moraespi/Treball/Panda/EmcBwStudies/SinglePhotonDiffVariables/RightPhis/ChecksModules"

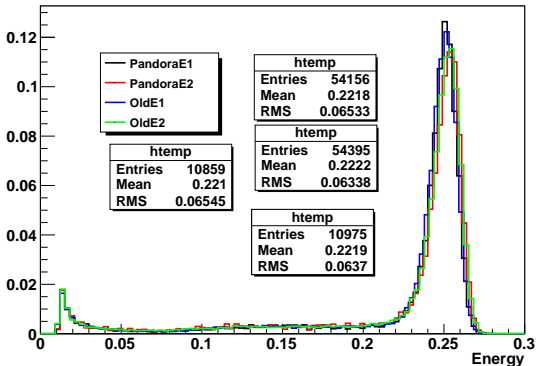# Compare Old simulation with Pandora simulation (physics values included)

Still from old analysis module but possibly right:

Files moved to:

"/home/moraespi/Treball/Panda/EmcBwStudies/SinglePhotonDiffVariables/PhysicsAnalysis/01Simul/"
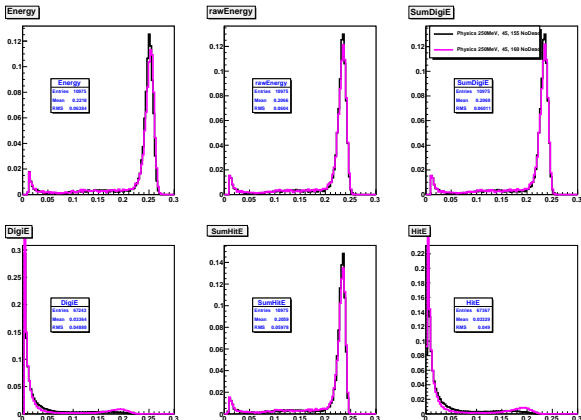
Energy

Some histos from new simulation and analysis

To be compared with Dmitry's simulation

"/home/moraespi/Treball/Panda/EmcBwStudies/SinglePhotonDiffVariables/PhysicsAnalysis/02simul/"

Analysis signal/background separation

- Macro:
  "/home/moraespi/Treball/Panda/EmcBwStudies/Macros/MatchingSignalBackground.C"

Cut conditions for signal/background separation

```
/// Codition for fill the background or signal histo;
for(cand=0; cand<nwc; cand++)
    {
      if(!(EnergyMC>Energy[i]*0.98&&EnergyMC<Energy[i]*1.02))
        {
          EnergyMC=tEnergyNew[cand];
          //          printf("Aha!!!%d %f, %f\n",ii, EnergyMC, Energy[i]);
          goodMC=cand;
        }
      else printf("NOOOO!!!\n");
    }
if(ncnd==0)continue;
for(cand=0;cand<ncnd; cand++)
    {
          if (maxEnergy<EnergyNew[cand])
        {
          maxEnergy=EnergyNew[cand];
          bestCand=cand;
        }
    }
```

```
if ((recoPx[bestCand]-truePx[goodMC]>0.010865||recoPx[bestCand]-truePx[goodMC]<-0.010865) &&
   (recoPz[bestCand]-truePz[goodMC]>0.010865||recoPz[bestCand]-truePz[goodMC]<-0.010865) &&
   (recoPy[bestCand]-truePy[goodMC]>0.010865||recoPy[bestCand]-truePy[goodMC]<-0.010865))
  {
    printf("Background!!!!!!!!!!!!!!!%f \n", recoPx[bestCand]);
    if(maxEnergy!=-999) EnergyMCHisto->Fill(maxEnergy);
  }
else
  {
    printf("signal!!!!!! %f\n", maxEnergy);
    if(maxEnergy!=-999) EnergyTotal->Fill(maxEnergy);
  }
```
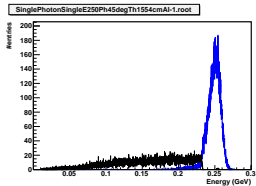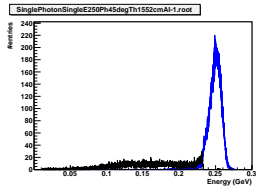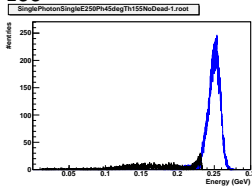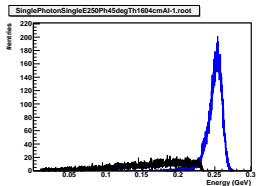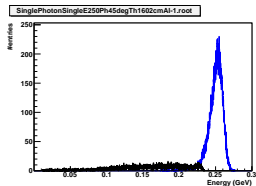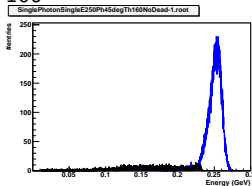
plots for 250 MeV

Outlook

- Simulation physics:
  - Comparison new histos with old ones.
    Which ones? Which aspects have to be compared?

- Analysis signal/background separation.
  Which ones? Which aspects have to be compared?

- Single e^+ or e^-
  Should I start with it?

- Single π^0 simulation.
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