

Dark matter search in higgs portal scenario

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status

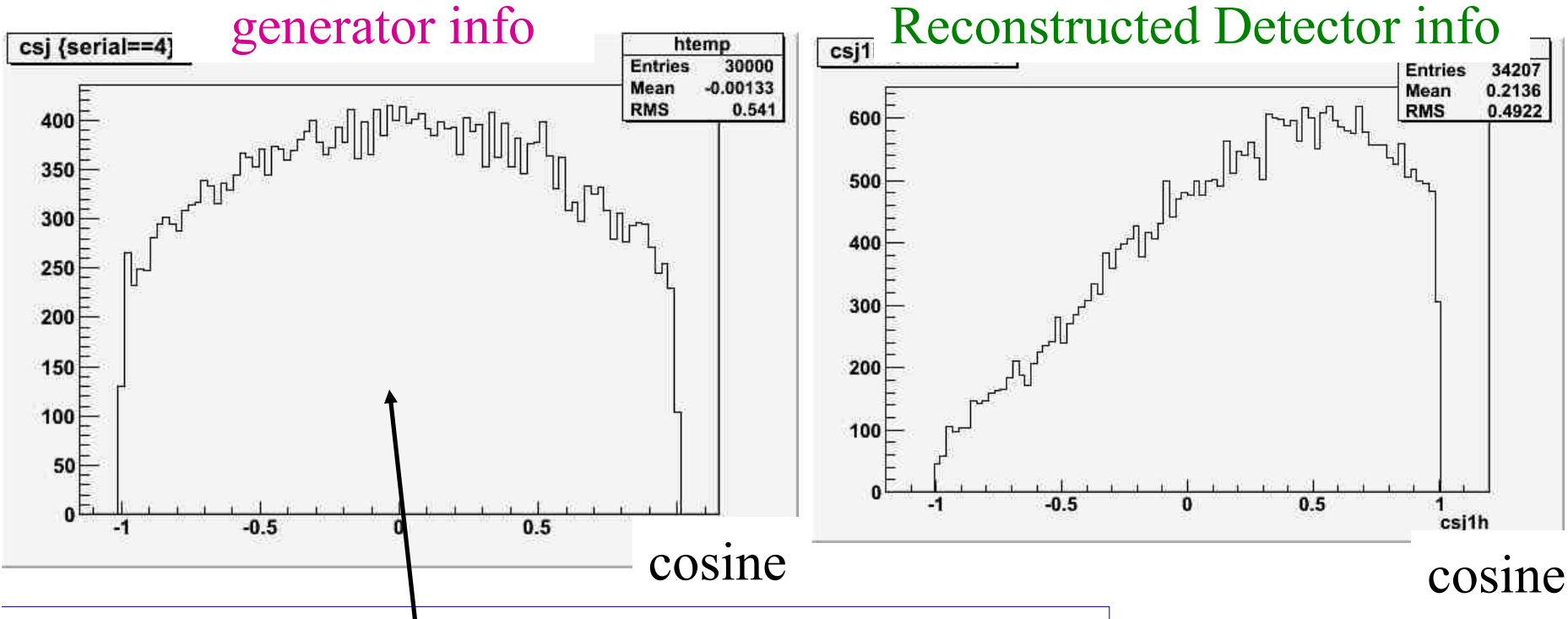
- To get more significance, the angular distribution of jet from Z boson was going to be added in analysis. However, it was wrong distribution. So I study this problem now.

Setup

- Checked dark-matter mass : 40 GeV
- E_{cm} : 300 GeV
- Beam polarization : electron +0.8, positron -0.3

Check the jet angle

Jet was boosted to Z frame and the angle is formed by jet and z axes



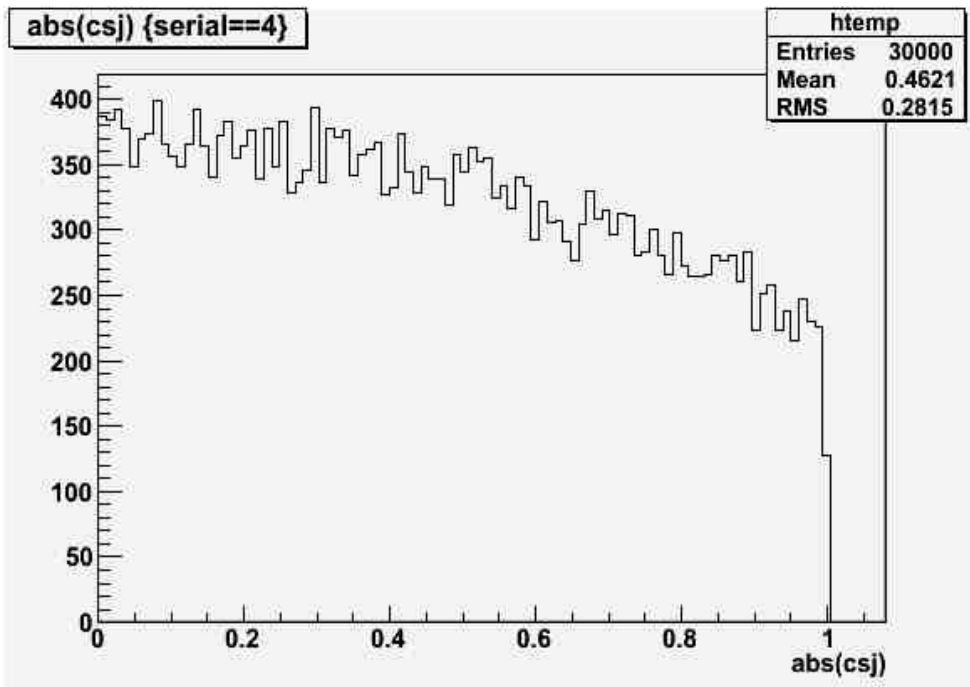
This distribution is because of Z-higgs coupling.
So it has the peak at $\theta=\pi/2$.

Detector info was different from generator one.

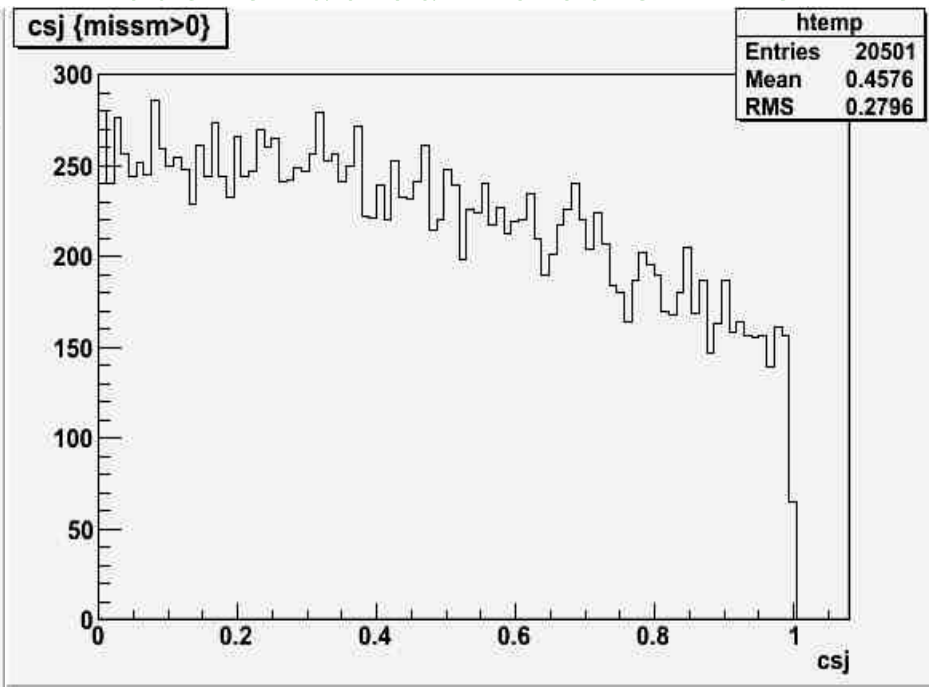
Check the jet angle 2

The absolute value of cosine was checked

generator info



Reconstructed Detector info



Detector info correspond to generator one.

Analysis code

Check the definition of jet in analysis code.
However, I can not find where is the problem.

```
ANLDurhamJetFinder* jclust = new ANLDurhamJetFinder();  
jclust->Initialize(*tracks);  
Int_t njets = 2;  
jclust->ForceNJets(njets);
```

Force 2 jets

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```
ANLPair *zp;  
TObjArray &jets = jclust->GetJets();  
ANLPairCombiner zcandidates(jets,jets);  
zp = (ANLPair *)zcandidates();  
ANLPair &z = *zp;
```

Reconstruct Z boson

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```
ANLJet &j1 = *static_cast<ANLJet *>(z[0]);  
ANLJet &j2 = *static_cast<ANLJet *>(z[1]);
```

↓
boost to Z frame

Summary & plan

Summary

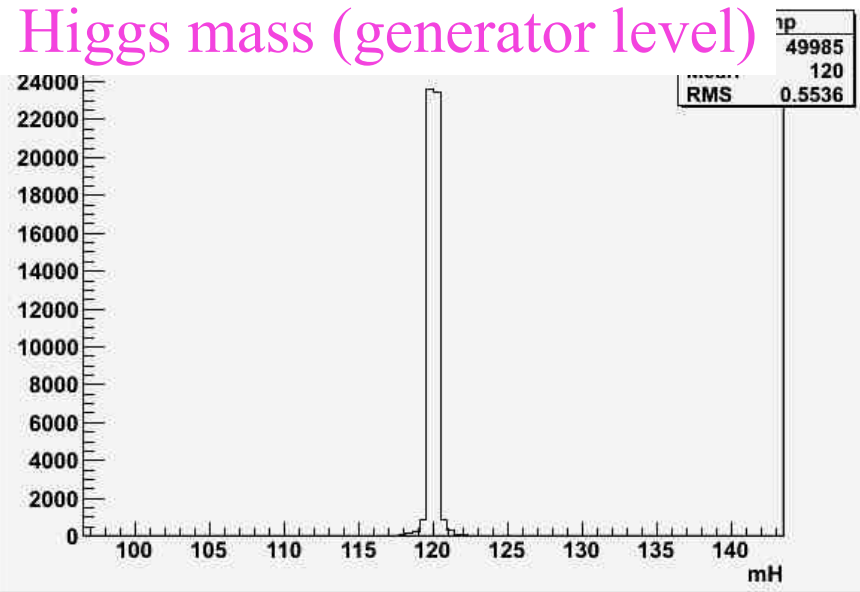
- The cosine value (Z decay angle) was not reconstructed well. But absolute value of this is correspond to generator info.

Plan

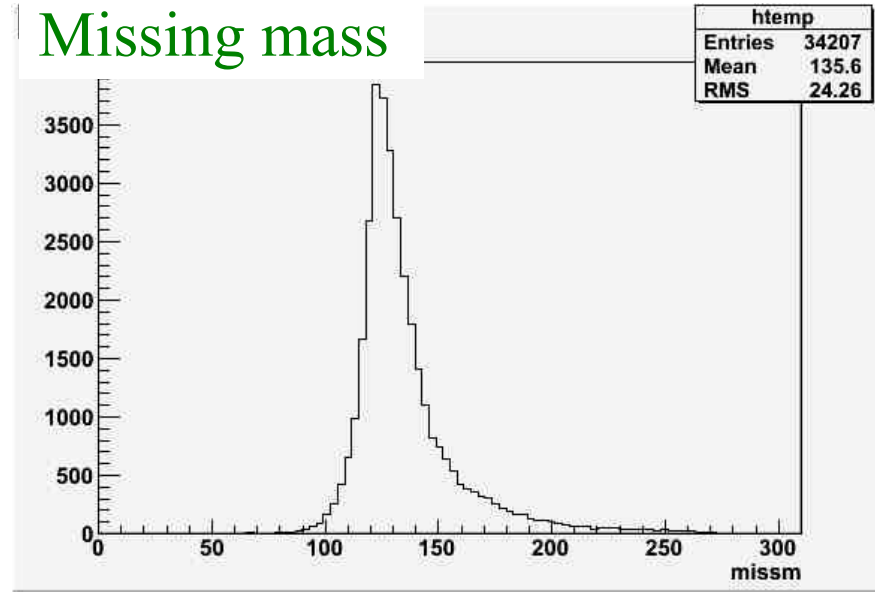
- Study it & Continue the analysis.
- How to get the “forward detector information”?
 - To suppress the isolated lepton events.

Check the generator information and the detector one

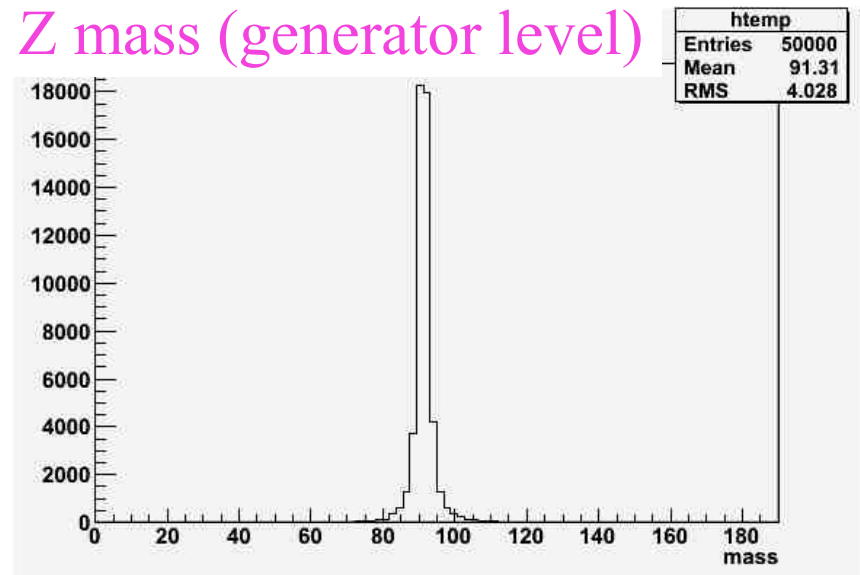
Higgs mass (generator level)



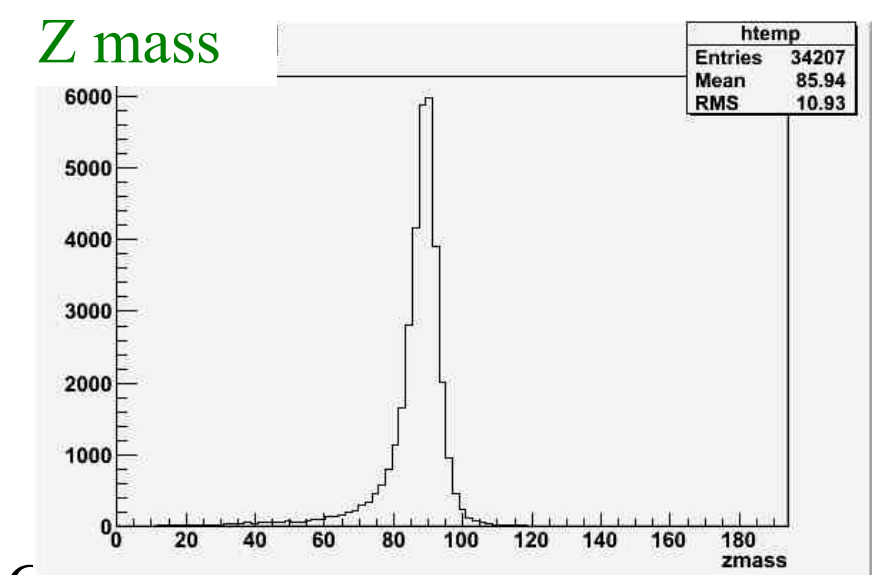
Missing mass



Z mass (generator level)



Z mass



Good reconstruction