Status Report

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- H→bb sample was normalized by the method Uta suggested to me
  - Cross section of Higgs production is calculated by MadGraph
  - Real branching ratio calculated by HDECAY is used
- Some of Delphes setups are changed
  - B-tagging
  - Electron reconstruction
  - Tracking efficiency

Normalization

- Charged current Higgs production was produced by MadGraph

  p e- > vl h j

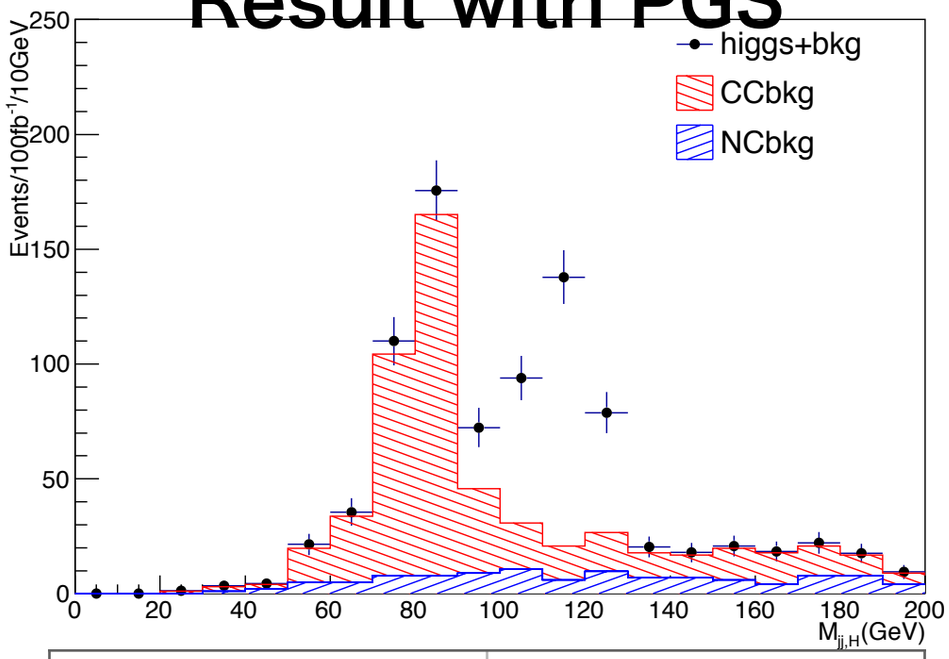
- The cross section is calculated to be 0.1099 pb
- Branching ratio of H→bb process was calculated to be 57.7% by HDECAY
- Cross section of Charged current H→bb process is

0.1099×0.577 = 0.063 pb

- Result with new normalization(PGS)

	σ (pb)	Number of Samples(10^6)	N/σ (fb^{-1})
Charged Current H→bb	0.063	0.1	1587
Charged Current background	5.9	0.6	101.6
Neutral Current background	28	3	107.2

Result with PGS



H→bb signal	232
S/N	2.97
S/√N	26.3

Setups of Delphes

- **Charged hadron tracking efficiency**
  - Coverage of PGS setup is $|\eta| < 4.7$
  - new : 60% for $1.5 < |\eta| < 4.7$ and $0.1 < PT < 1.0$
    85% for $1.5 < |\eta| < 4.7$ and $PT > 1.0$
    0% for $|\eta| > 4.7$
  - default : 4.7→3.0

- **Electron tracking efficiency**
  - Coverage of PGS setup is $|\eta| < 4.7$
  - new : 50% for $1.5 < |\eta| < 4.7$ and $0.1 < PT < 1.0$ GeV
    83% for $1.5 < |\eta| < 4.7$ and $1.0 < PT < 10$
    90% for $1.5 < |\eta| < 4.7$ and $PT > 10$
    0% for $|\eta| > 4.7$
  - default : 4.7→3.0

Setups of Delphes

- **Momentum resolution for charged tracks**
  - Coverage of PGS setup is $|\eta| < 4.7$
  - new : 3% for $1.5 < |\eta| < 4.7$ and $0.1 < PT < 1.0$ GeV
    2% for $1.5 < |\eta| < 4.7$ and $1.0 < PT < 10$
    4% for $1.5 < |\eta| < 4.7$ and $10 < PT < 200$
    5% for $1.5 < |\eta| < 4.7$ and $PT > 200$
  - default : 4.7→3.0

- **Electron and Photon efficiency**
  - Coverage of PGS setup is $|\eta| < 4.7$
  - new : 85% for $1.5 < |\eta| < 4.7$ and $PT > 4$ GeV
    0% for $|\eta| > 4.7$
  - default : 4.7→3.0

Setups of Delphes

- **Electron and Photon efficiency**
  - Setups of electron and photon are same
  - new : 85% for $1.5 < |\eta| < 4.7$ and PT > 4 GeV
    0% for $|\eta| > 4.7$
  - default : 4.7→3.0

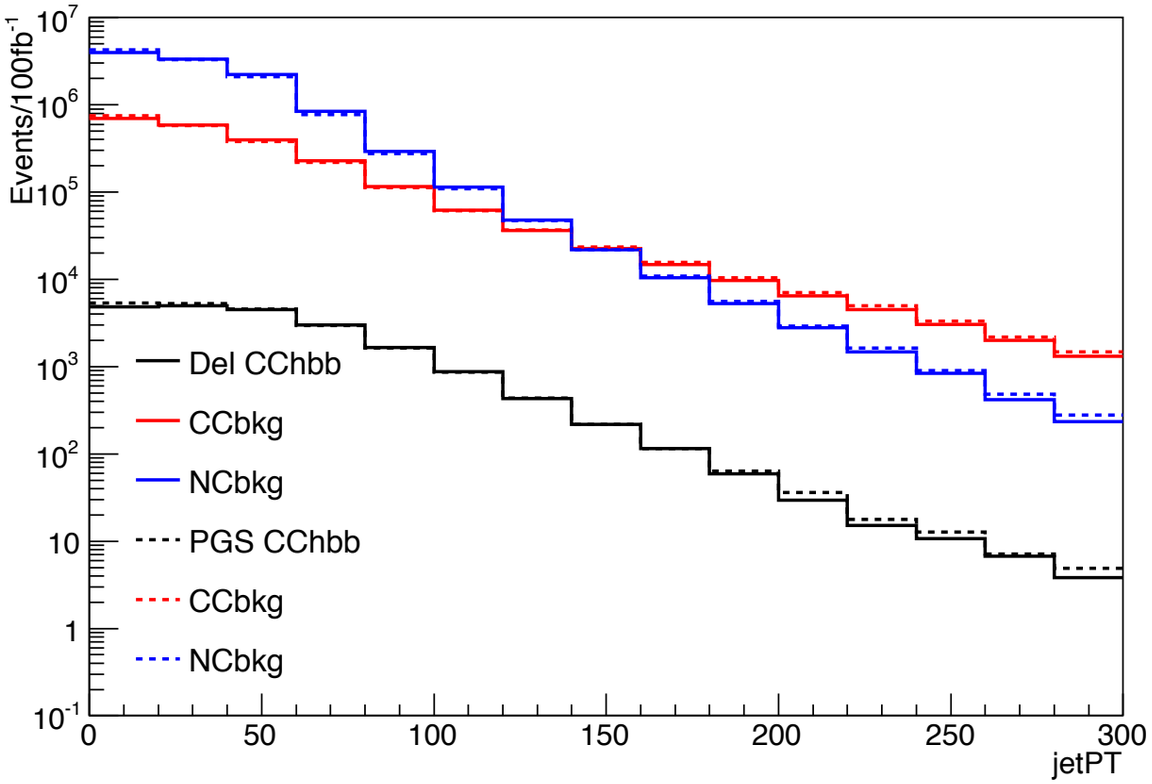
- **Electron and Photon isolation**
  - Setups of electron and photon are same
  - Minimum PT = 4.0 GeV (default 0.5GeV, PGS 4.0 GeV)

- **B-tagging**
  - $\Delta R = 1.3$ (Some values ware tried)

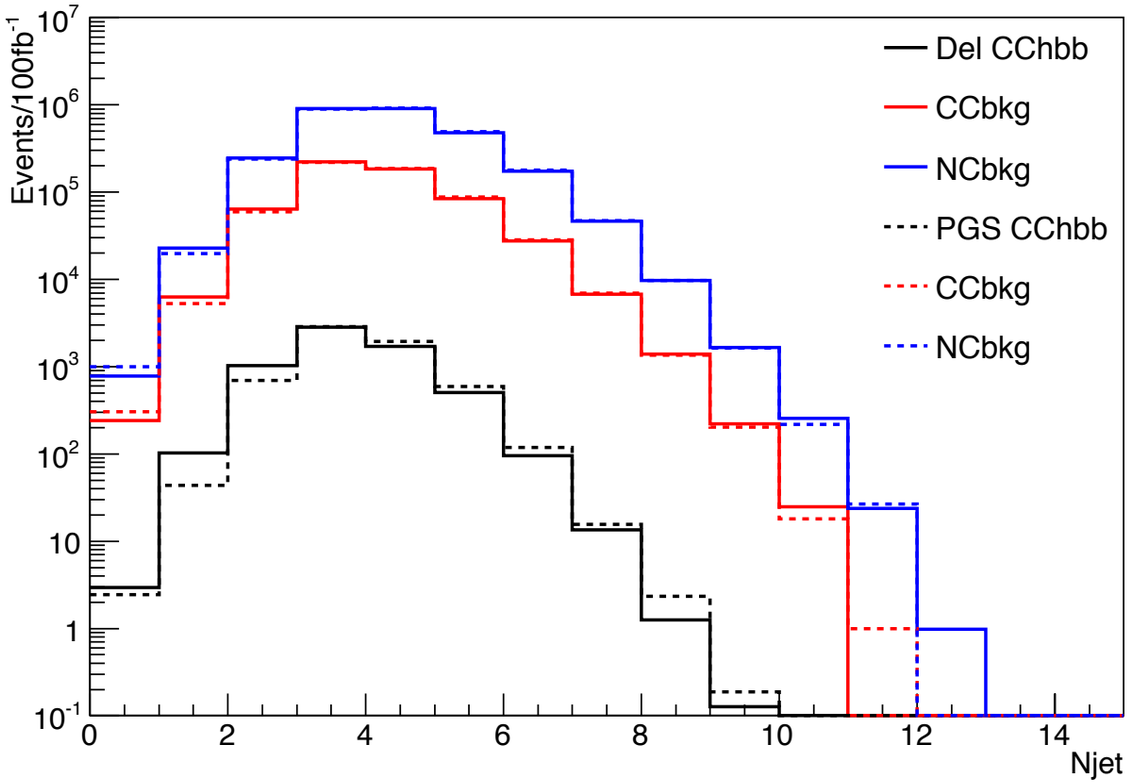
PT and Number of jet

- kt algorithm with ΔR=0.9 is used for jet reconstruction
- Delphes and PGS are compared
- They are in good agreement

PT of jet

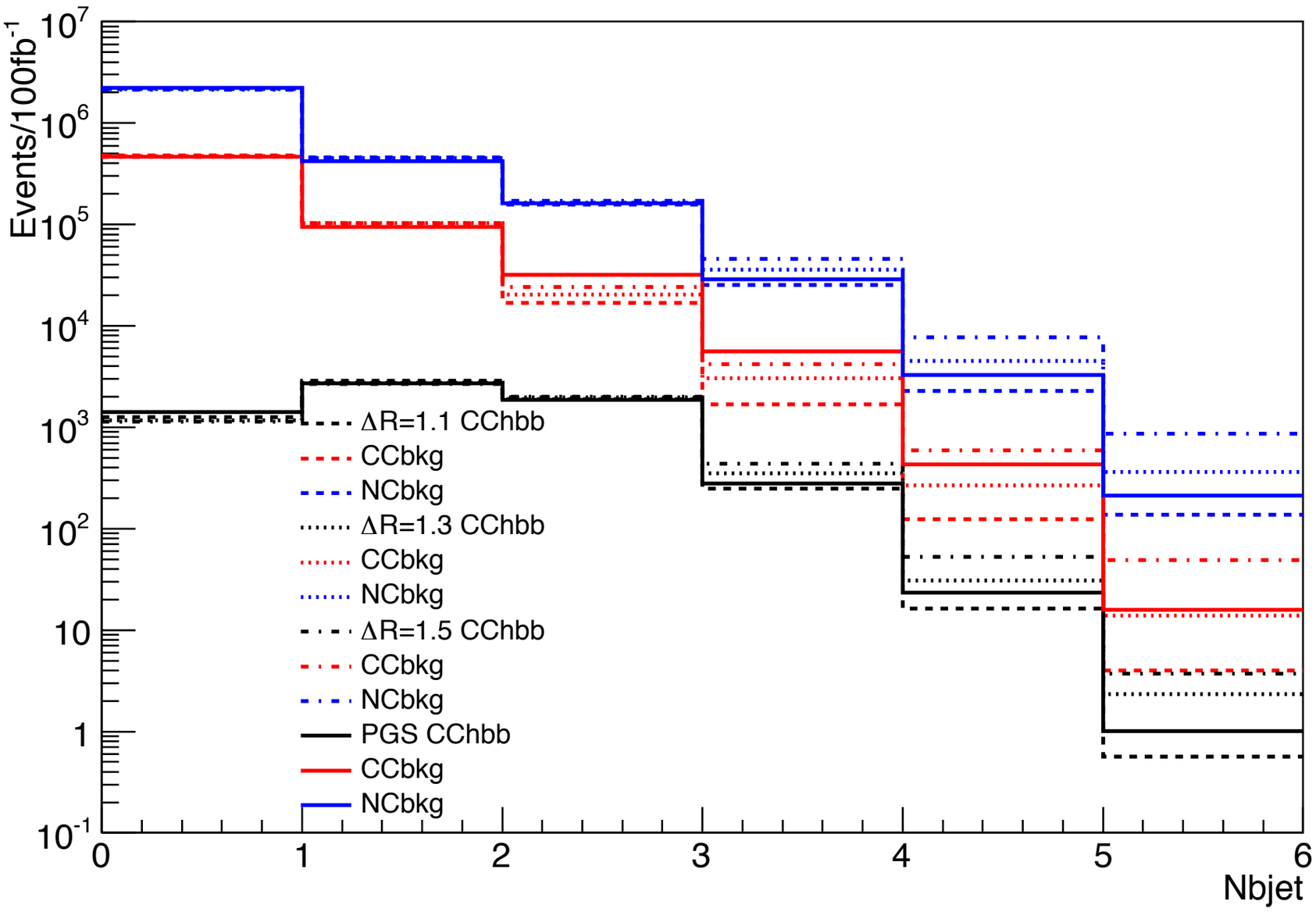


Number of jet



Number of b-jet

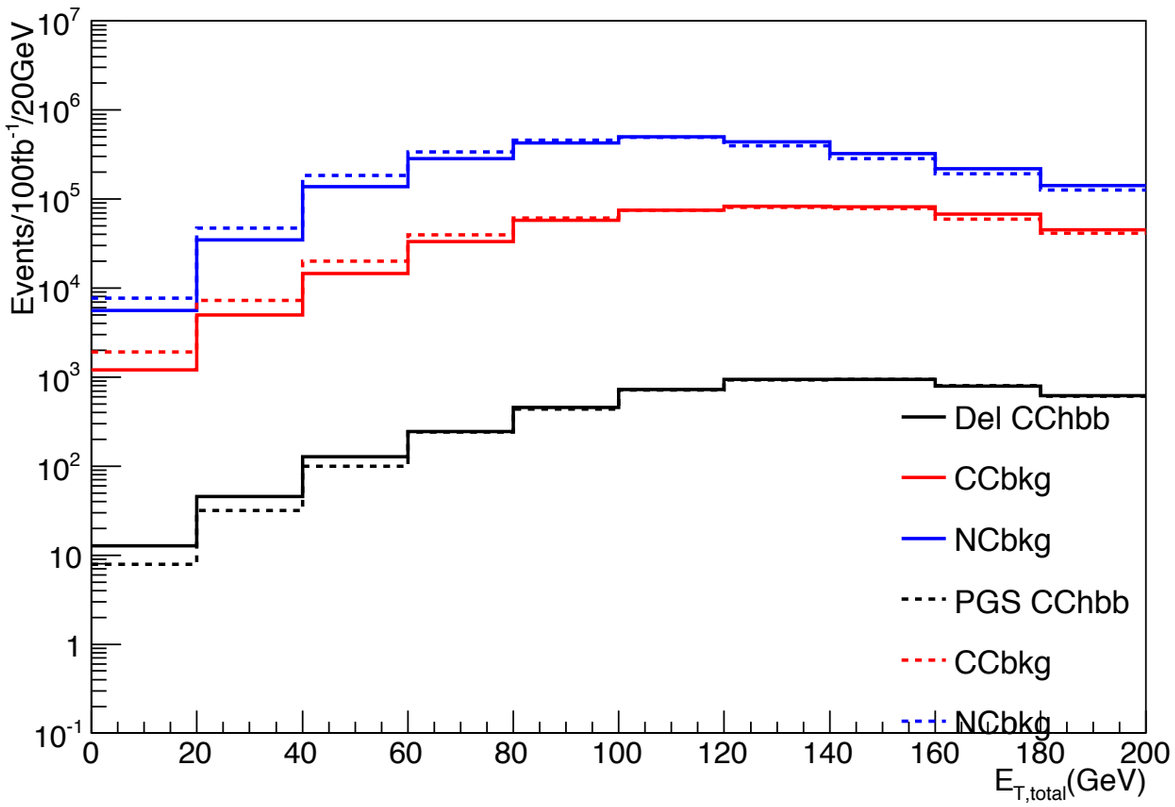
- Some values of ΔR are tried(ΔR=1.1, 1.3, 1.5)
- Number of b-jet increase as ΔR increase
- Values around ΔR=1.3 seem to be the best
- ΔR=1.3 is chosen in this analysis



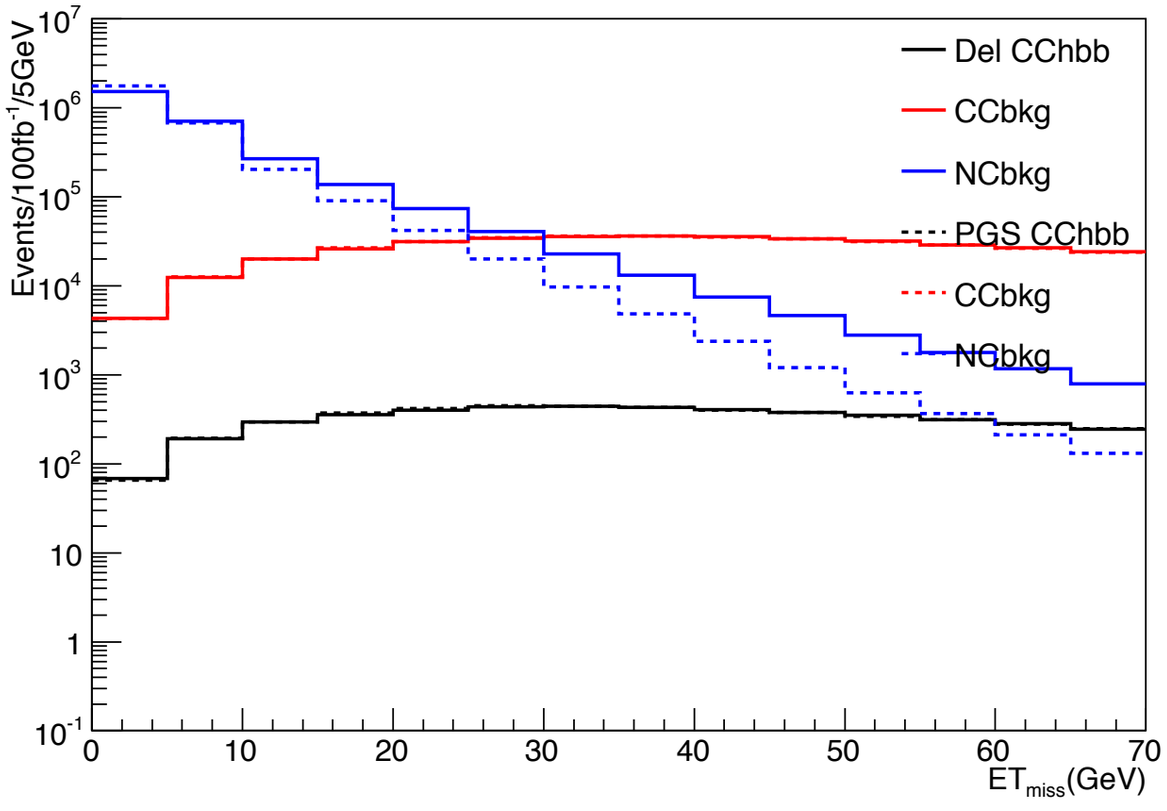
Total ET and Missing ET

- About Total ET, they are in good agreement
- About Missing ET, distributions of NC background are different because of the difference of calculation method of missing ET
  - PGS smear energy of neutrino
  - Delphes exactly calculate addition of all dropped energy

Total ET

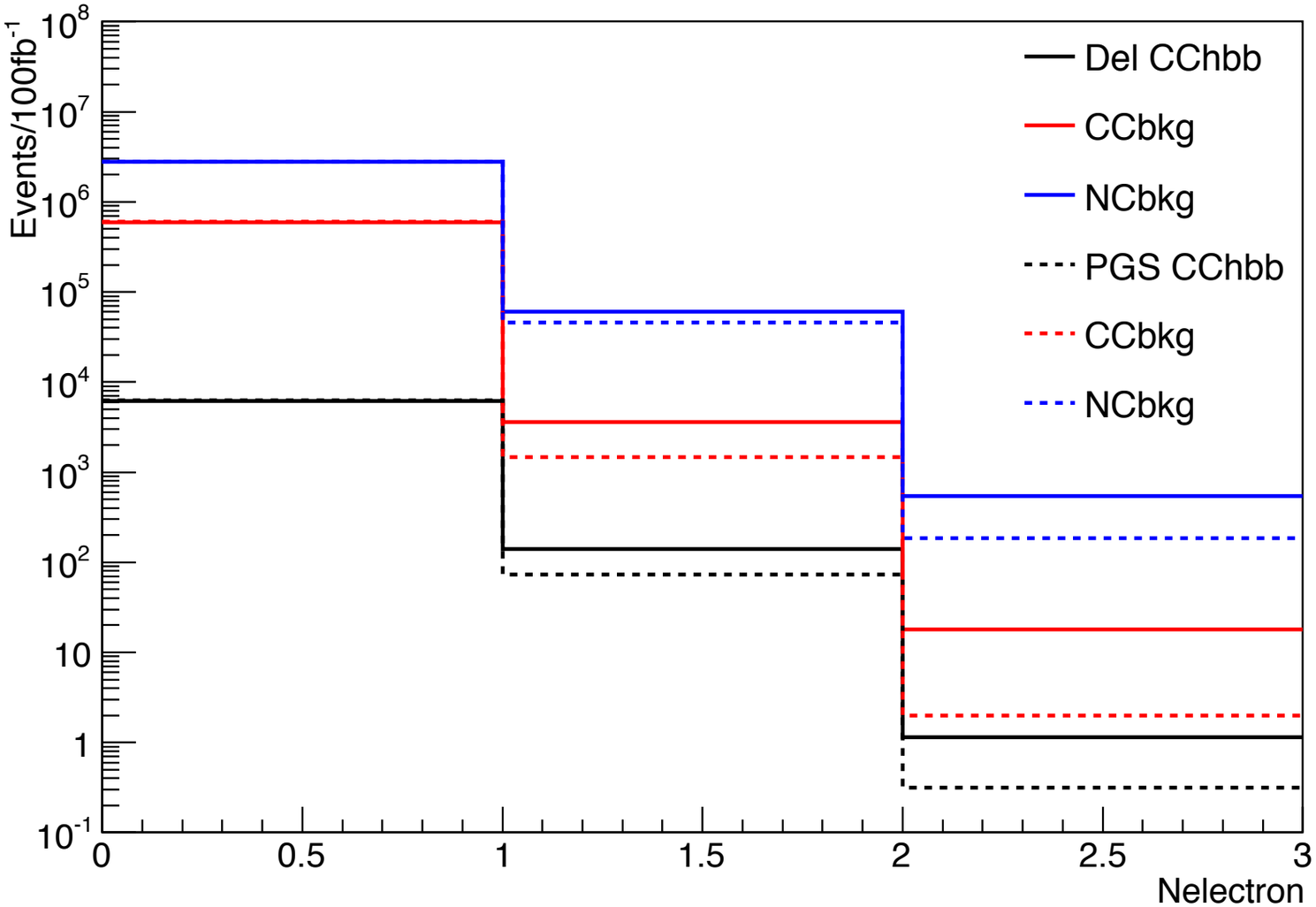


Missing ET



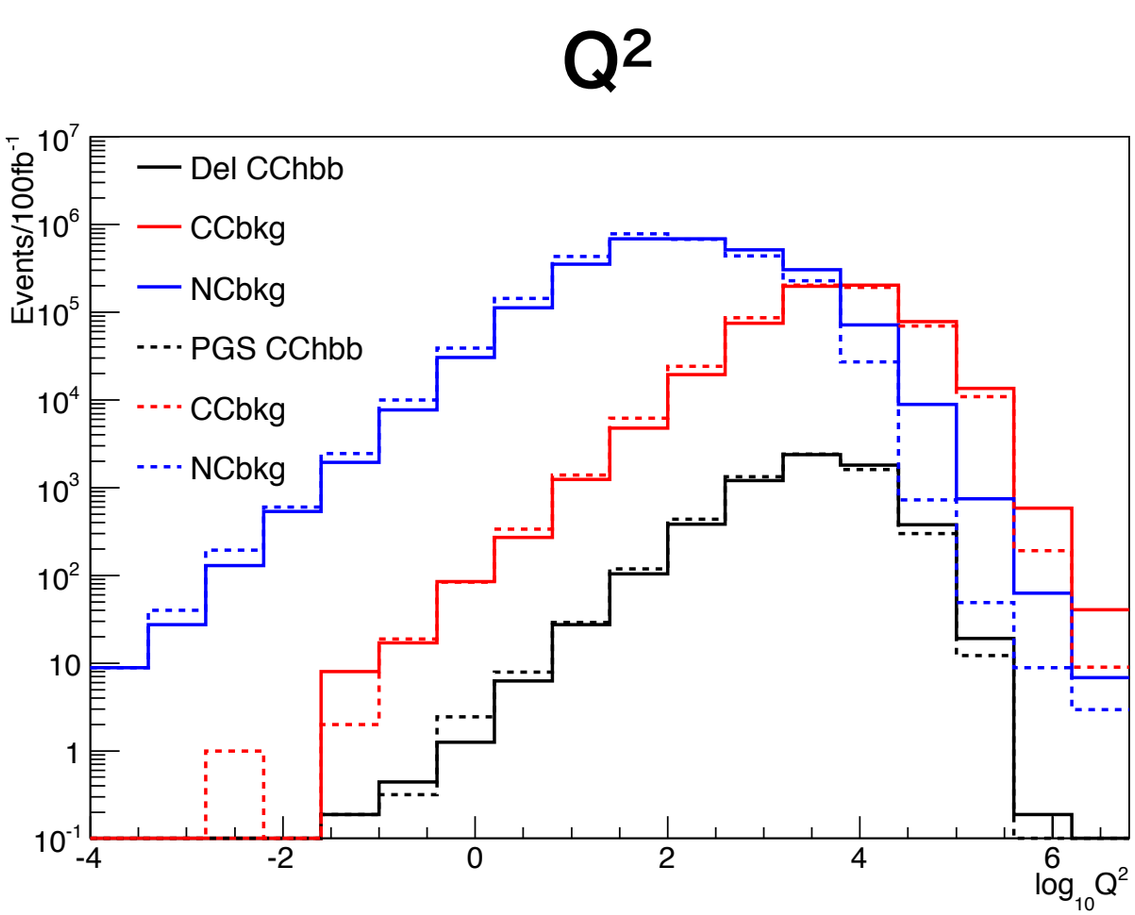
Number of electron

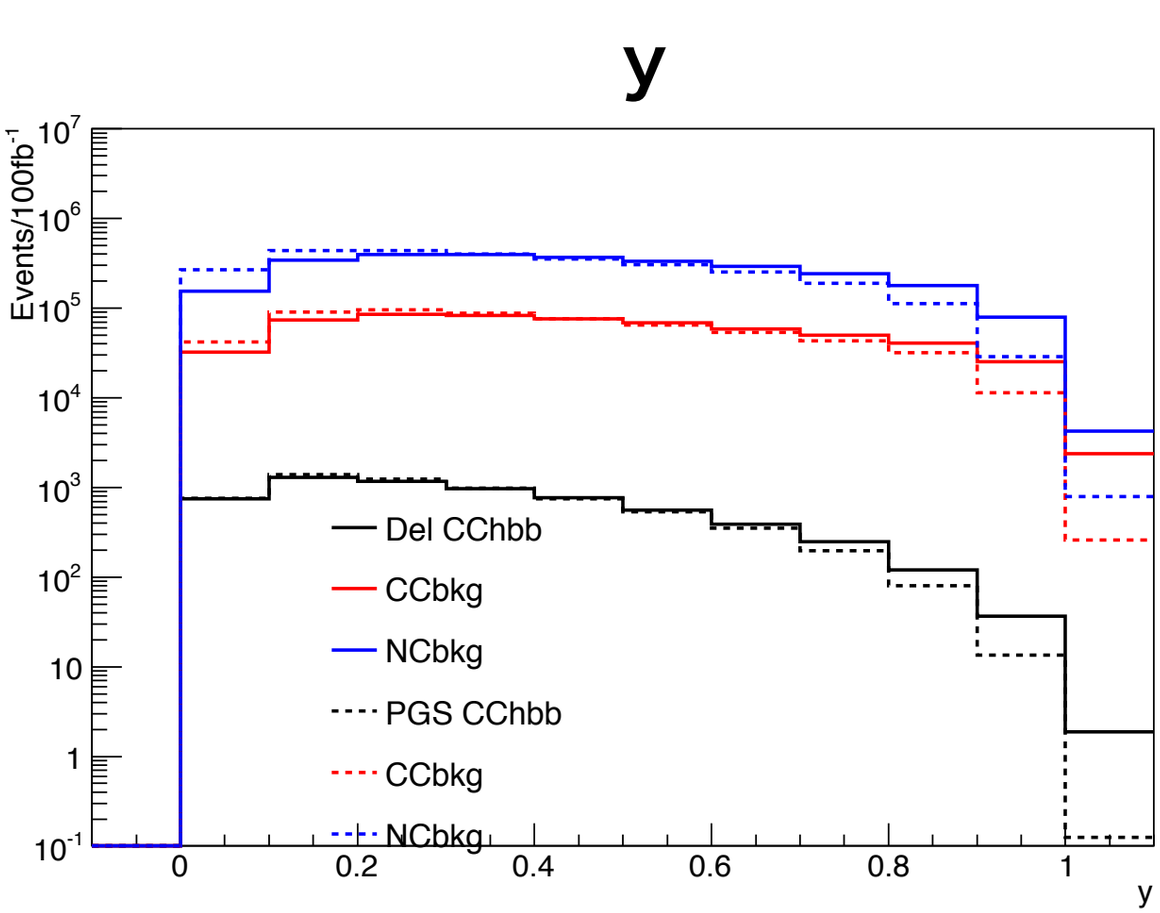
- Delphes tags more electron
  - Coverage is same between Delphes and PGS
  - Electron efficiency has to be smaller in high η region ?
    now coverage is just expanded



Q^2 and y

- They are in good agreement

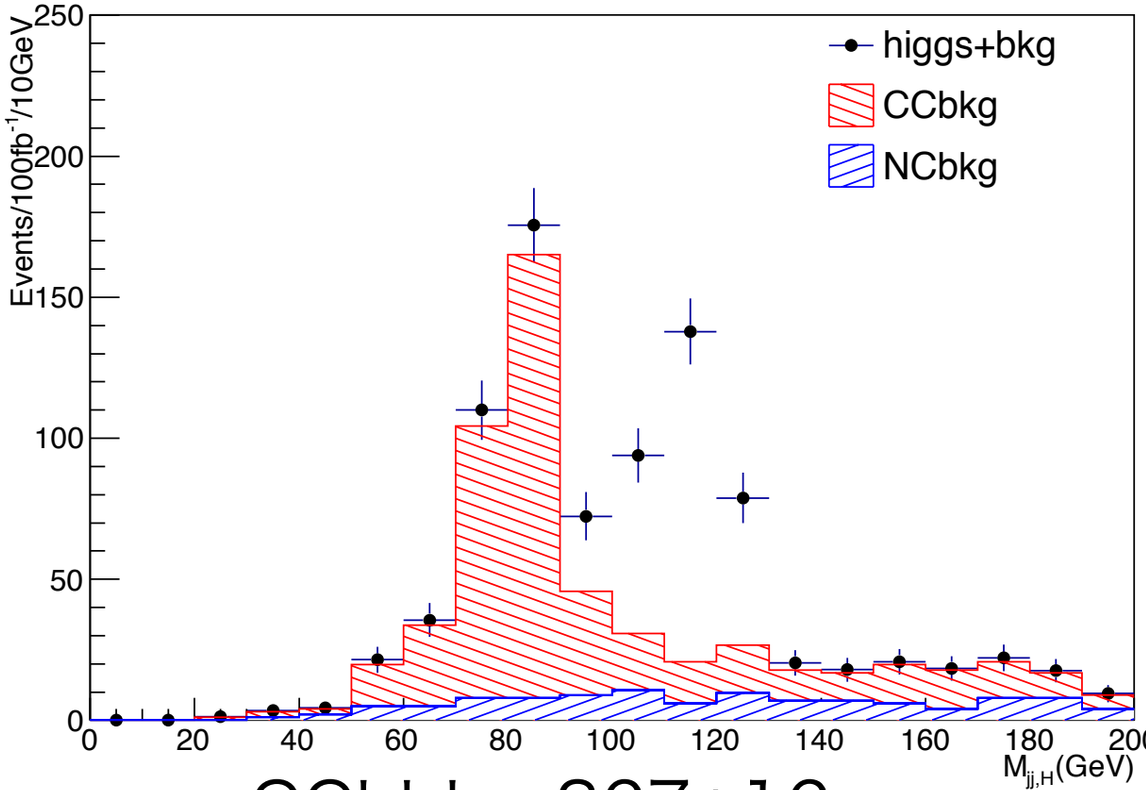




Result

- 100 fb^{-1} is assumed
- Each error is square root of events
- Difference of NCbkg seems to come from the difference of missing ET

PGS

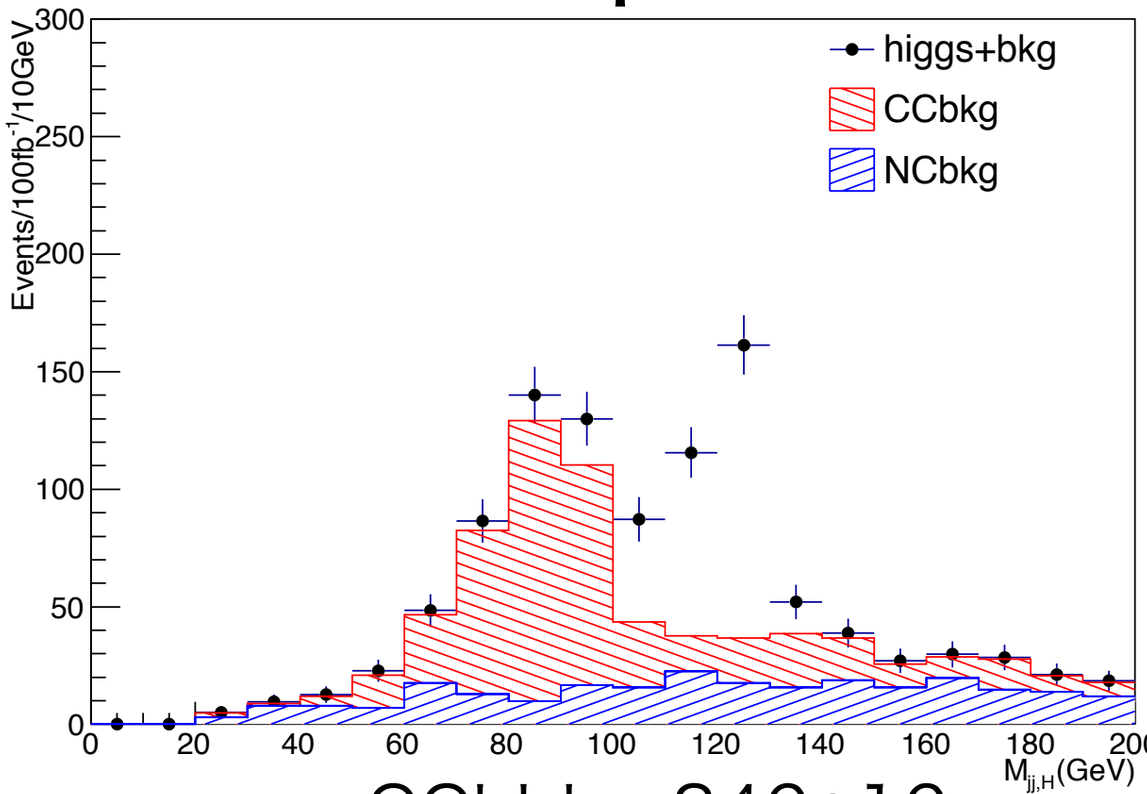


CChbb : 267±16

CCbkg : 69.7±8.3

NCbkg : 24.6±5.0

Delphes



CChbb : 246±16

CCbkg : 61.7±7.9

NCbkg : 56.0±7.5

Events in signal region

Summary

- H→bb sample was normalized by using the cross section of charged current Higgs production calculated by MadGraph and real branching ratio calculated by HDECAY
- Some of setups of Delphes were modified and the result was compared with that of PGS