Subject: Geant 3, Geant 4 VMC, native geant 4 comparison
Posted by Dima Melnychuk on Fri, 22 Feb 2008 11:20:53 GMT
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Hi again,

I put here a couple of plots that demonstrate difference in deposited energy for Geant3, Geant4 VMC and native Geant4.

So cluster_energy_full.jpg -

is energy deposited from 1GeV photon in emc barrel (theta=50, phi=0-360).

And it is comparable with energy deposited in EmcTest setup (5x5 PbWO4 crystals), implemented by Stefano.

So around 5% of energy is lost somewhere for Geant4 and it doesn't come from complicated emc geometry.

But with native Geant4 application

deposited energy is similar to Geant3 VMC and close to the value calculated by Jan in Babar framework for the whole EMC.
http://tau.ep1.rub.de/HyperNews/get/SimGenDisc/2159/1/1/1/1/1.html

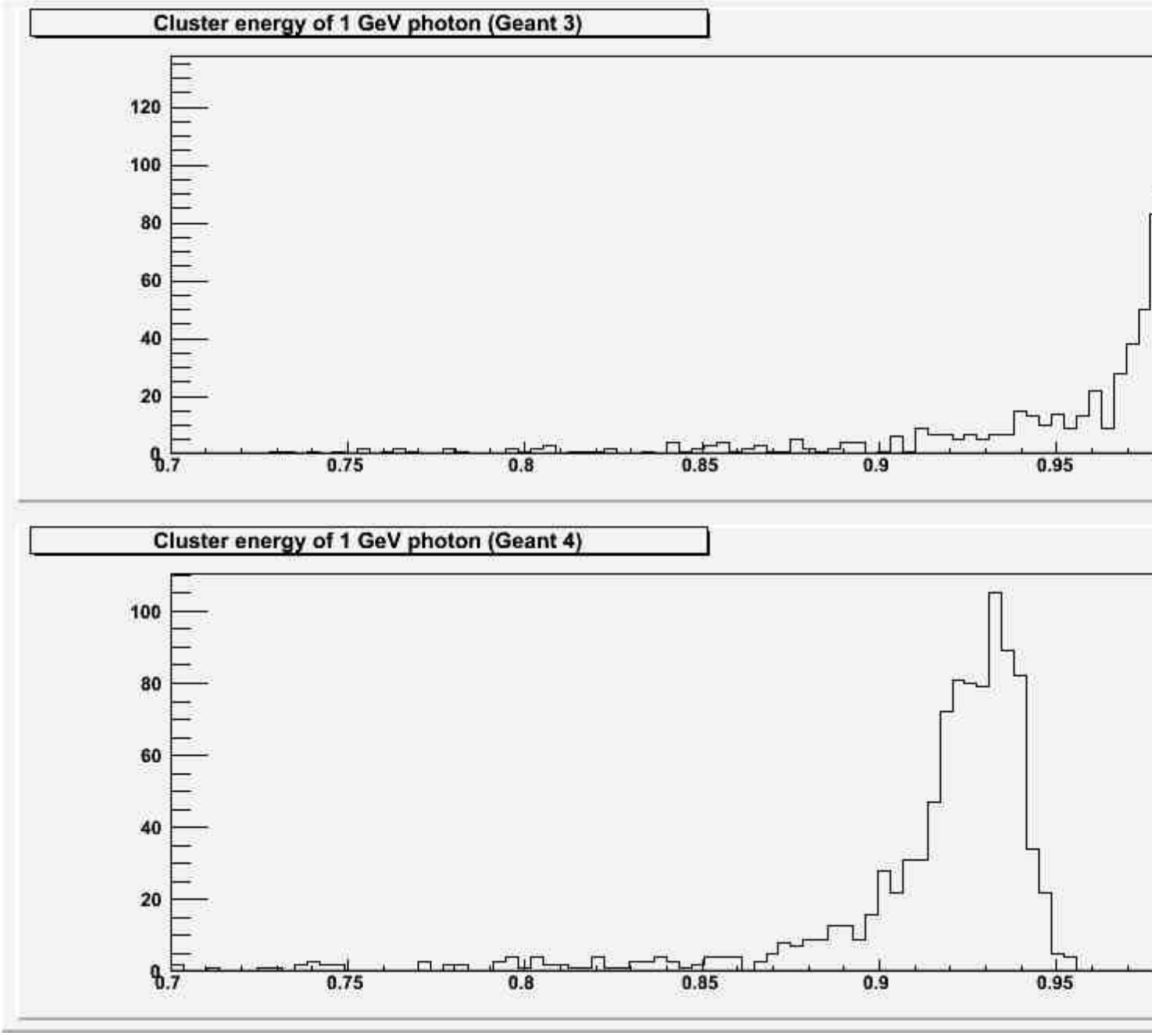
So the difference doesn't come from the different Geant4 version
4.7 in Babar framework vs. 4.9 in pandaroot (which I also used in native Geant4 application).

So the source of difference is still under investigation,

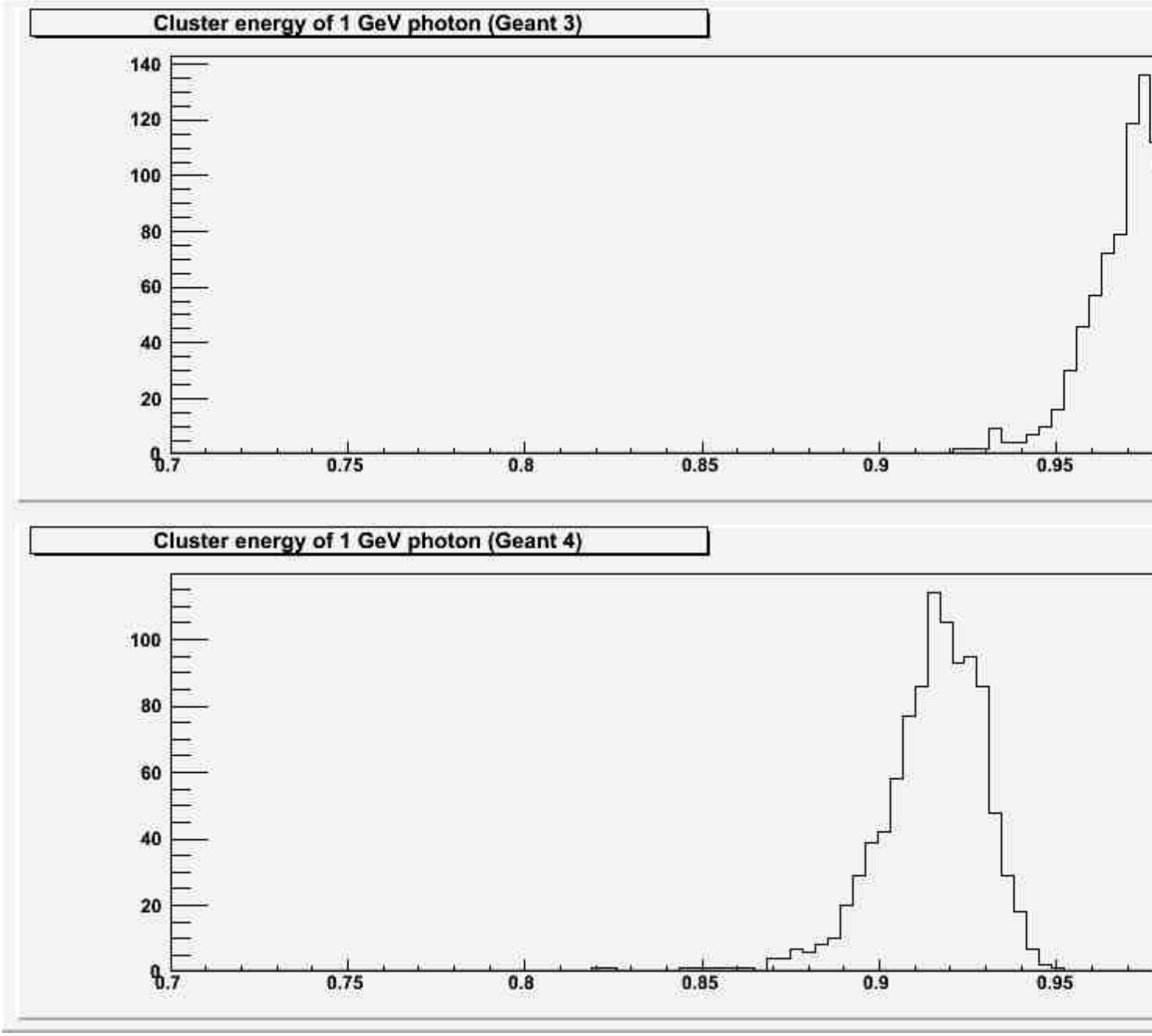
Dima

File Attachments

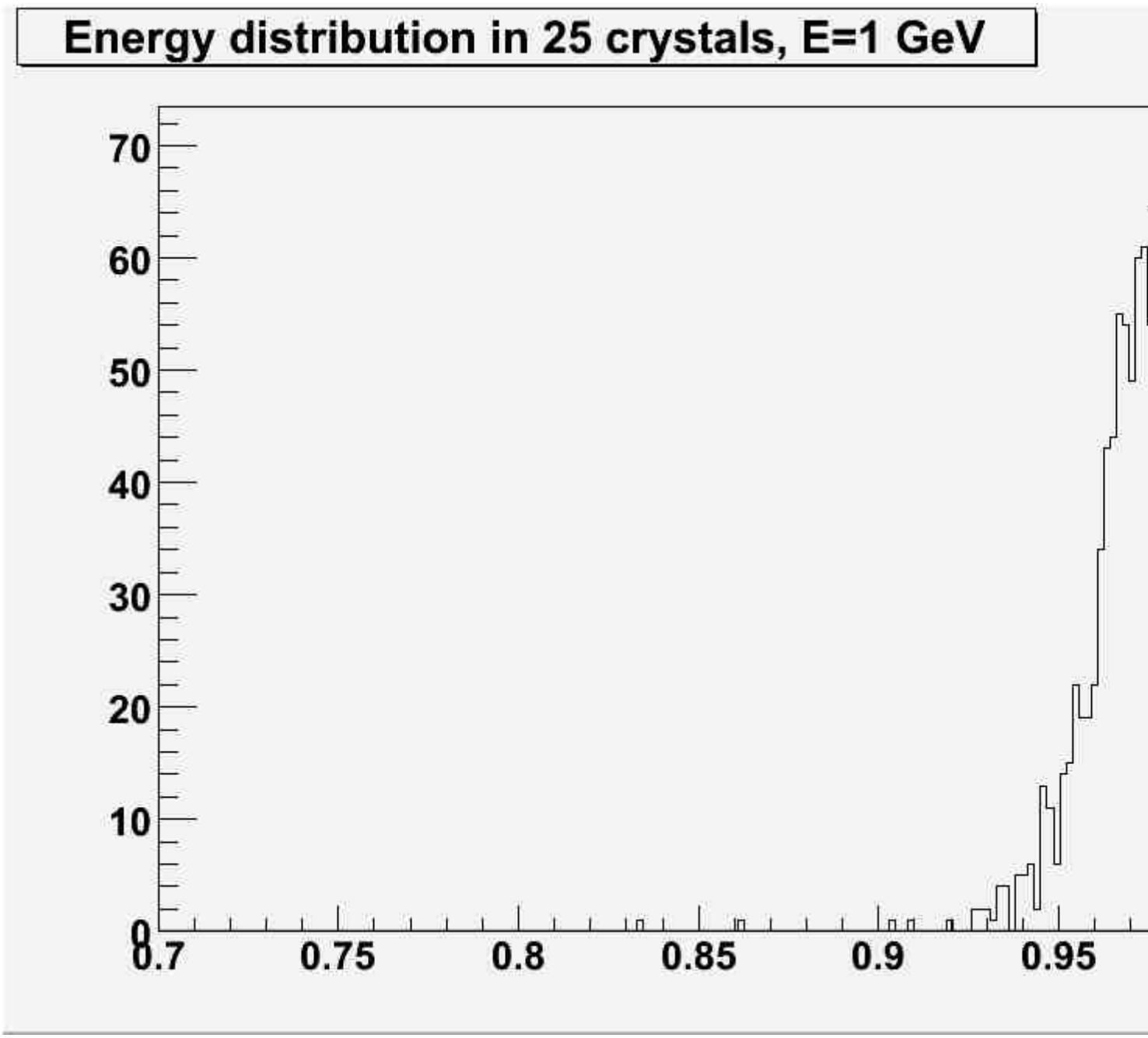
1) cluster_energy_full.jpg, downloaded 2671 times



2) cluster_energy_test.jpg, downloaded 2764 times



3) cluster_energy_g4.jpg, downloaded 2723 times



Subject: Re: Geant 3, Geant 4 VMC, native geant 4 comparison
Posted by StefanoSpataro on Fri, 22 Feb 2008 12:02:29 GMT
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Which physics list are you using for native Geant4?

Subject: Re: Geant 3, Geant 4 VMC, native geant 4 comparison
Posted by Dima Melnychuk on Fri, 22 Feb 2008 12:30:51 GMT
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I used standard Electromagnetic Physics List only - PhysListEmStandard.cc which I copied

from one of Geant4 examples (/geant4/examples/extended/electromagnetic/TestEm14/src/), but it is identical in most of electromagnetic examples. In Geant4 there are several alternative electromagnetic physics lists, but this is recommended.

And I used default cut value - 1mm, which is actually used in Babar framework.

In pandaroot in g4config.C there is a cut not in range but in energy - 1MeV, but when I run simulation in pandaroot whith Geant4 it prints energy cuts which correspond to 1 mm range cut for PWO (84.8 keV for gamma and 1.13 MeV for electrons) but if I put these values instead of 1 MeV the result is the same.

Dima

Subject: Re: Geant 3, Geant 4 VMC, native geant 4 comparison
Posted by Johan Messchendorp on Fri, 22 Feb 2008 12:38:44 GMT
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Hi Dima and others,

Thanks for looking into this problem. I think we can learn a lot from it.
I had another question. I was wondering whether it would make sense to run the Geant4 mini-EMC detector within the Geant4-VMC templates provided by Ivana in cbmsoft/transport/geant4_vmc/examples/.... This would be a simulation with the "native" Geant4-VMC, which might differ from - lets say - the CBM/PandaRoot-VMC.

Kind wishes,

Johan.

Subject: Re: Geant 3, Geant 4 VMC, native geant 4 comparison
Posted by Dima Melnychuk on Fri, 22 Feb 2008 12:42:09 GMT
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Hi Johan,

In principle I planned it ("native" Geant4-VMC) as the next step.

Dima

Subject: Re: Geant 3, Geant 4 VMC, native geant 4 comparison
Posted by Johan Messchendorp on Fri, 22 Feb 2008 12:45:19 GMT
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Great Dima,

Let me know the outcome....

Johan.

Subject: Re: Geant 3, Geant 4 VMC, native geant 4 comparison
Posted by Mohammad Al-Turany on Mon, 25 Feb 2008 20:26:25 GMT
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Hi all,

I tried to reproduce this problem, so I switched on only the emStandard list for G4 in the VMC which correspond to the PhysListEmStandard.cc used in native G4, i.e:

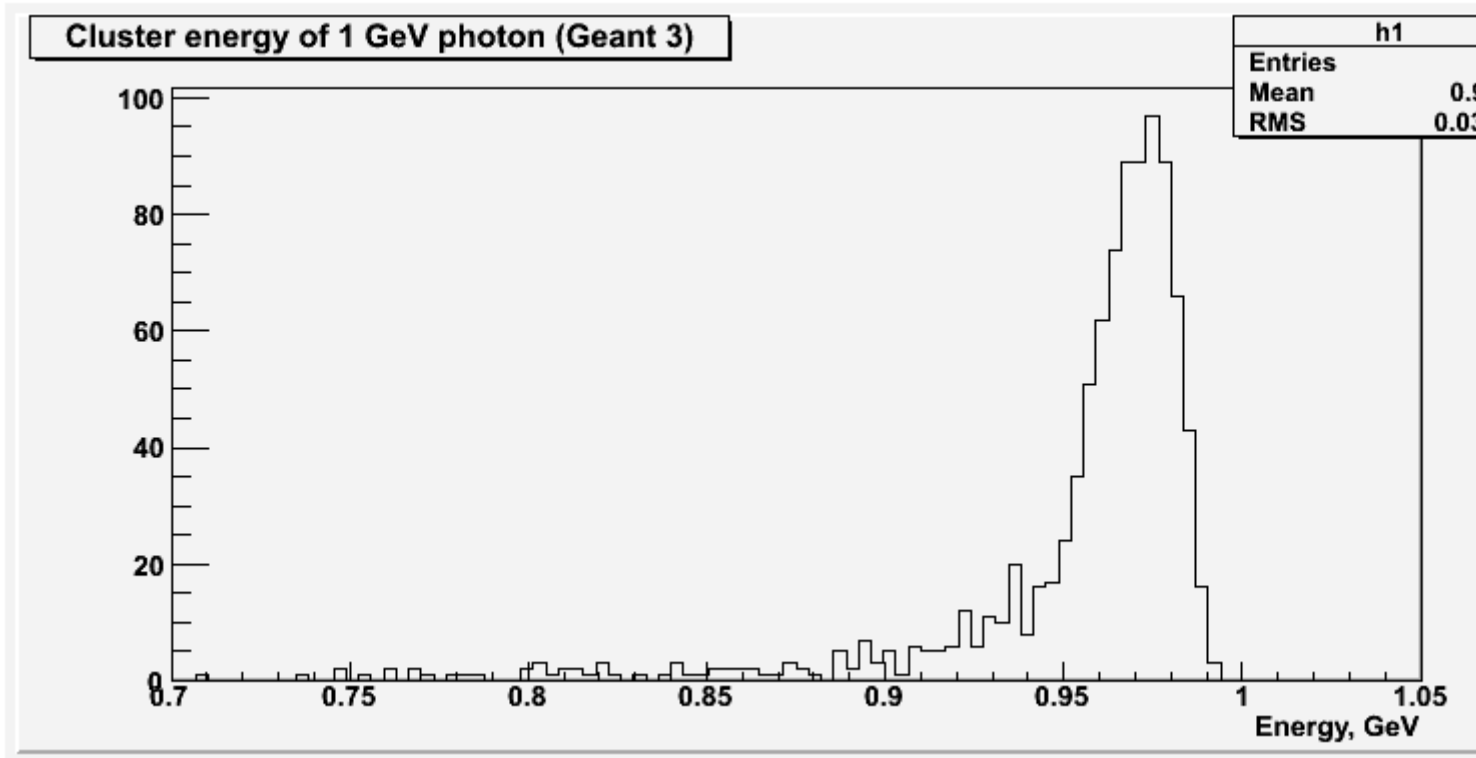
```
Config()
{
....
TG4RunConfiguration* runConfiguration
        = new TG4RunConfiguration("geomRoot", "emStandard");
...
}
```

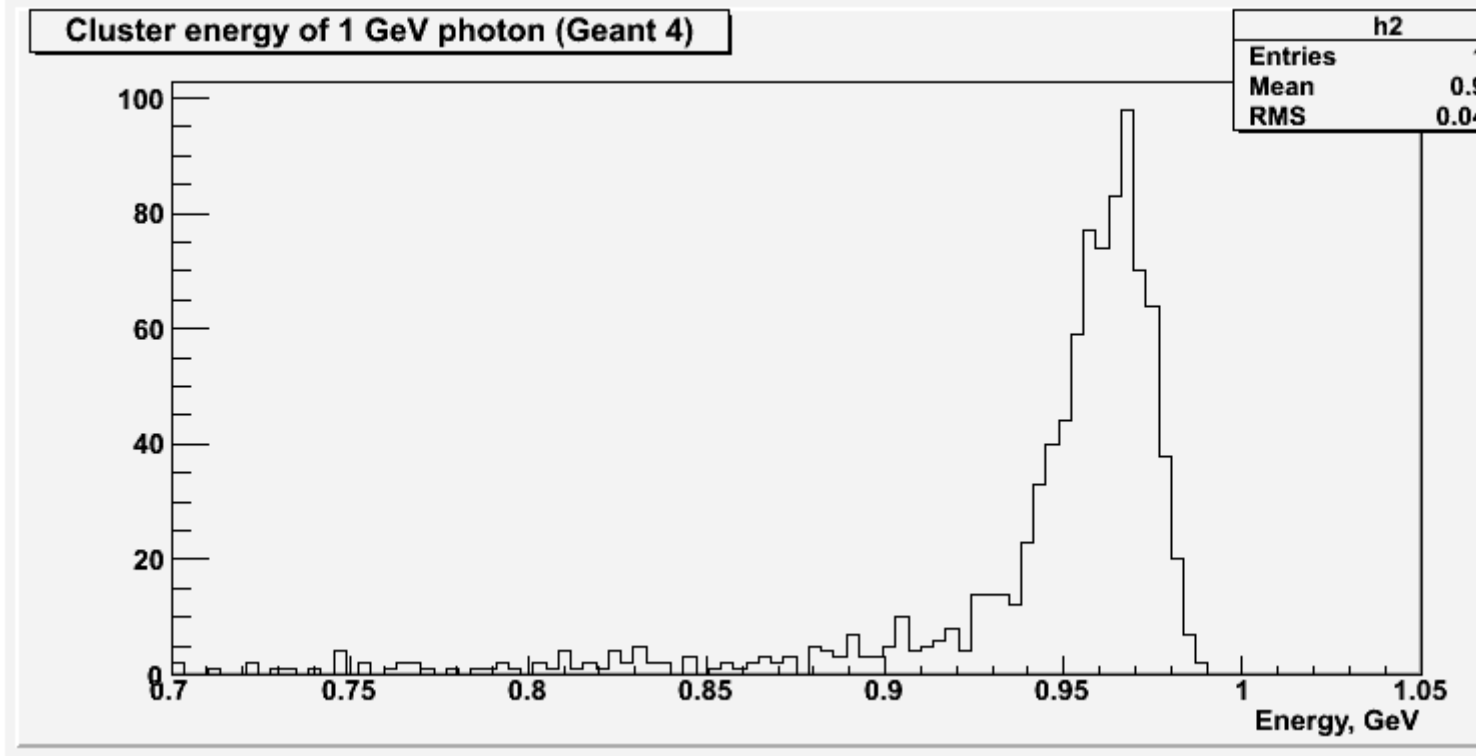
The result was as you can see in the attached figures some how acceptable!! So it seems that all the problem comes from the combination of the physics lists in VMC. So we need to investigate further what is going on here!

and drawing both over each other (G4 in red)

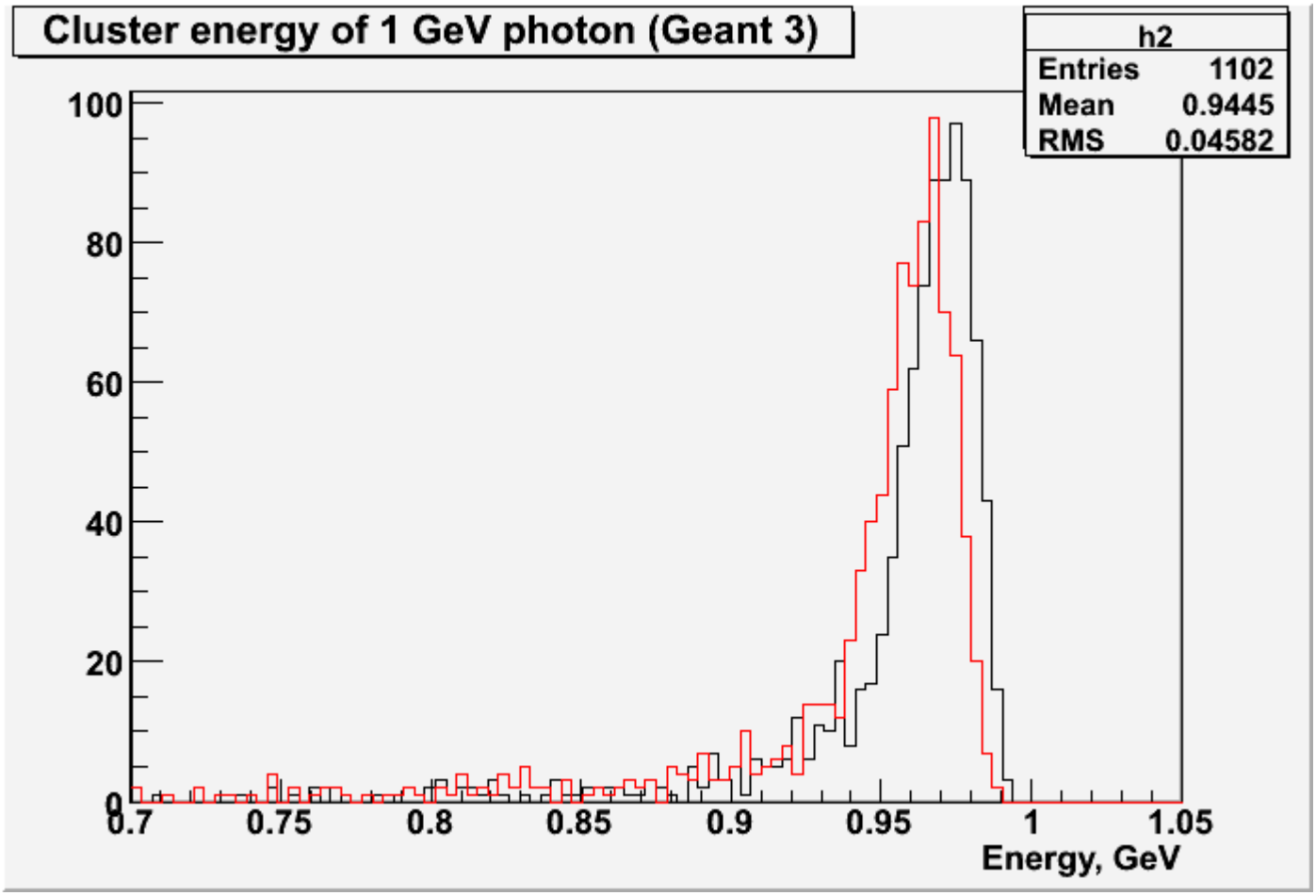
File Attachments

1) g3_g4.gif, downloaded 1853 times





2) g3_g4_overlap.gif, downloaded 1912 times



Subject: Re: Geant 3, Geant 4 VMC, native geant 4 comparison
Posted by Johan Messchendorp on Mon, 25 Feb 2008 20:43:21 GMT
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Hi Mohammad,

Just for completeness. Did you do a simulation with the 5x5 matrix? The reason why I am asking, is that I noticed that the response for G3 from Dima differ from the G3 from your simulation (albeit slightly, but nevertheless significant by looking at the average energy)....

Johan.

Subject: Re: Geant 3, Geant 4 VMC, native geant 4 comparison
Posted by Mohammad Al-Turany on Mon, 25 Feb 2008 21:43:33 GMT
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Hallo Johann,
and here is the 5x5 matrix results:

File Attachments

1) 5x5g3g4.gif, downloaded 1944 times

