

Status Report

Tokyo Institute of Technology

Kuze Laboratory



Masahiro Tanaka

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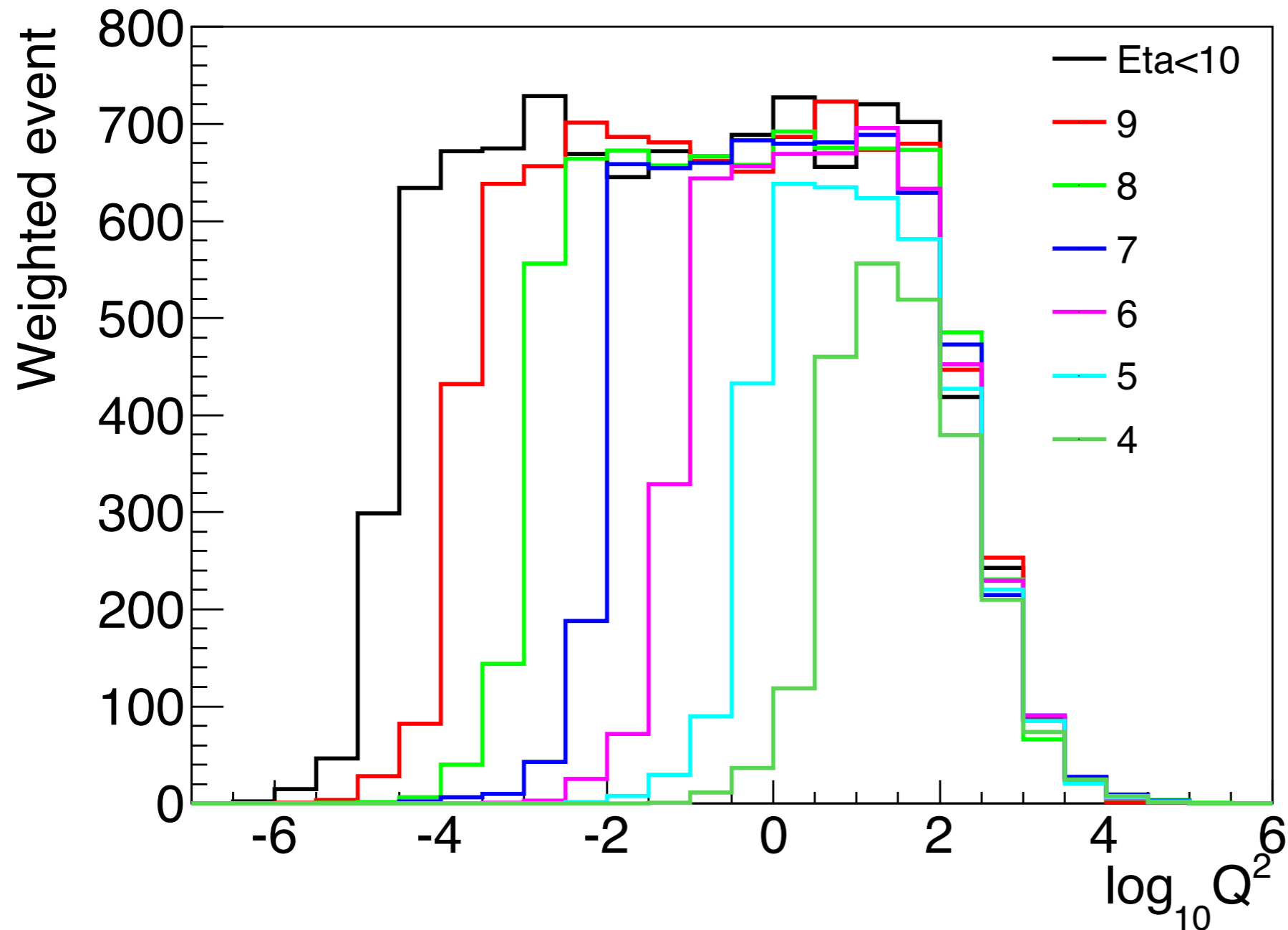


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- Study generator cut for NCbkg $e-p > e-jjj/h$
 - Cut for retaining $Q^2 > 1 \text{ GeV}^2$ DIS events
 - Add threshold cuts which are also used in analysis
- Some Analysis
 - Made CChbb(100k), CCbkg(100k), NCbkg(900k) samples
 - Considered cut requirement following Kengo's method

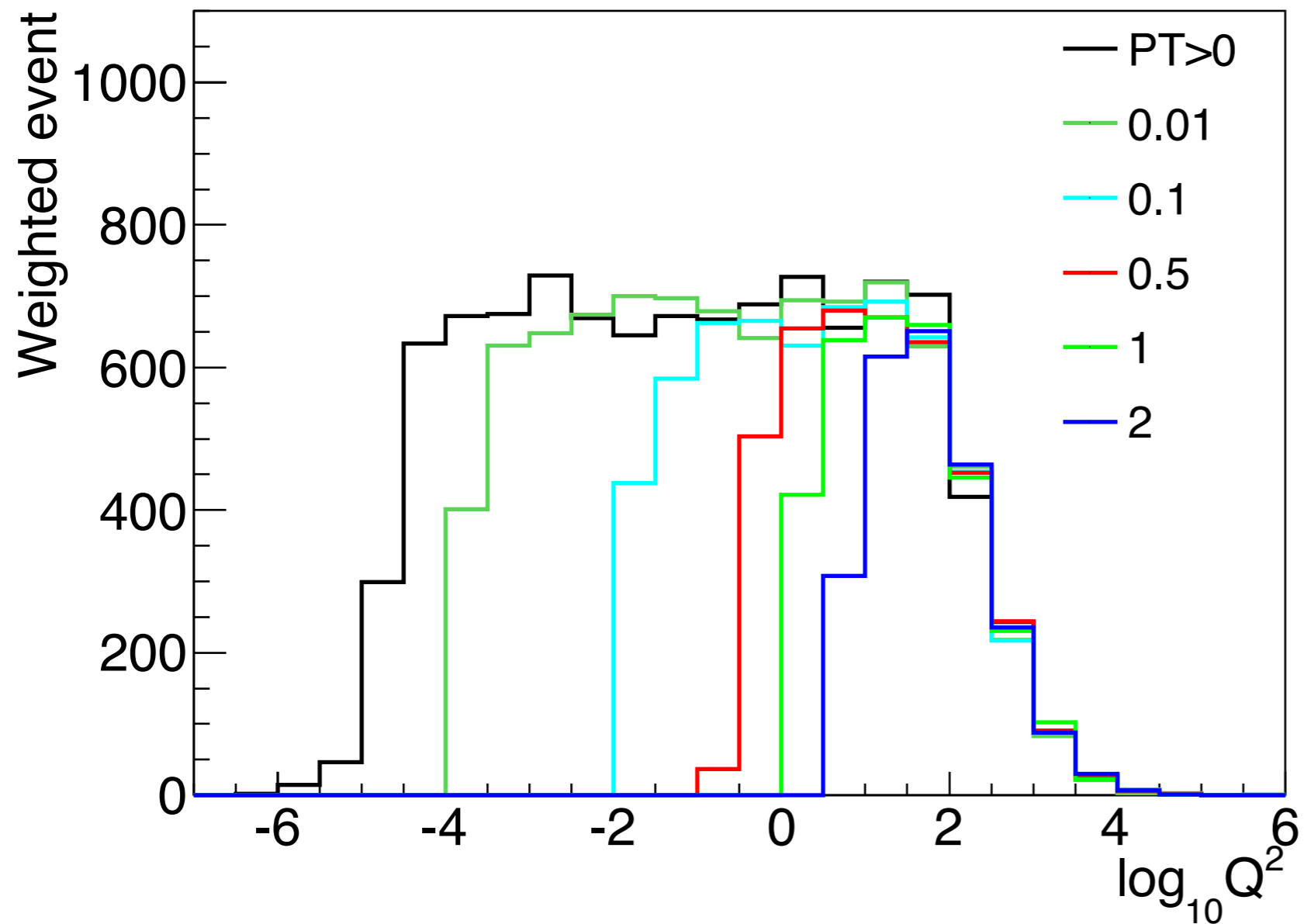
Generator cut

- Plot Q^2 changing Jet, Lepton, Photon Eta cut
- Jet PT > 5GeV, $dr_{jj} > 0.1$
- Weighted by cross section of each event
- Choose Eta<5 cut



Generator cut

- Plot Q^2 changing Lepton PT
- Jet PT > 5GeV, $dr_{jj} > 0.1$
- Weighted by cross section of each event
- Choose PT > 1 GeV cut

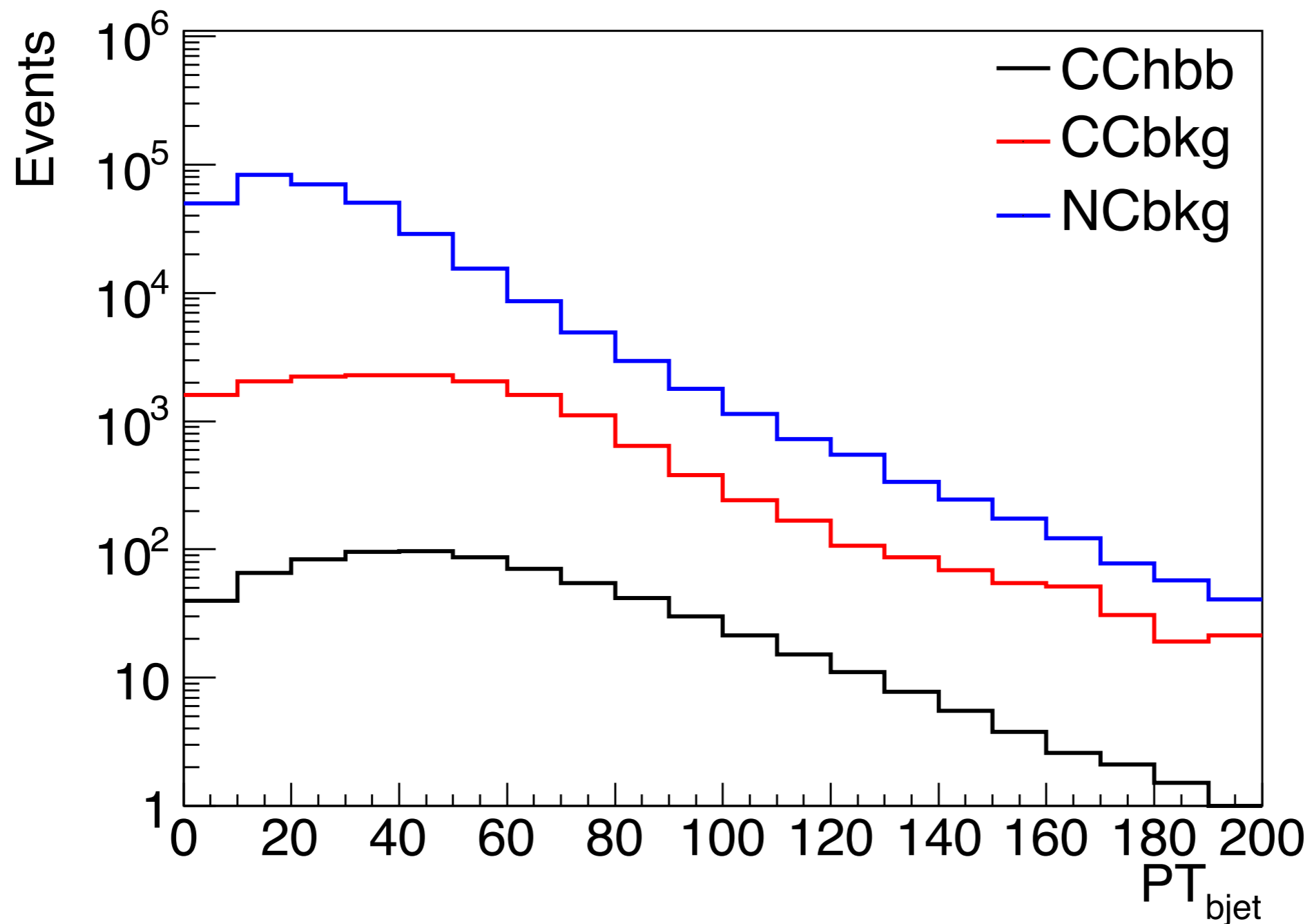


Generator cut

- Add some threshold cuts which are also used in analysis
 - Jet and Lepton $PT > 10\text{GeV}$, Min 2 jets mass $M_{jj} > 60\text{GeV}$
- Result of these cuts each cross section becomes ...
 - CChbb 0.62pb
 - CCbkg 5.5pb
 - NCbkg 83pb
- Number of samples is ...
 - CChbb and CCbkg 100k, NCbkg 900k

b-jet PT

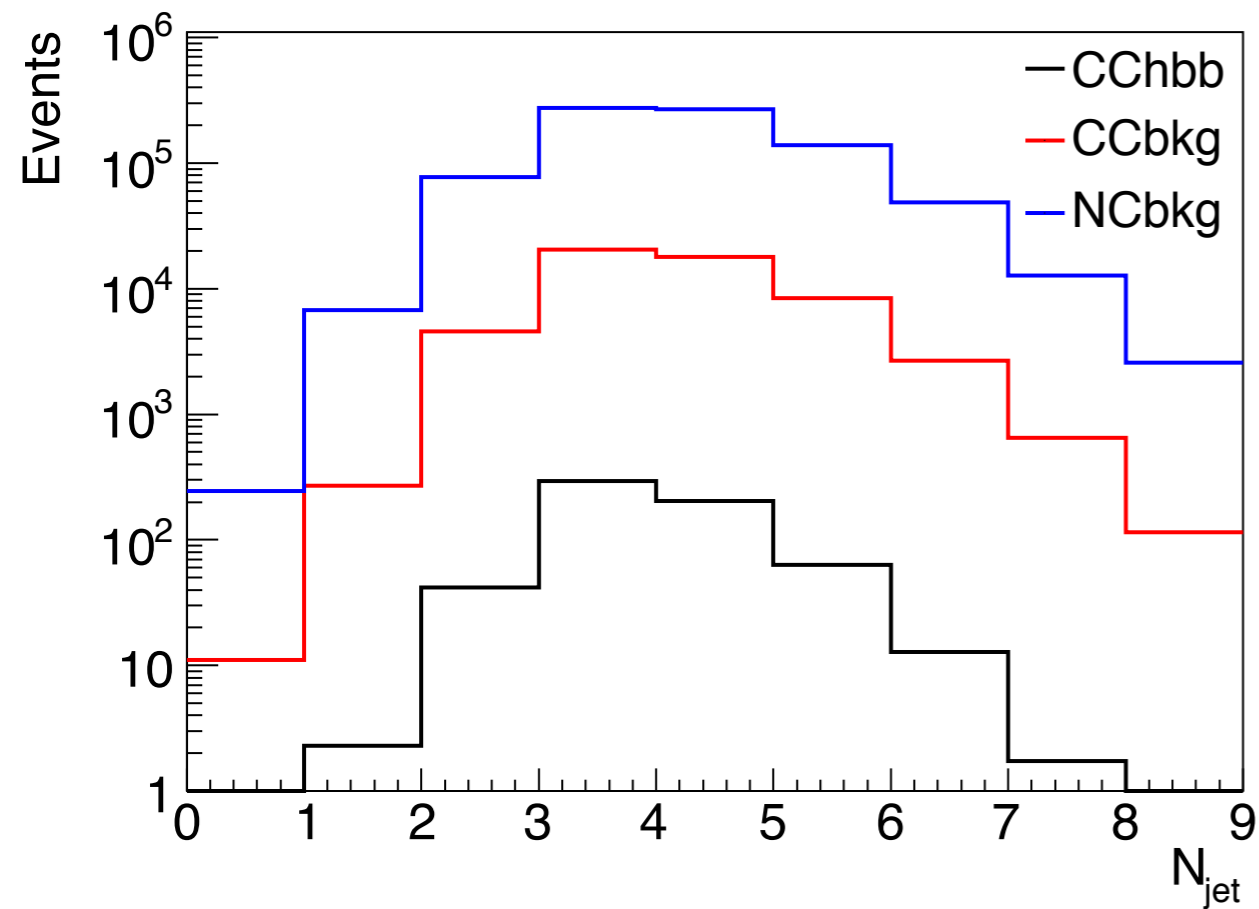
- Analysis of data after PGS
- Weighted by cross section
- Plot b-tagged jets PT
- Choose $PT > 30\text{GeV}$



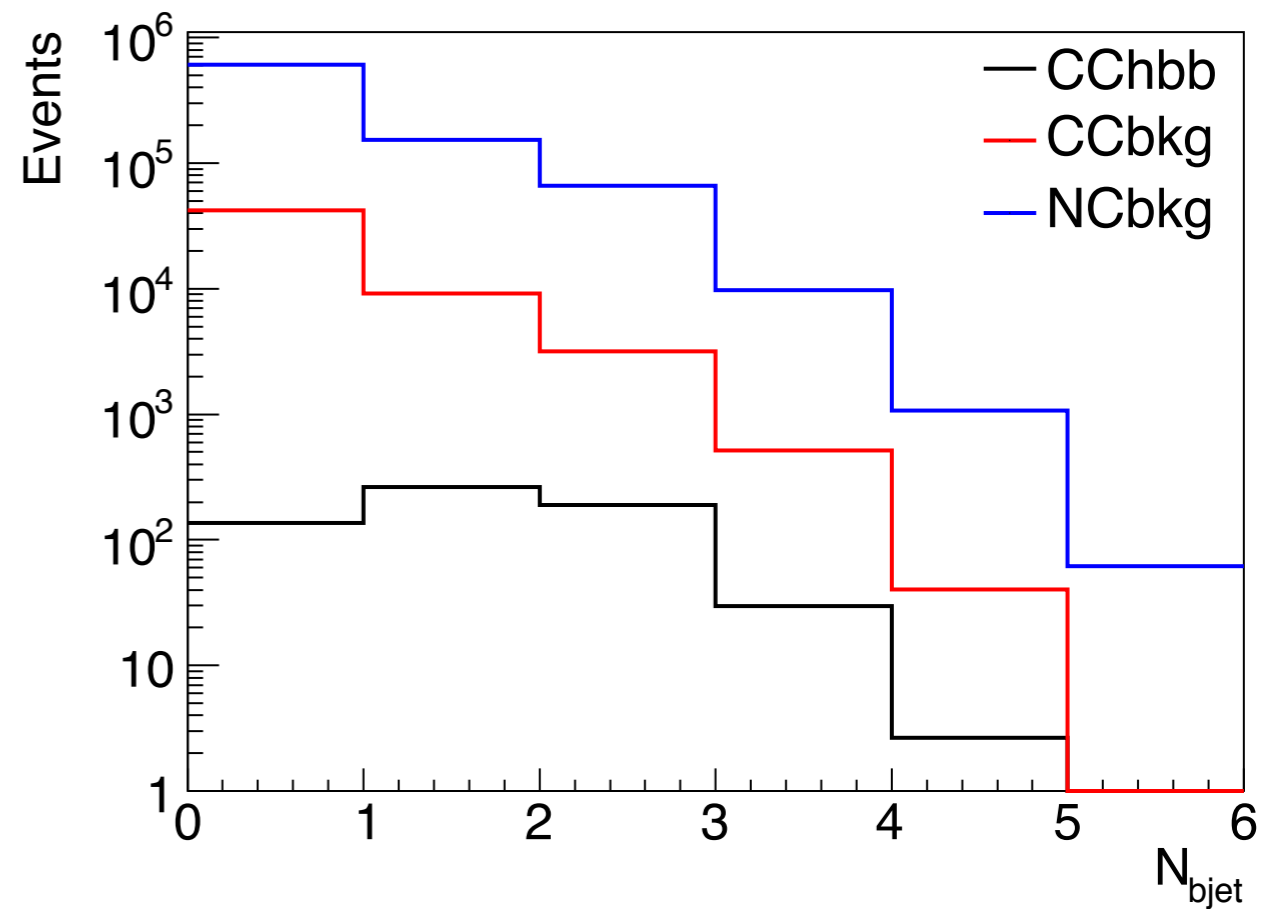
N_{jet} and N_{bjet}

- N_{bjet} means number of b-tagged jets
- Choose $N_{\text{jet}} \geq 3$ and $N_{\text{bjet}} \geq 2$

N_{jet}

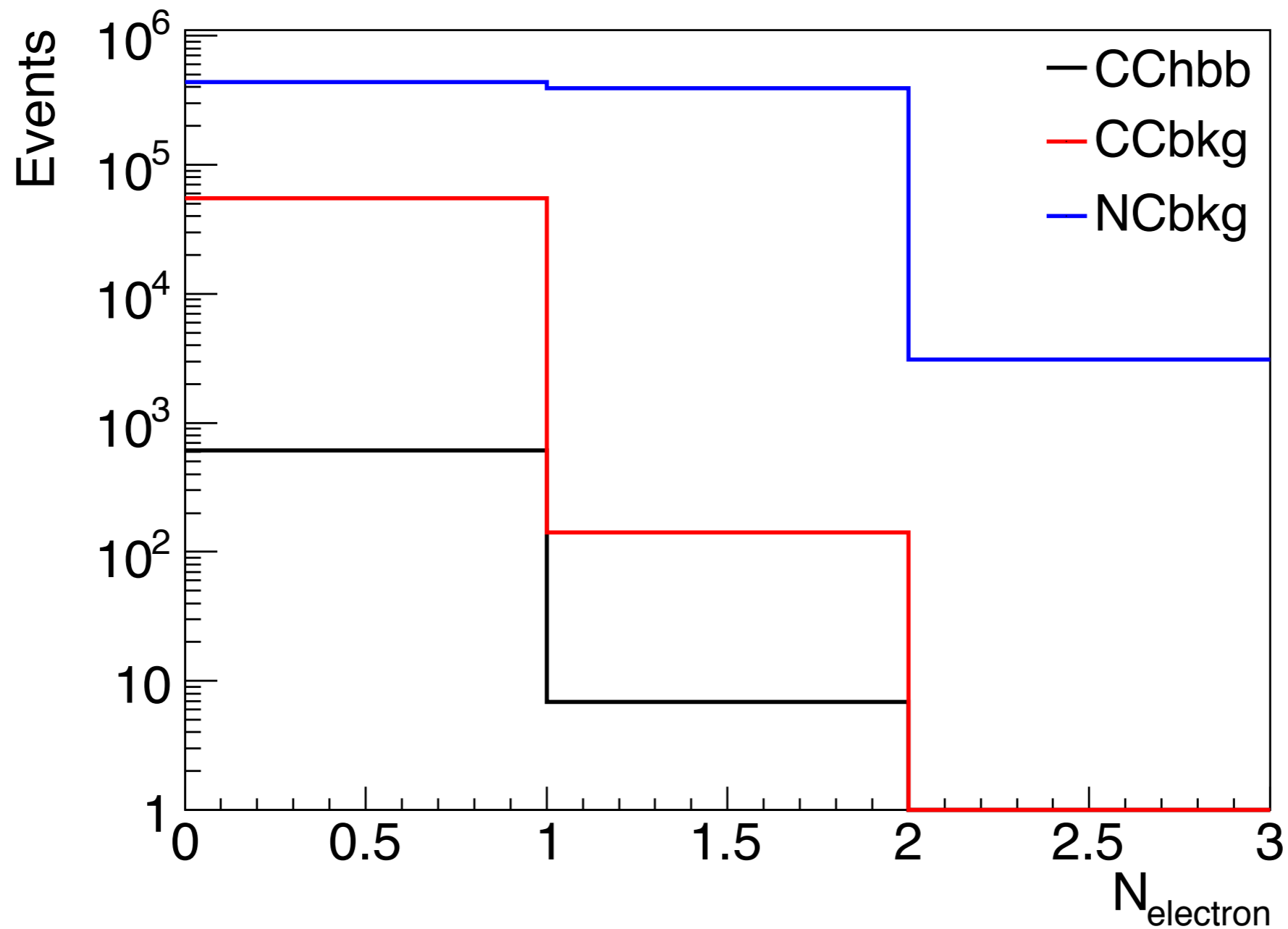


N_{bjet}



N_{electron}

- Plot number of Electron
- Choose $N_{\text{electron}} = 0$

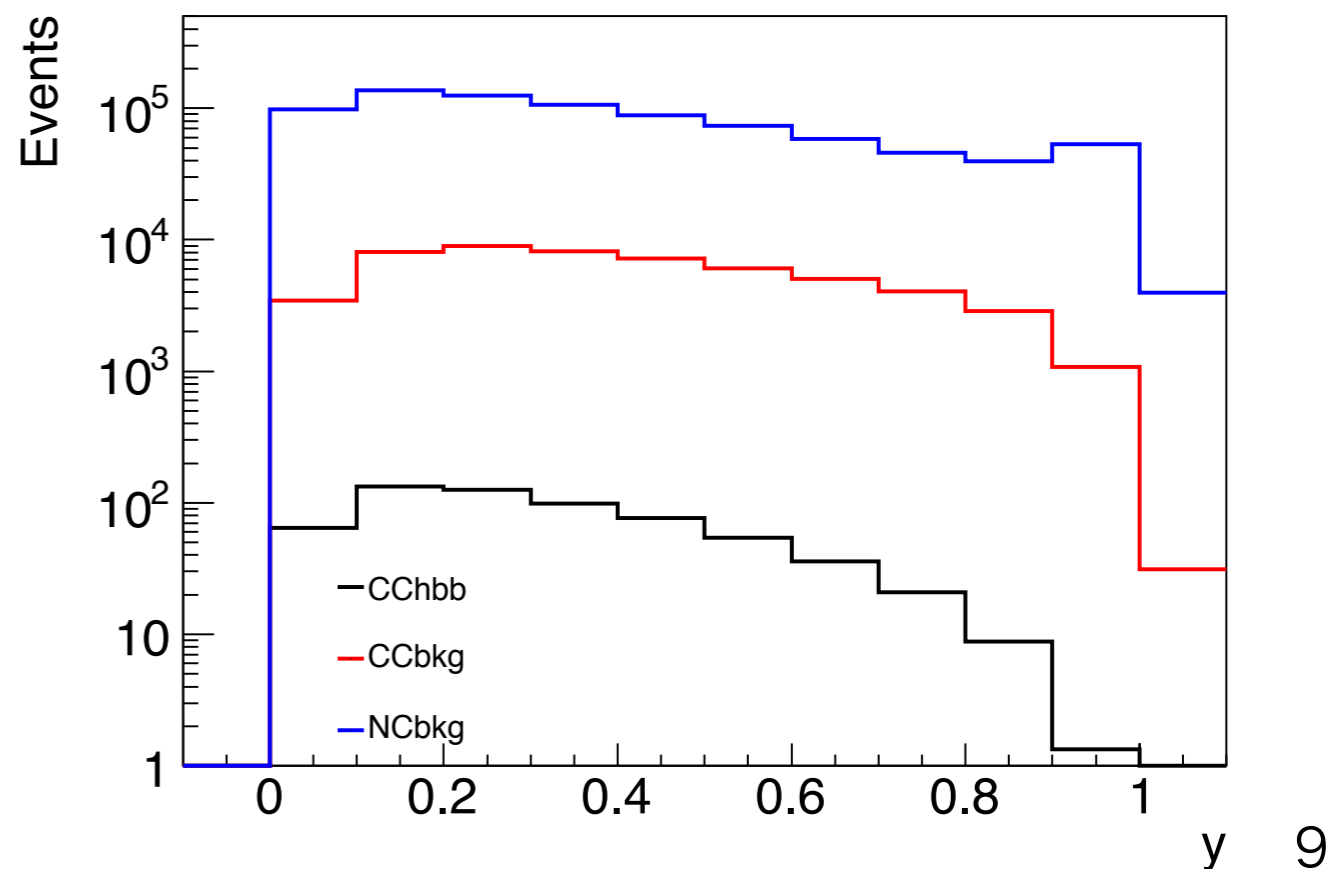
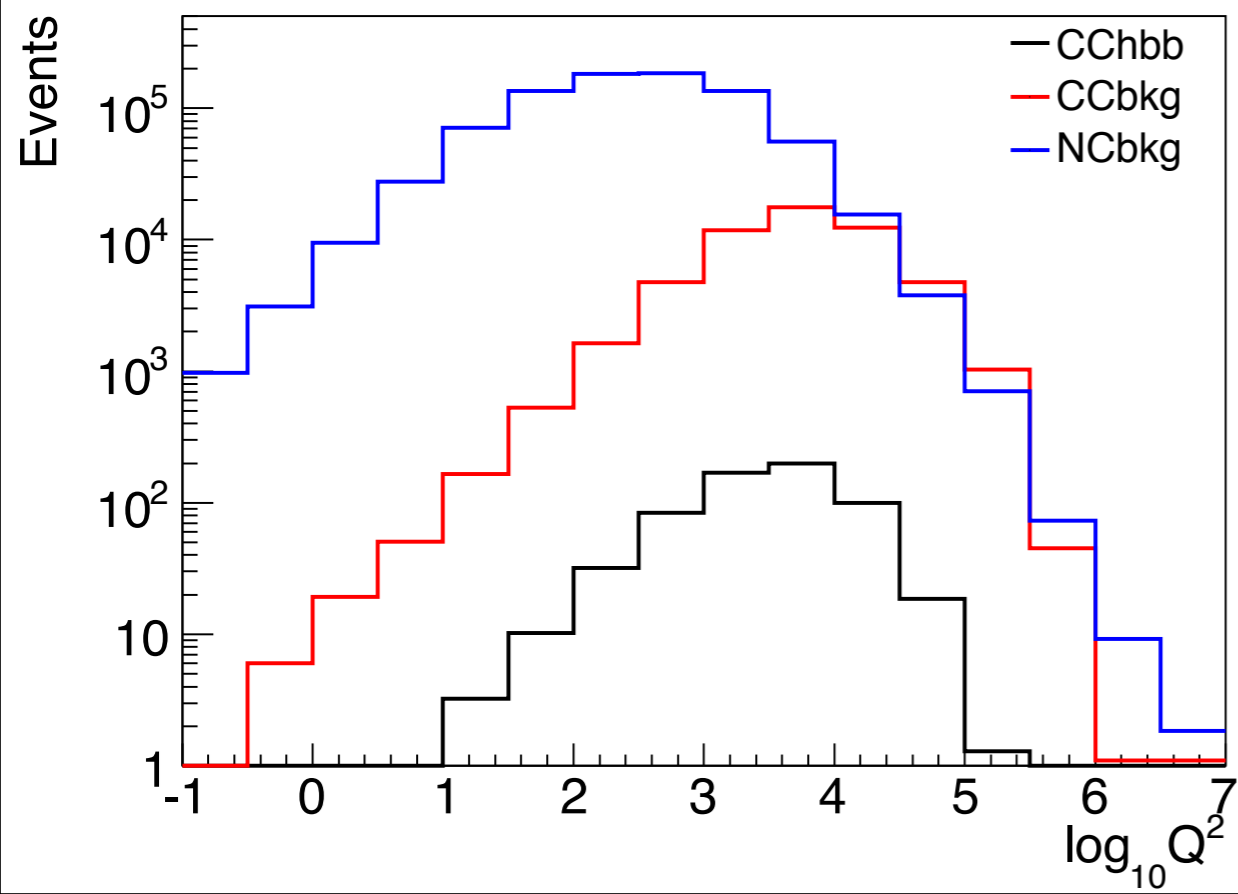


Momentum transfer Q^2

- Plots Q^2 and y
- Choose $Q^2 > 100 \text{ GeV}^2$ and $y < 0.9$

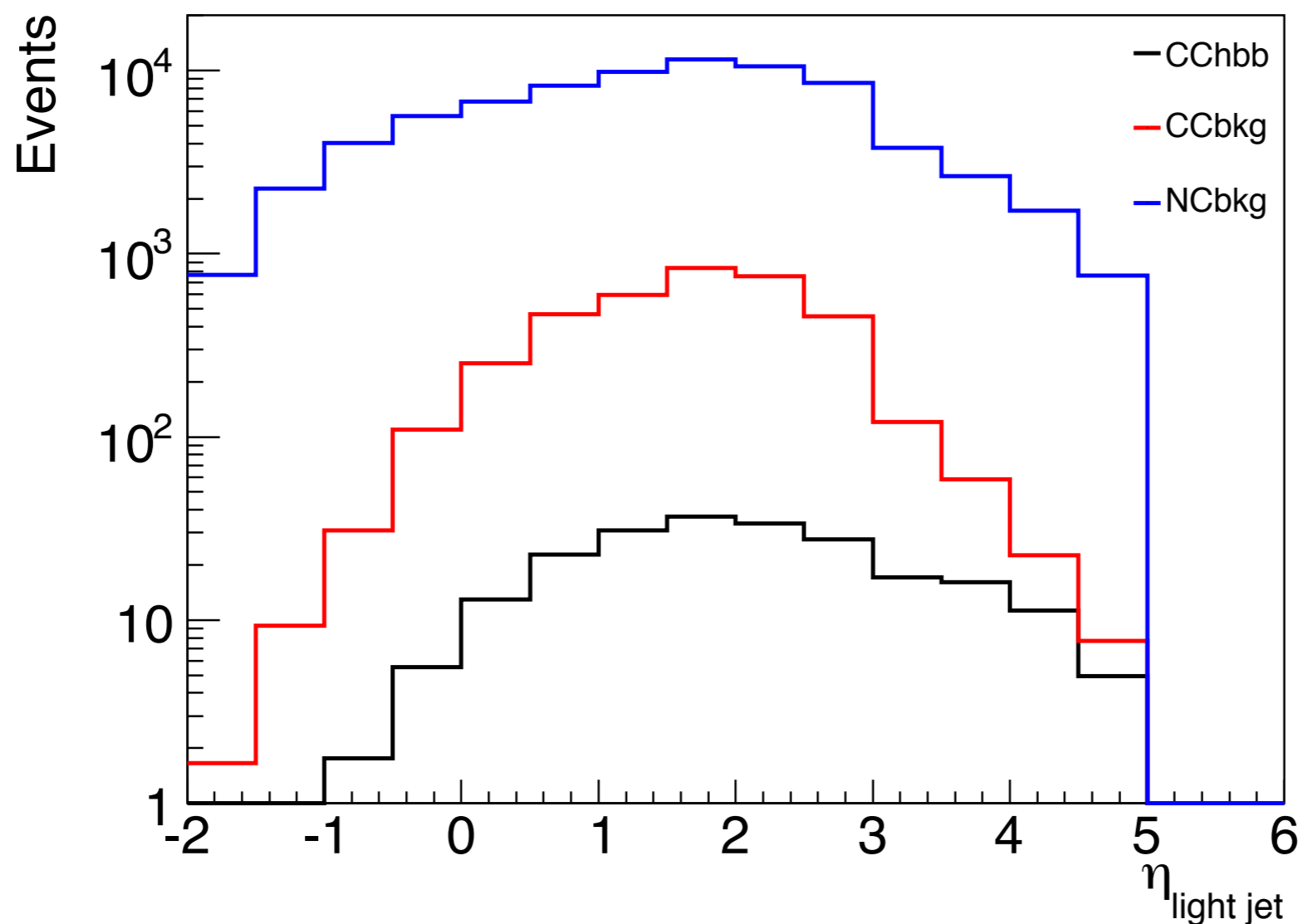
$$Q_{rec}^2 = \frac{\left(\sum^{hadronjet} P_x\right)^2 + \left(\sum^{hadronjet} P_y\right)^2}{1 - y_{rec}}$$

$$y_{rec} = \frac{\sum^{hadronjet} (E - p_z)}{2E_e}$$



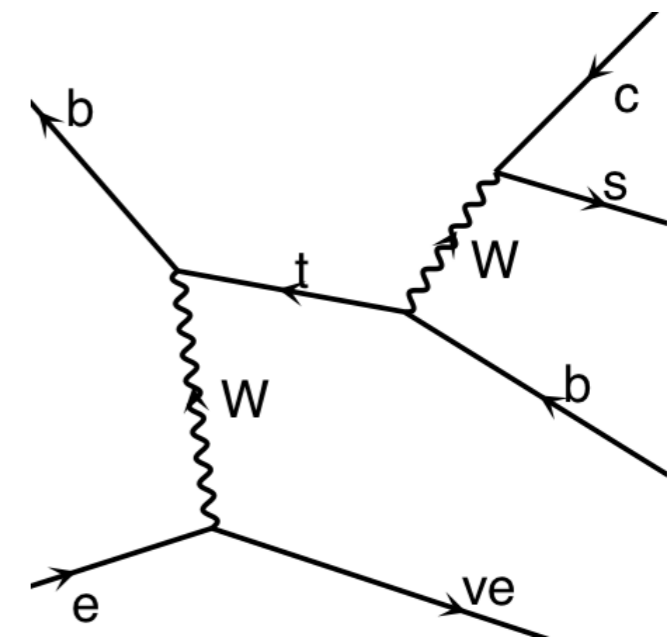
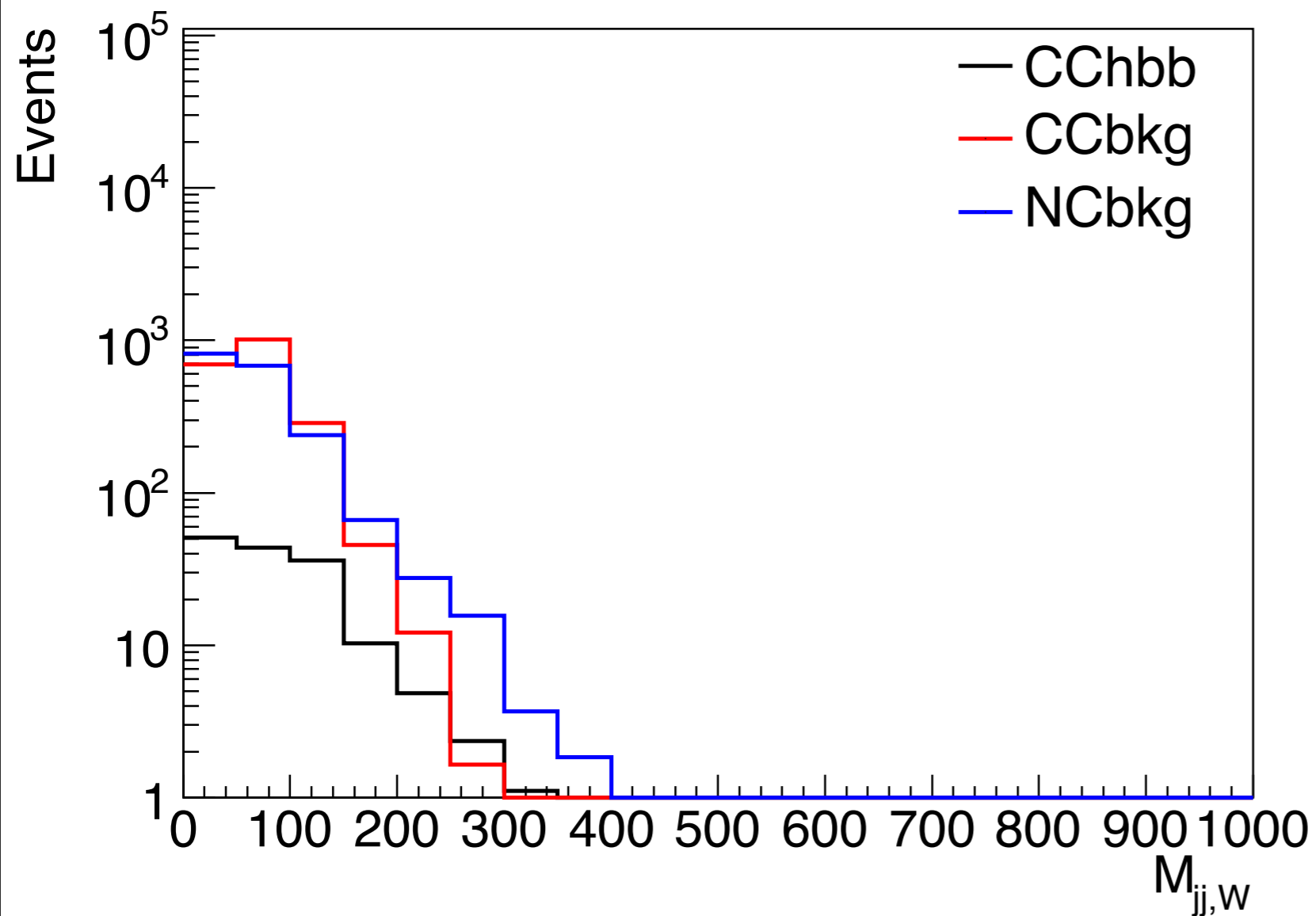
Light jet Eta

- Light jet means min Eta jet except min and 2nd minimum Eta b-jets
- Choose $\text{Eta} > 0$



W mass

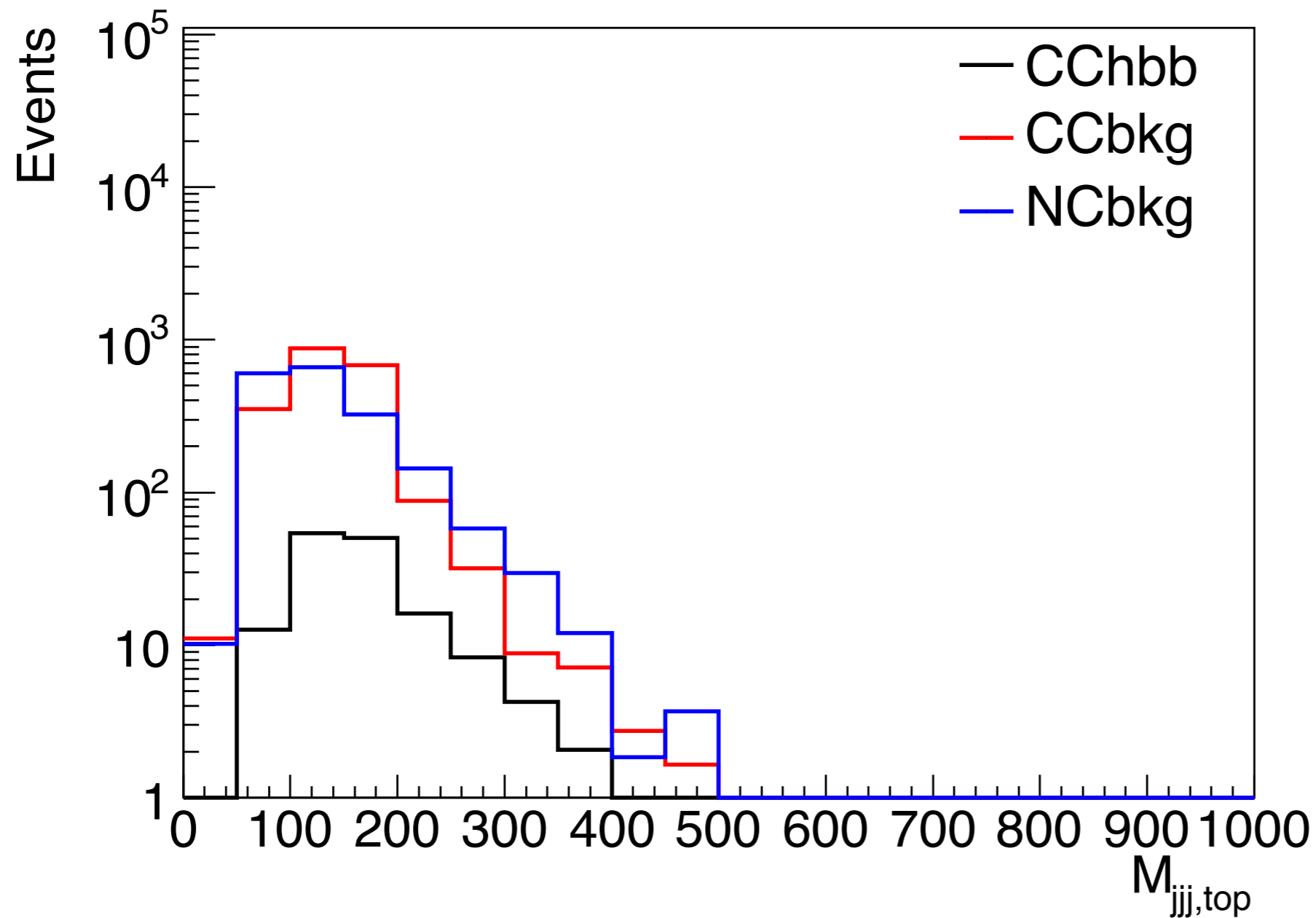
- After using all cuts in previous slide
- Decrease events intermediated by top quark
- Choose Min Eta b-jet and light jet as W decay jets
- Choose $M_{jj,w} > 100\text{GeV}$



top intermediating process

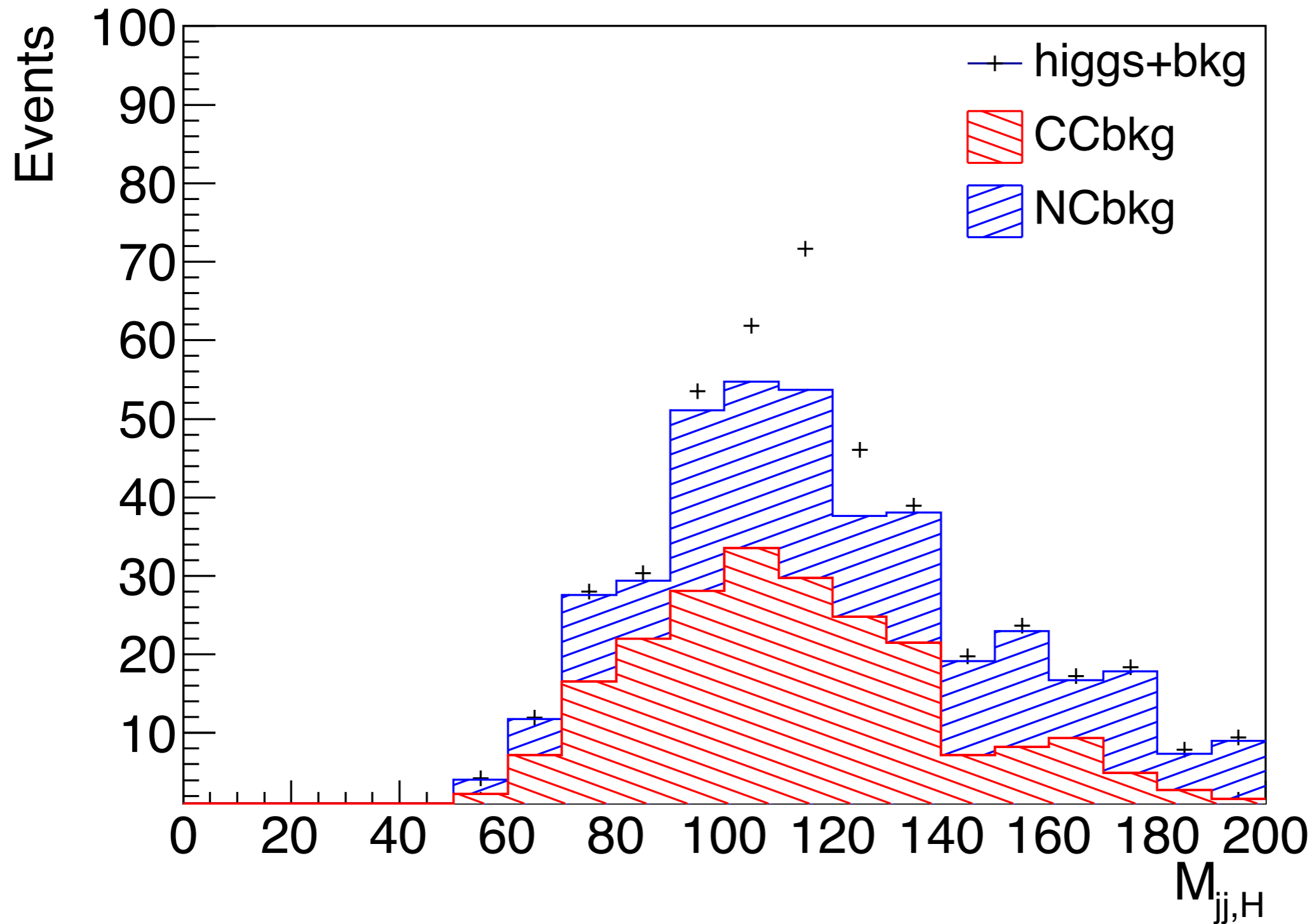
Top quark mass

- After using all cuts except W mass cut
- Choose min and 2nd min Eta b-jets and light jet as top decay jets
- Choose $M_{jj,top} > 150\text{GeV}$



Result

- After using all cuts
- Choose min and 2nd min Eta b-tagged jets and calculate mass



Number of events

- Event number in Mass range (100,130)GeV
- Kengo used Mass range (90,120)GeV

$$E_e = 60\text{GeV}$$

NCbkg

58.1

37.9

CCbkg

87.9

60.3

signal

180

124

mine

Kengo's

signal

$$\frac{\text{signal}}{\sqrt{\text{NCbkg} + \text{CCbkg}}}$$

$$= 14.9 \quad \text{mine}$$

$$= 12.5 \quad \text{Kengo's}$$