Subject: Re: EMC resolution
Posted by Dima Melnychuk on Wed, 30 Oct 2013 14:23:31 GMT
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Some additional results on emc resolution from my side.

First of all after Jifeng put a latest version of digitization by default, (based on code for EMC feature extraction developed at KVI) the energy resolution is different.

I did study for barrel 30-130 degree range, 10 k events, 1 GeV photons.

For new digitization sigma=1.6%

For previous digitization sigma=1.2%

There are two options for non-uniformity, first is based on measurements and implemented by Christian Hammann, sigma=2.6%

And second one (linear non-uniformity) is based on fit to reproduce prototype data and implemented by Hossein Moeini, sigma=2.5%, so both options are very close.

You can use this option with

```
PndEmcHitProducer* emcHitProd = new PndEmcHitProducer();
TString nonuniformityFile=gSystem->Getenv("VMCWORKDIR");
nonuniformityFile+="/macro/params/EmcDigiNoniformityPars2.root";
emcHitProd->SetNonuniformityFile(nonuniformityFile.Data());
```

So non-uniformity definitely affect the result as well as newer digitization.

But you can see if you use non-uniform response the peak position is shifted and calibrartion/energy correction is necessary. And shift is in different direction for two implementations of non-uniformity. Hossein provided correction for his case but it was for older digitization and newer digitization shift a peak position itself a little bit. So it should be redone.

So I plan to redo energy correction for new digitization with both non-uniformity options and I hope rather soon.

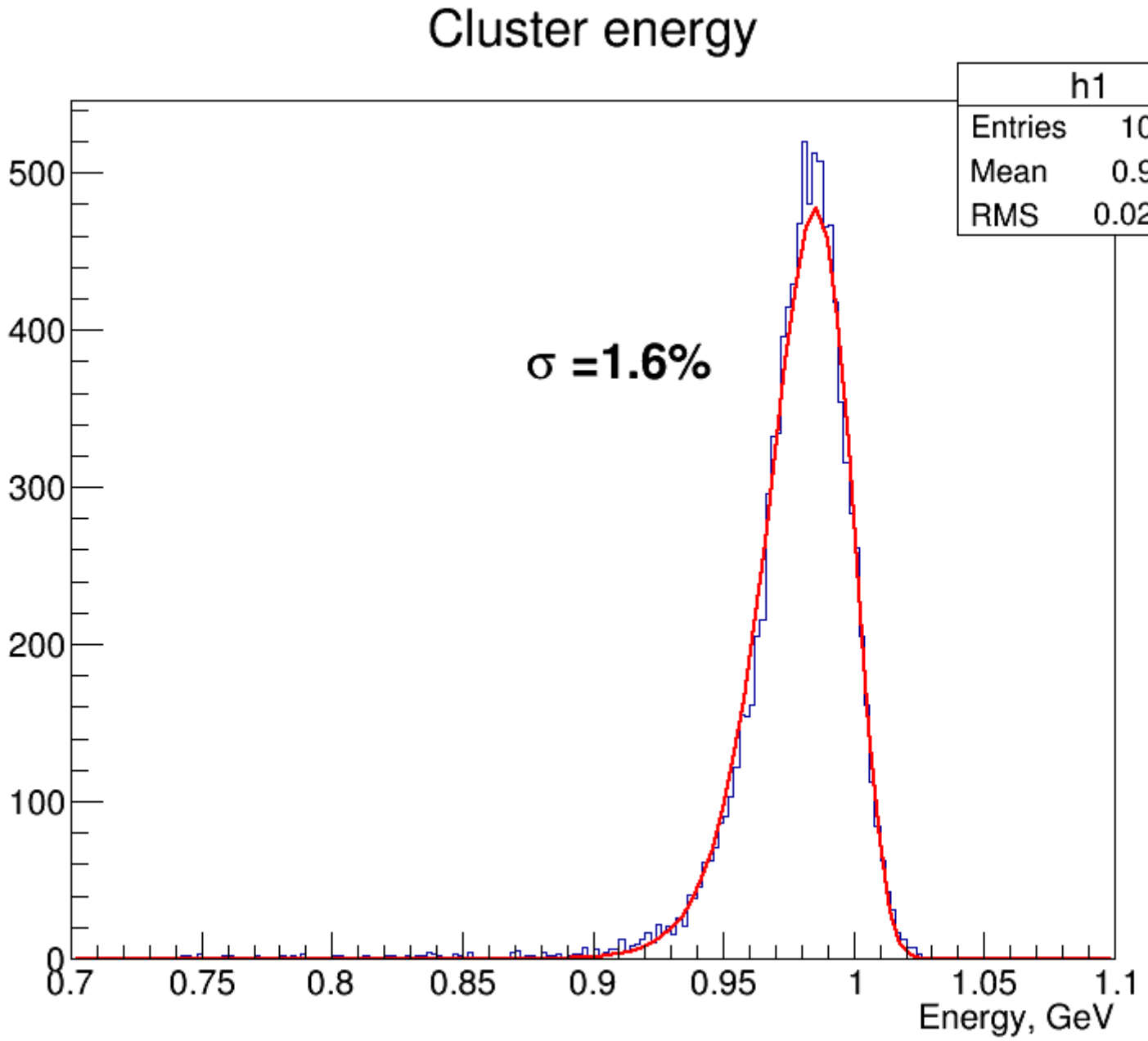
2.6% resolution for 1 GeV photon is what Christian Hammann quoted before as a result in agreement with prototype data.

So when energy correction will be ready the question can be closed.

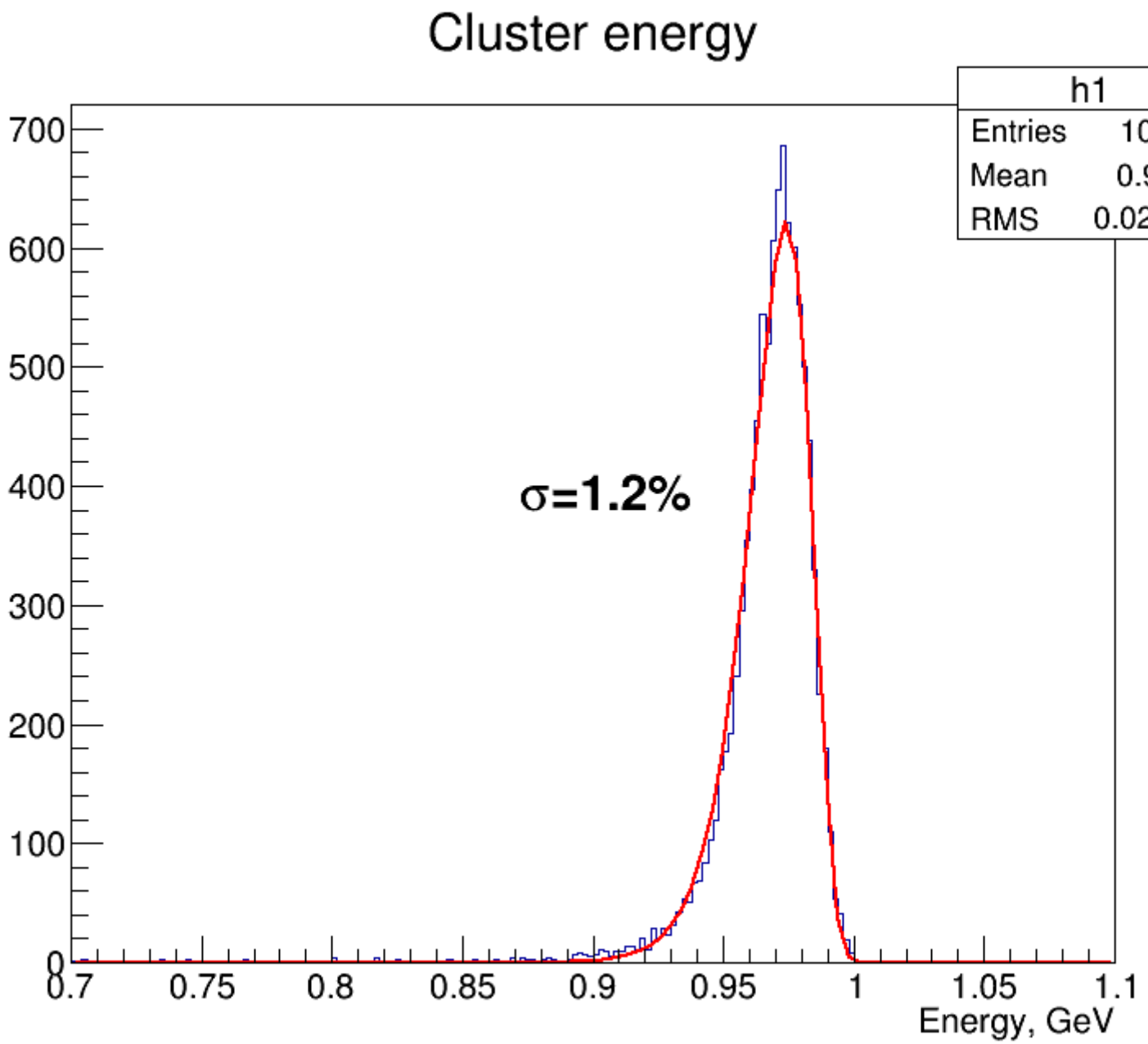
Dima

File Attachments

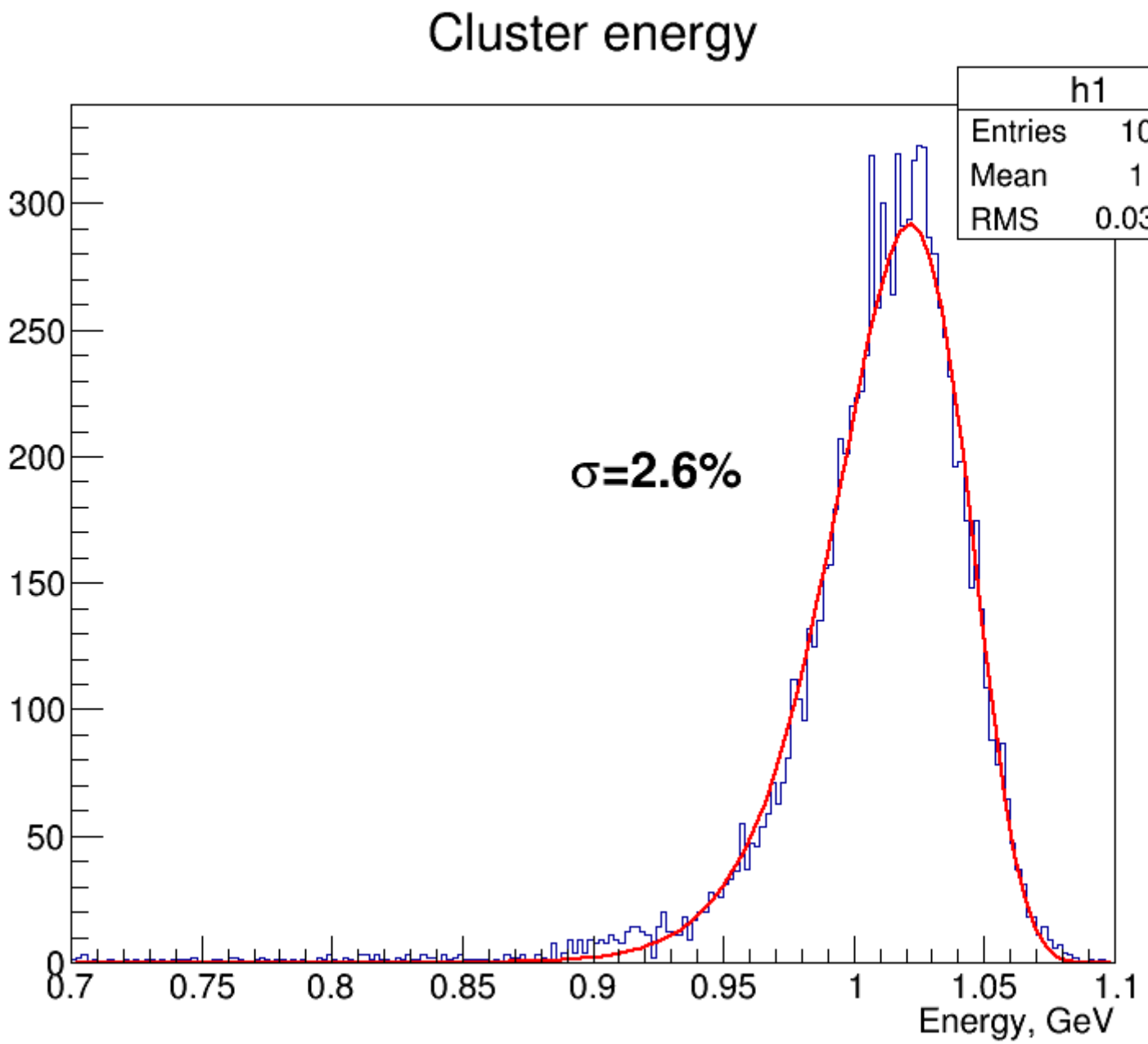
1) energy1.png, downloaded 969 times



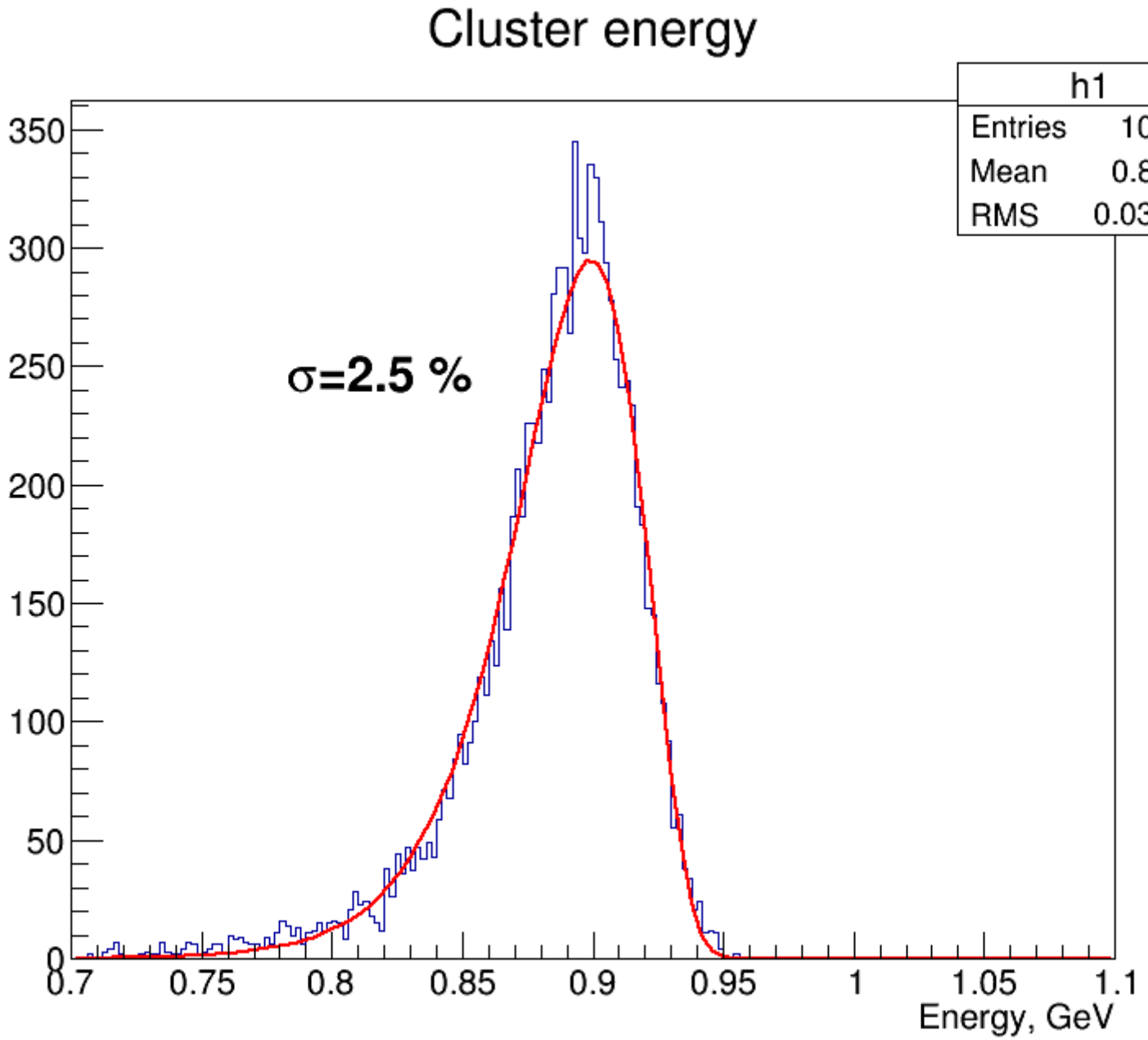
2) energy2.png, downloaded 929 times



3) energy3.png, downloaded 872 times



4) energy4.png, downloaded 1019 times


Cluster energy
h1
Entries 10
Mean 0.8
RMS 0.03
σ=2.5 %
350
300
250
200
150
100
50
0
0.7
0.75
0.8
0.85
0.9
0.95
1
1.05
1.1
Energy, GeV