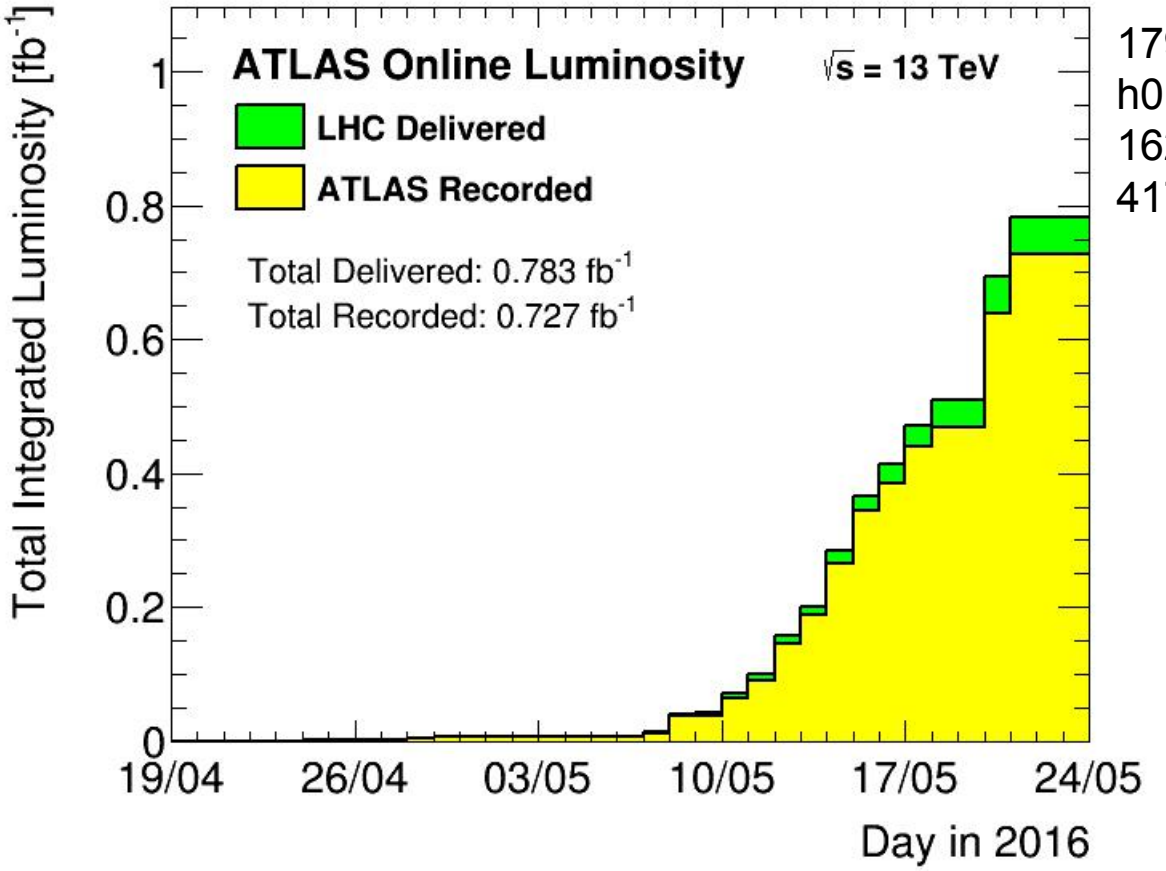
weekly report



179 pb^{-1} in GRL
h012pre2 MxAOD is well prepared
1626 events pass SM Higgs selection
417 pass high-mass diphoton selection

Yu Zhang

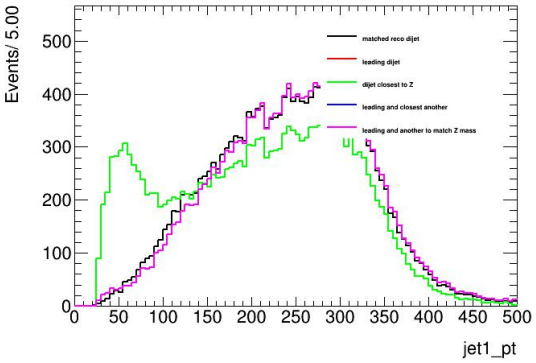
05.23

outline

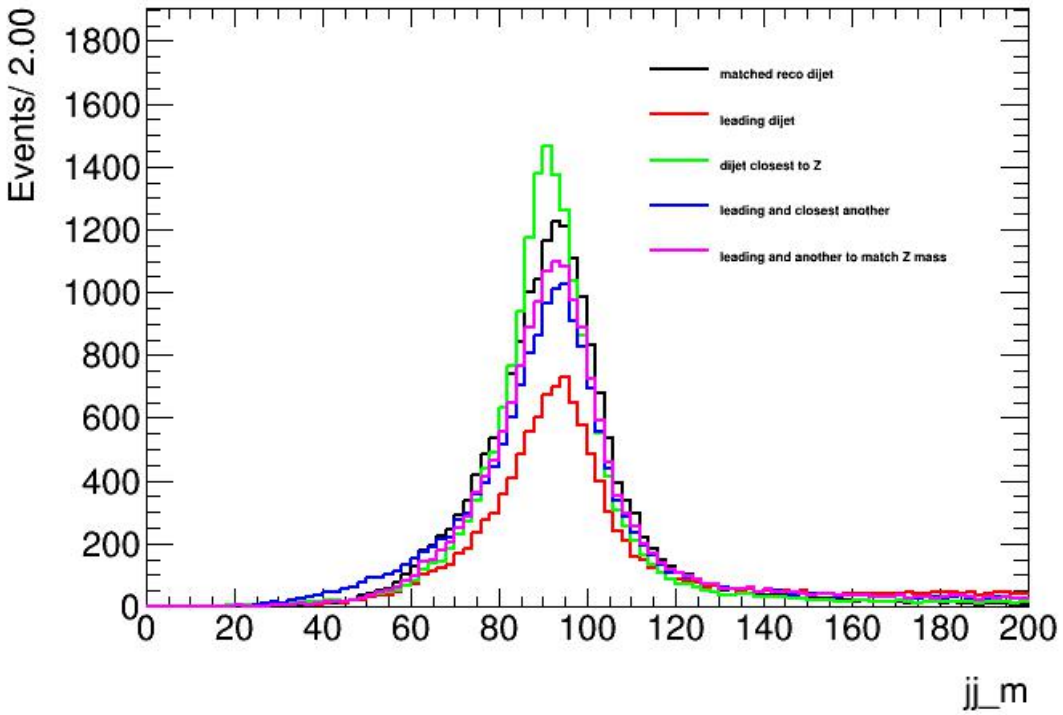
- Zgam
  - fit and resolution
  - further optimization
- High-Mass diphoton
  - photon photon fusion

Z(qq) gam ---dijet combination

- four strategy
  - ①leading dijet
  - ②dijet closest to Z mass
  - ③leading and another closest jet
  - ④leading and another jet to reconstruct best M_Z
- ① has a bad resolution, ② has a bad structure in jet1 pT and dijet pT

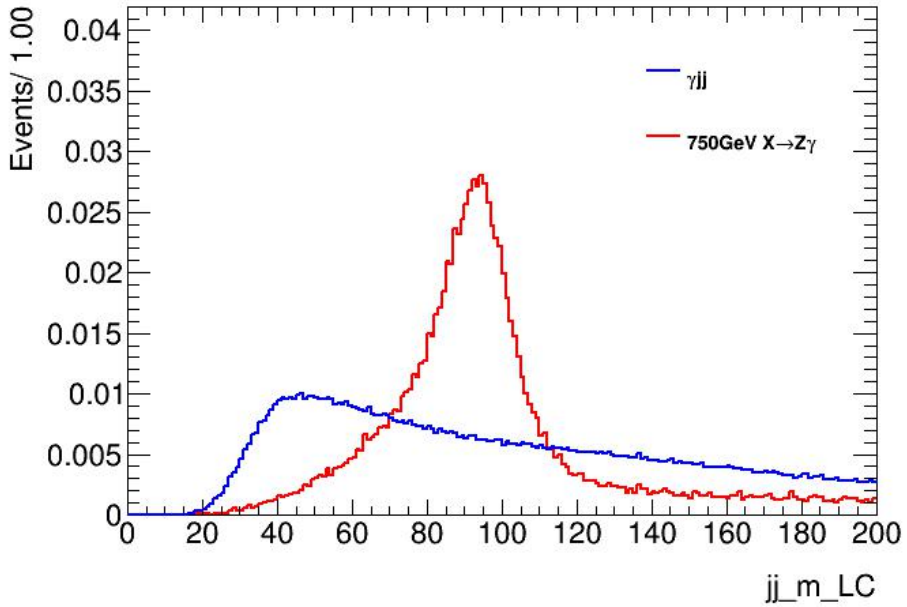


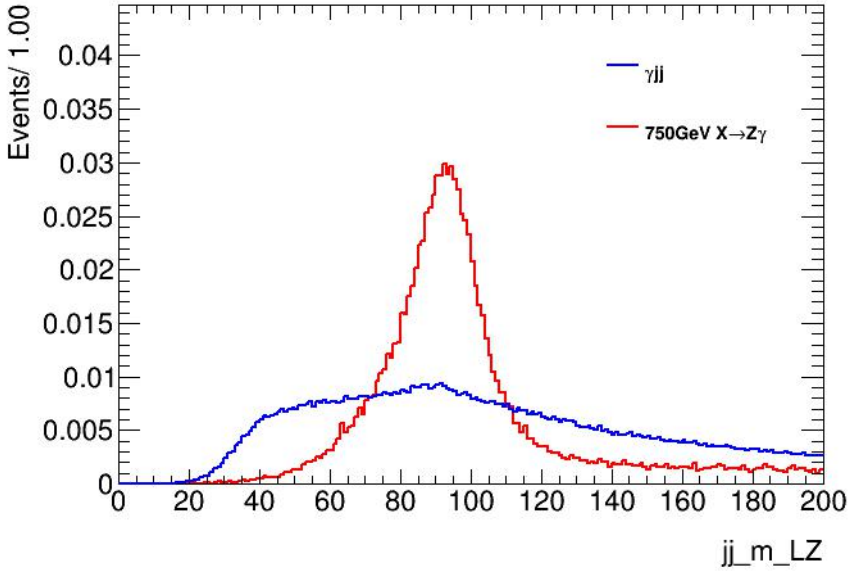
	match j1	match j2	match dijet
①	86.9%	40.3%	39.0%
②	71.9%	53.4%	49.7%
③	86.9%	57.1%	55.1%
④	86.9%	58.4%	55.8%



dijet combination

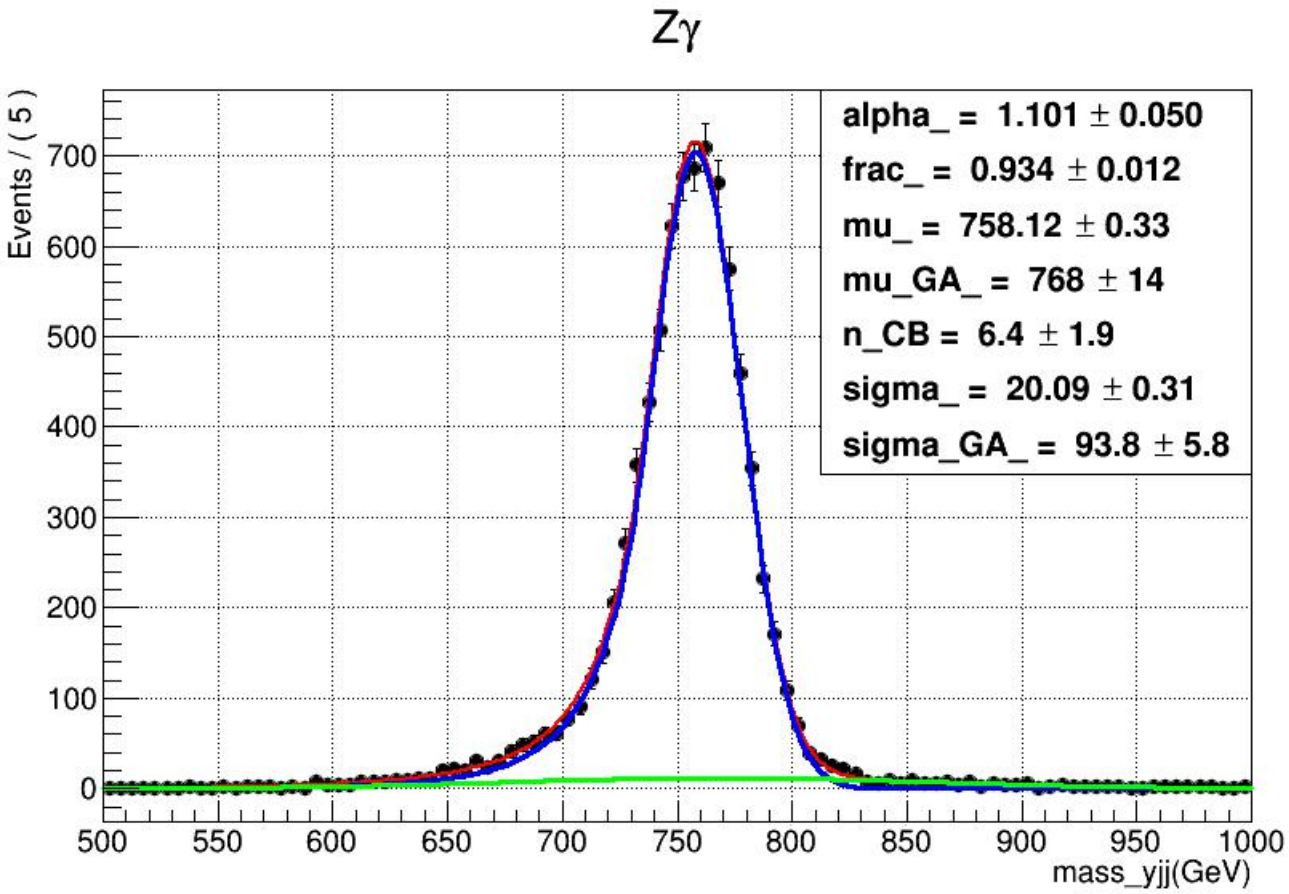
- check the signal-bkg ratio in strategy ③(left) and ④(right)
- since ④ requires dijet mass cloest to Z, a bump near Z mas in bkg will give poor significance
- select ③ finally





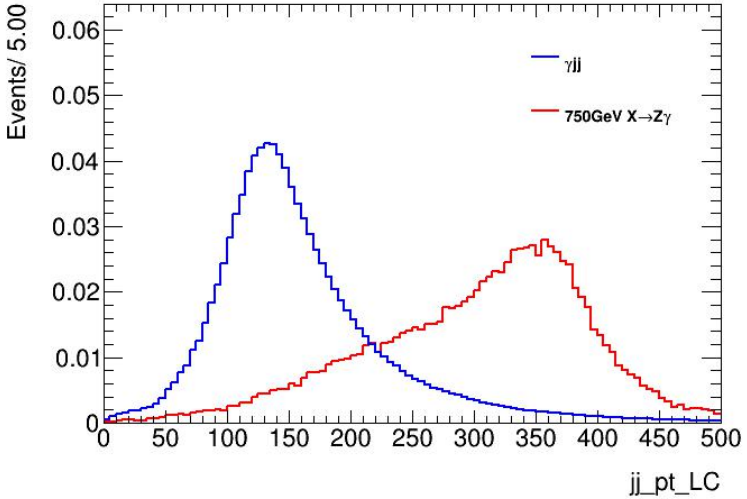
fit and resolution

- photon pt> 300GeV, |mjj-90| < 17GeV
- resolution of Crystal ball is ~20GeV
- sum of weights is 8436, and the fitted one is 8328, 1.3% bias

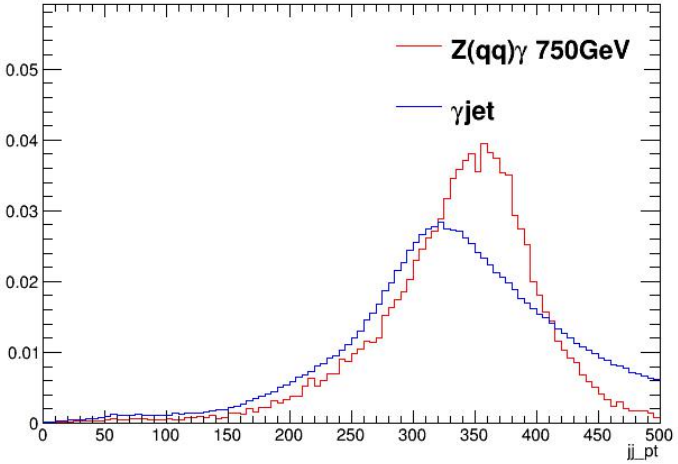


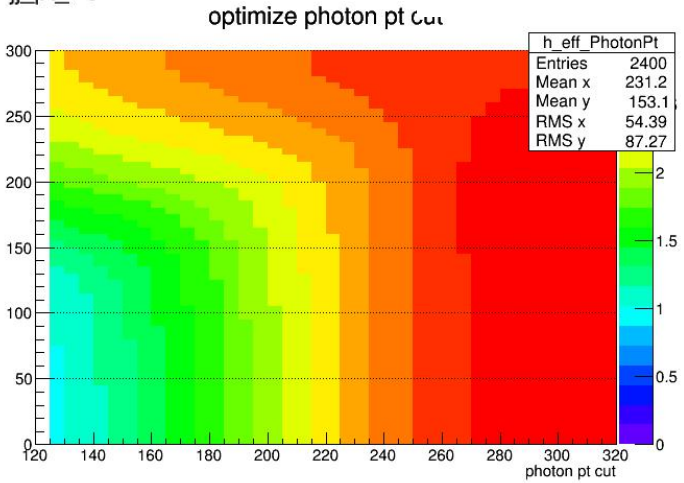
simultaneous scan on pT_γ and pT_{jj}

- working point : $pT_\gamma > 300GeV$ and $pT_{jj} > 175GeV$
- improvement on $\frac{eff(x)}{\sqrt{eff(b)}}$ is 2.90
- same improvement as an only $pT\gamma$ cut on 300GeV : 2.90

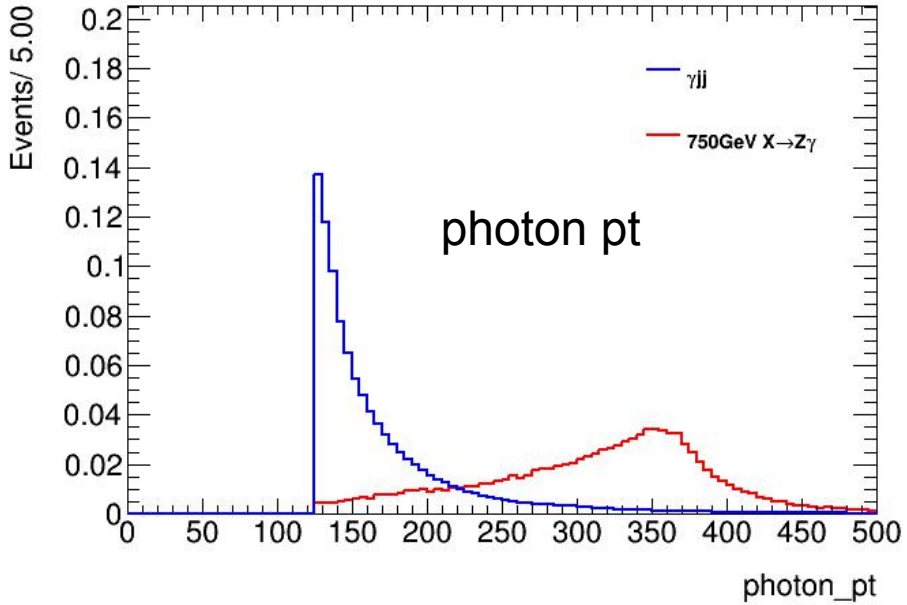


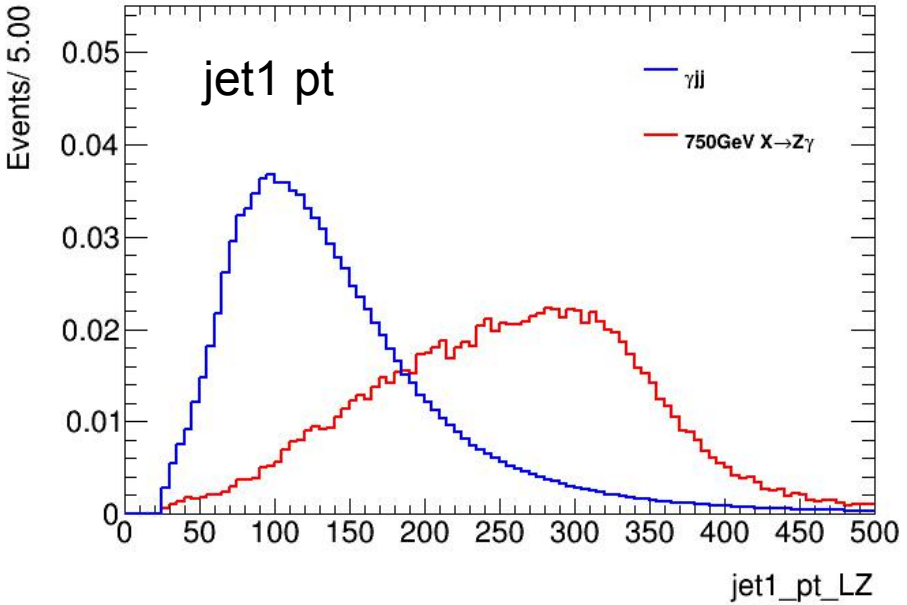
photon pt cut

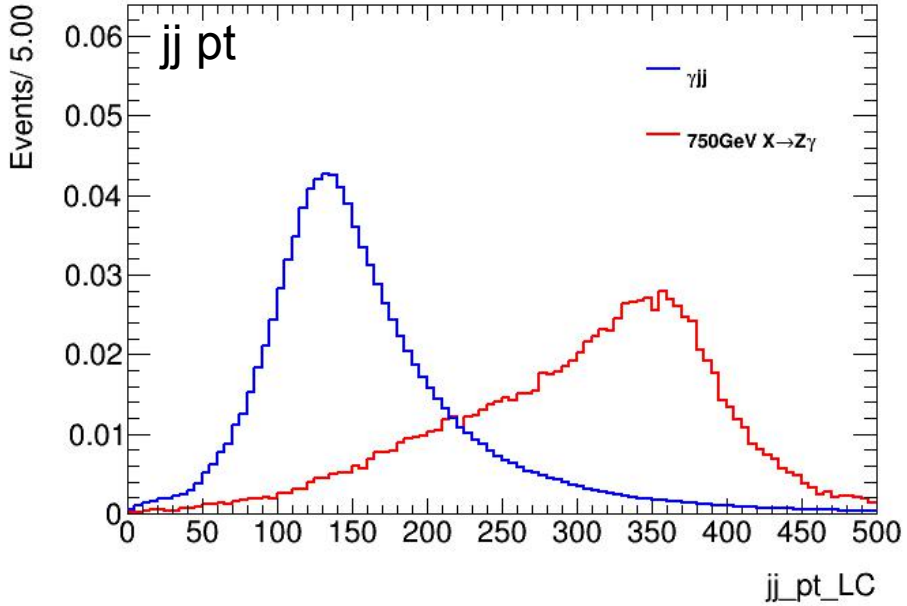


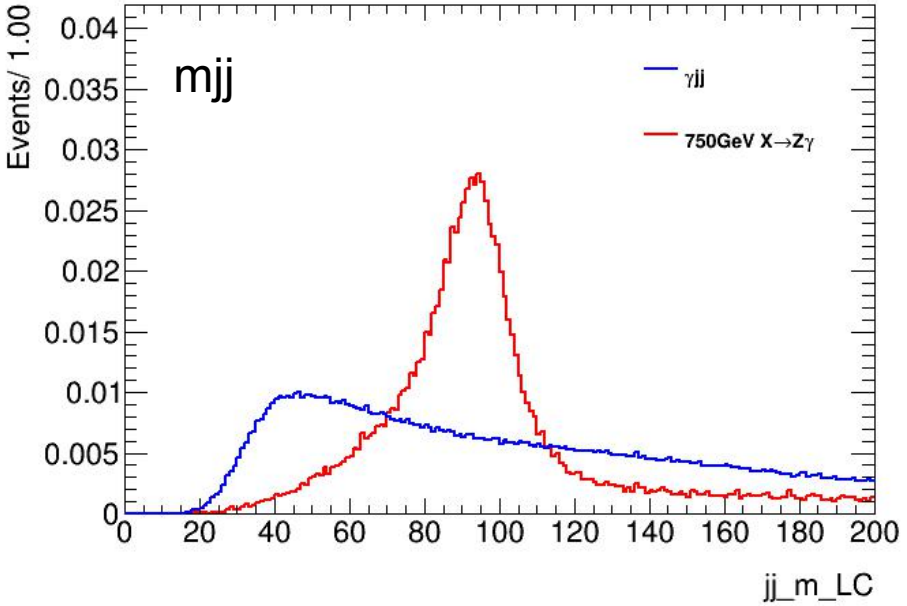


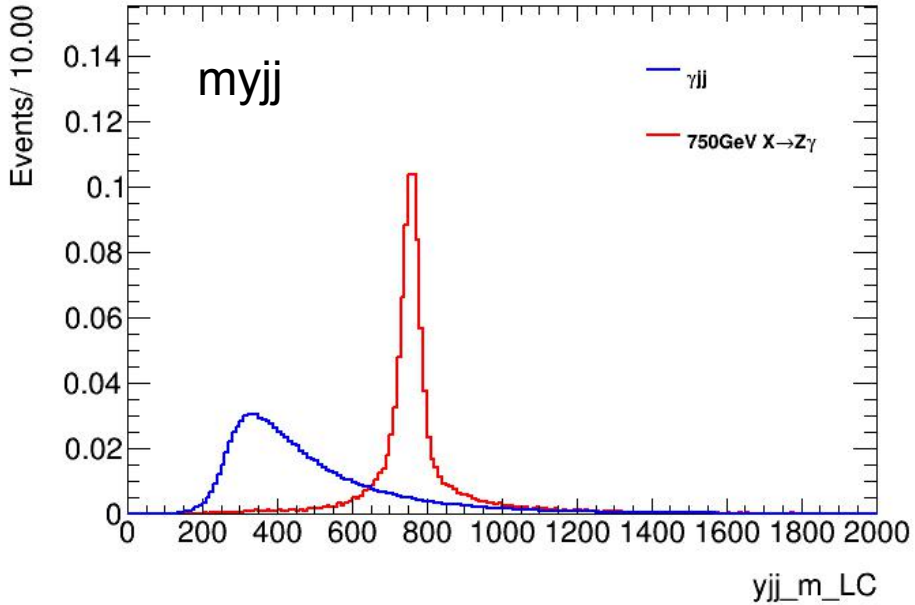
other variables(after pre-selection)

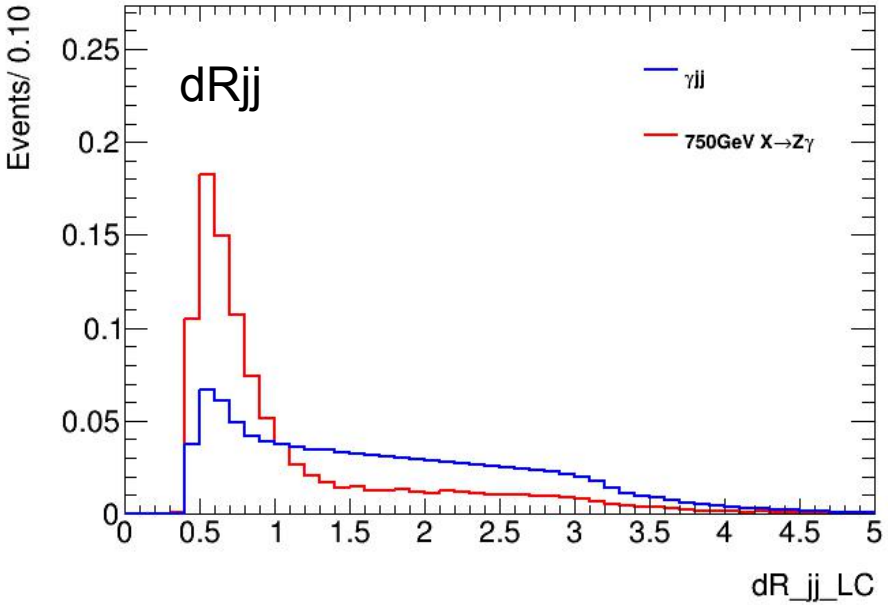


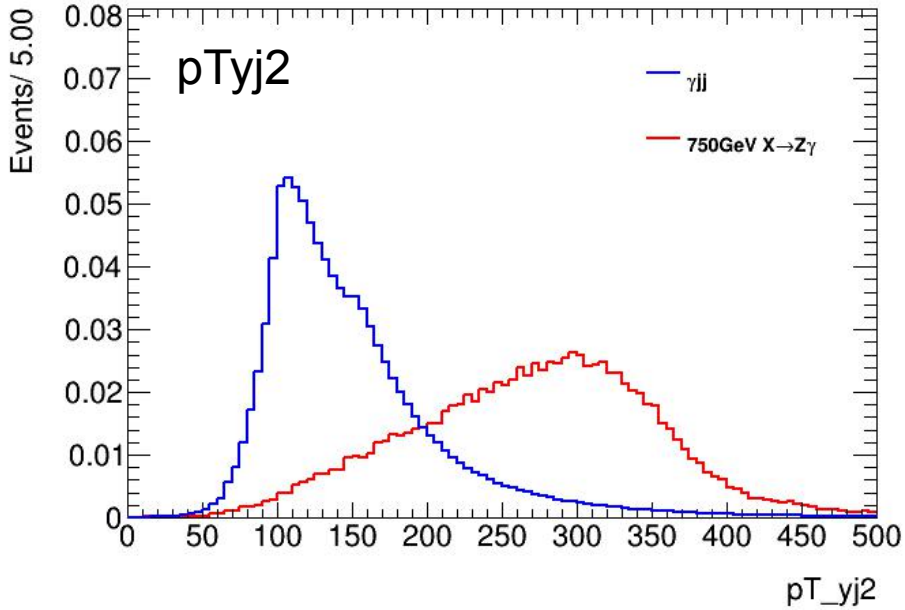


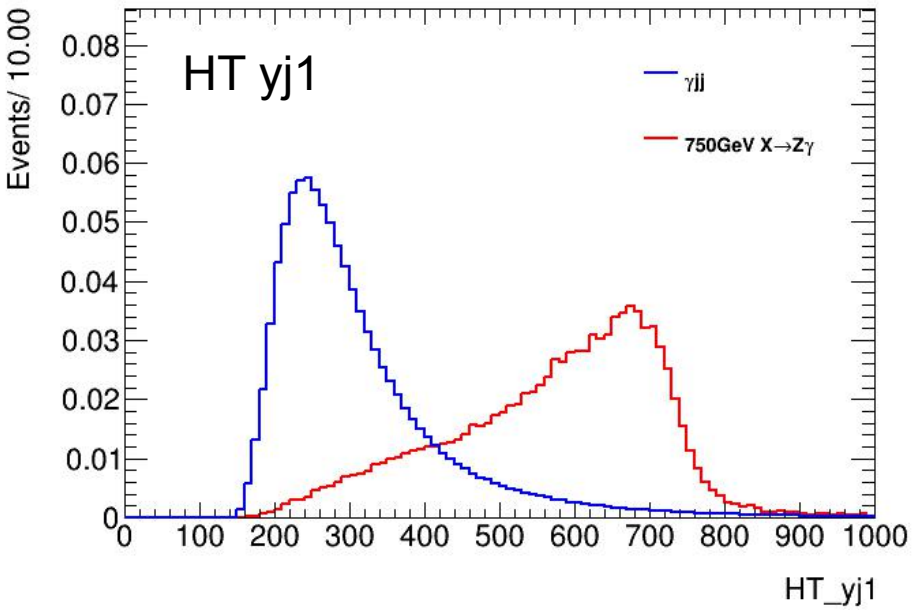


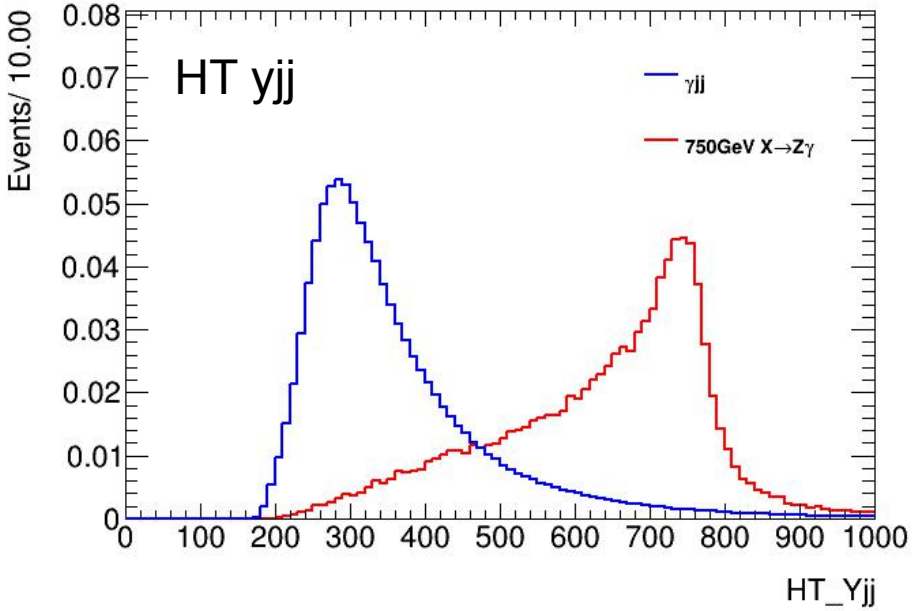


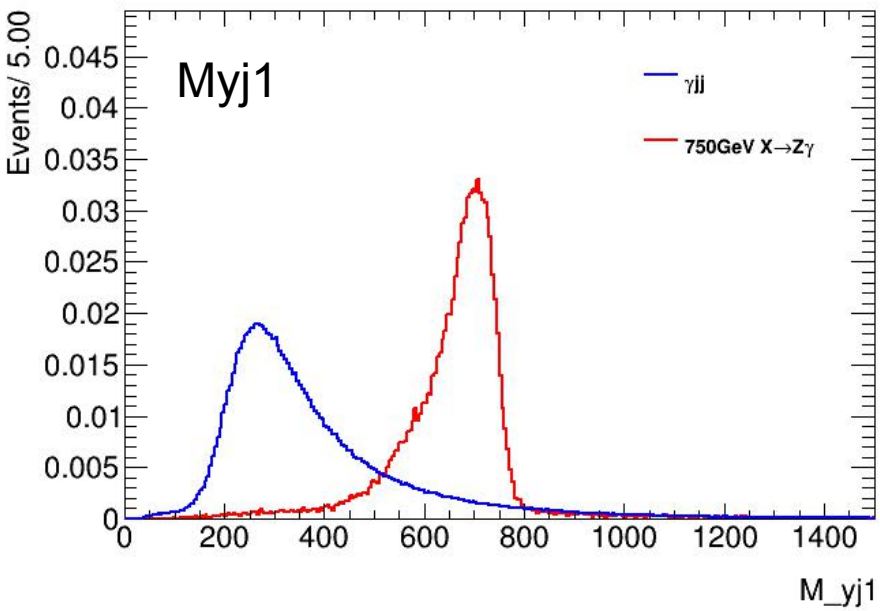

myjj
γjj
750GeV X→Zγ
Events/ 10.00
yjj_m_LC

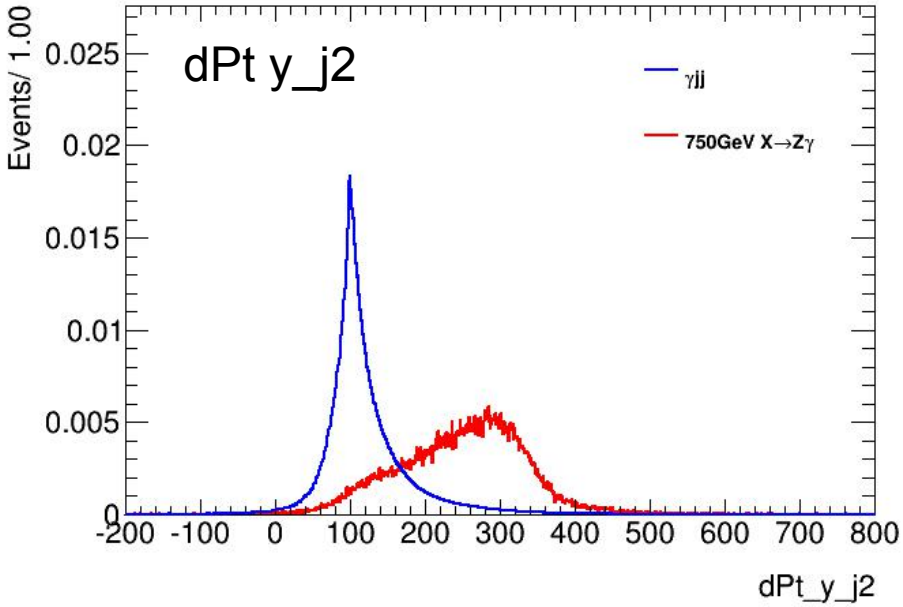

dRjj
γjj
750GeV X→Zγ
Events/ 0.10
dR_jj_LC

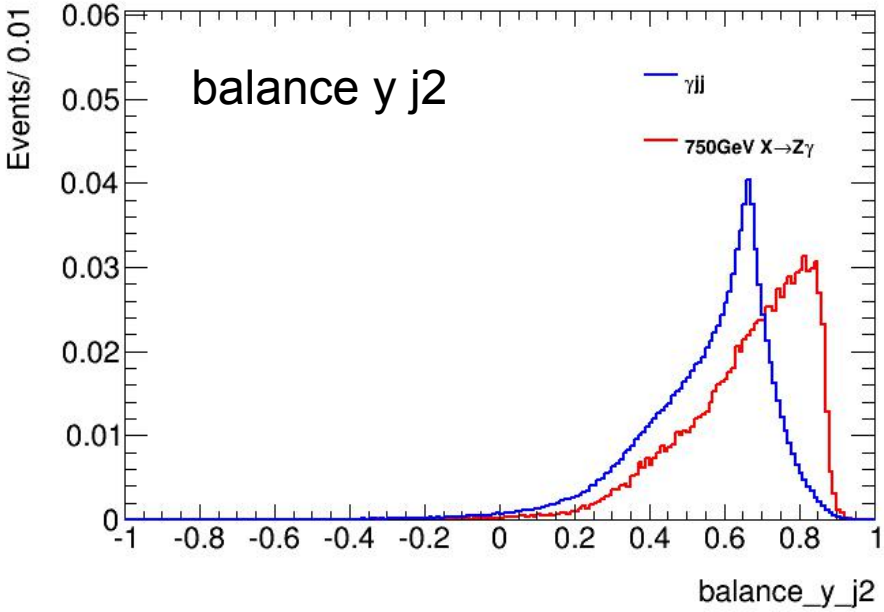

pTyj2
γjj
750GeV X→Zγ
Events/ 5.00
pT_yj2

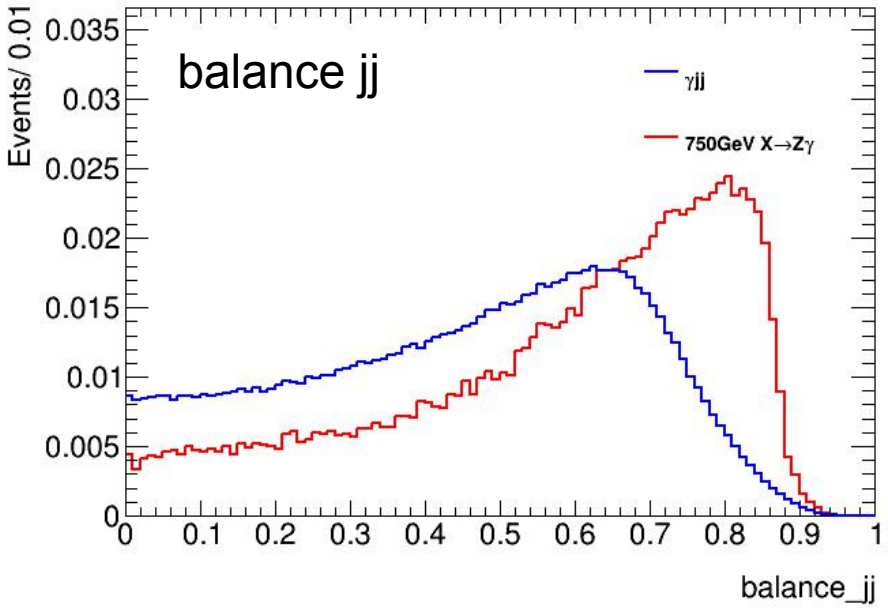

HT yj1
γjj
750GeV X→Zγ
Events/ 10.00
HT_yj1

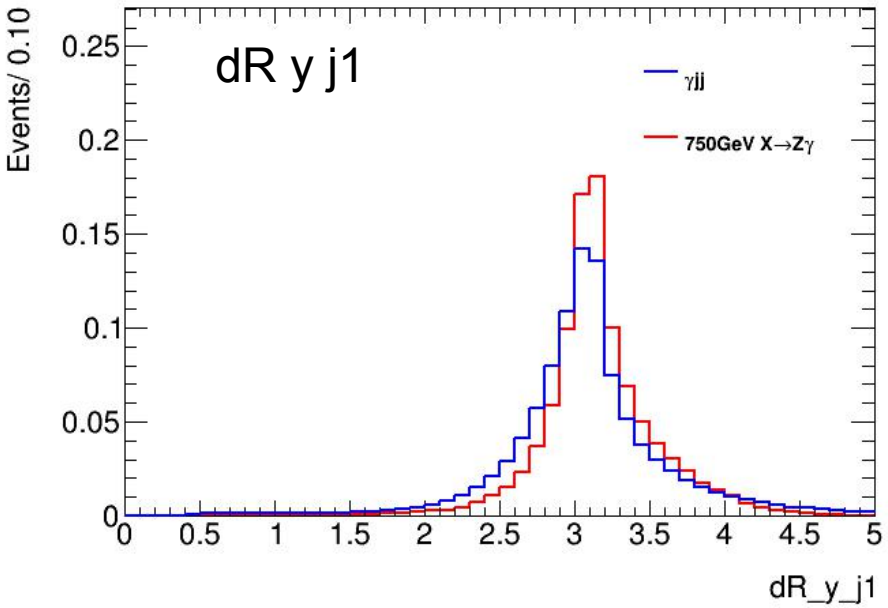

HT yjj
γjj
750GeV X→Zγ
Events/ 10.00
HT_Yjj

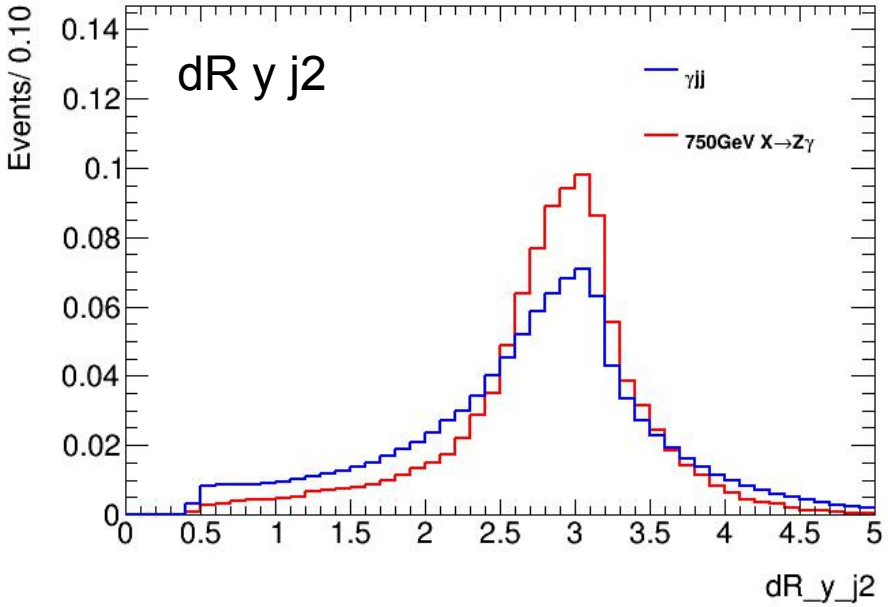

Myj1
γjj
750GeV X→Zγ
Events/ 5.00
M_yj1


dPt y_j2
γjj
750GeV X→Zγ
Events/ 1.00
dPt_y_j2

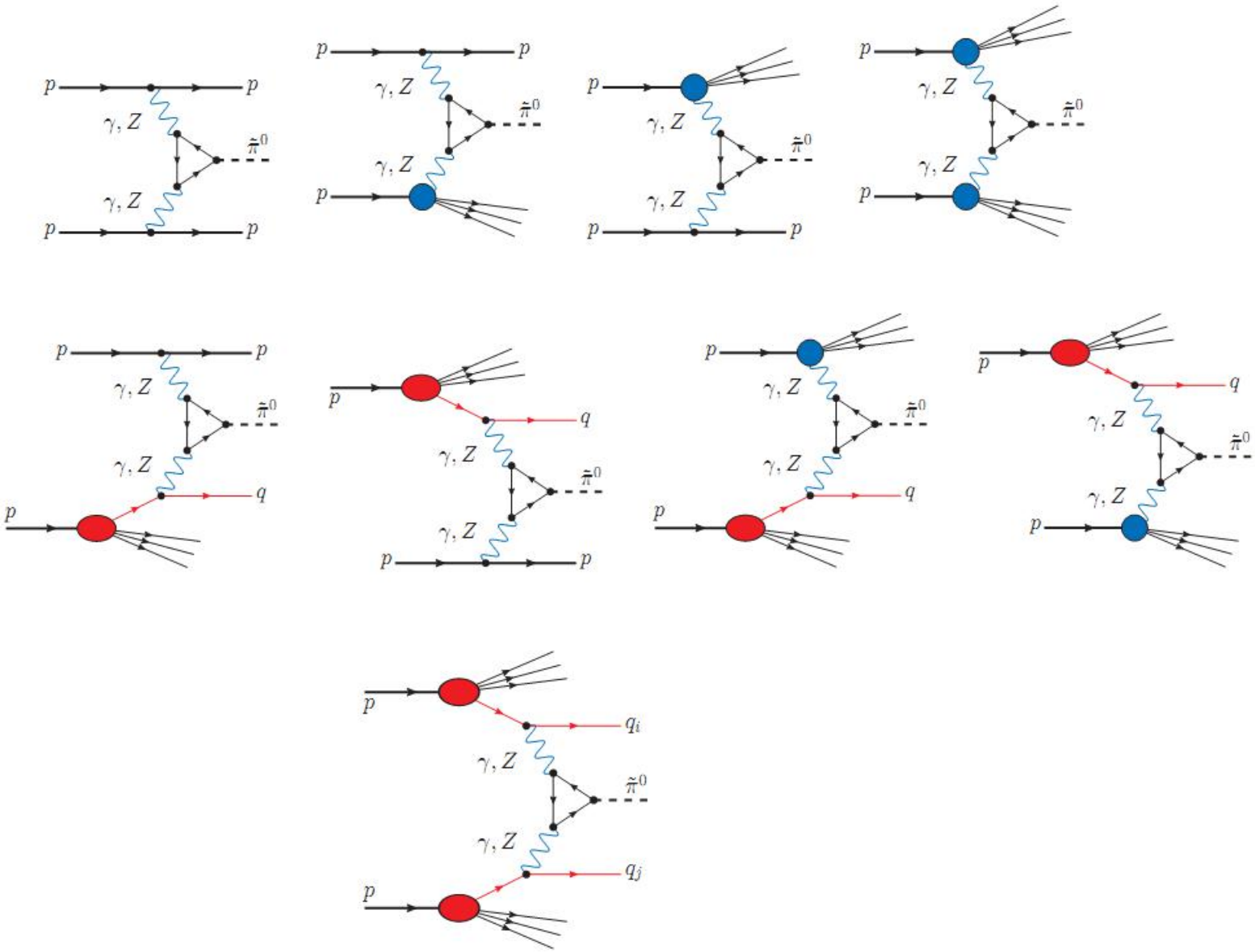

balance y j2
γjj
750GeV X→Zγ
Events/ 0.01
balance_y_j2


balance jj
γjj
750GeV X→Zγ
Events/ 0.01
balance_jj

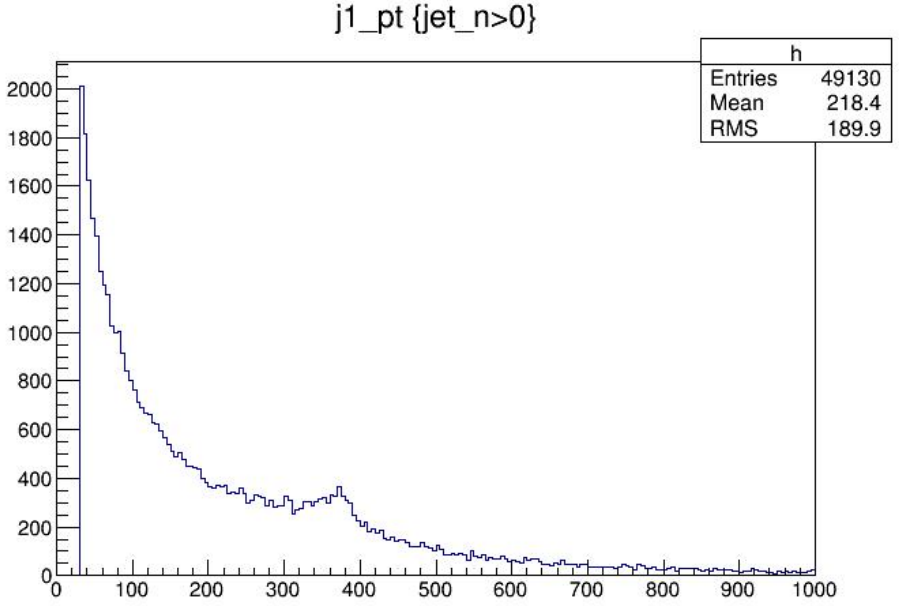

dR y j1
γjj
750GeV X→Zγ
Events/ 0.10
dR_y_j1


dR y j2
γjj
750GeV X→Zγ
Events/ 0.10
dR_y_j2

photon photon fusion



kinematics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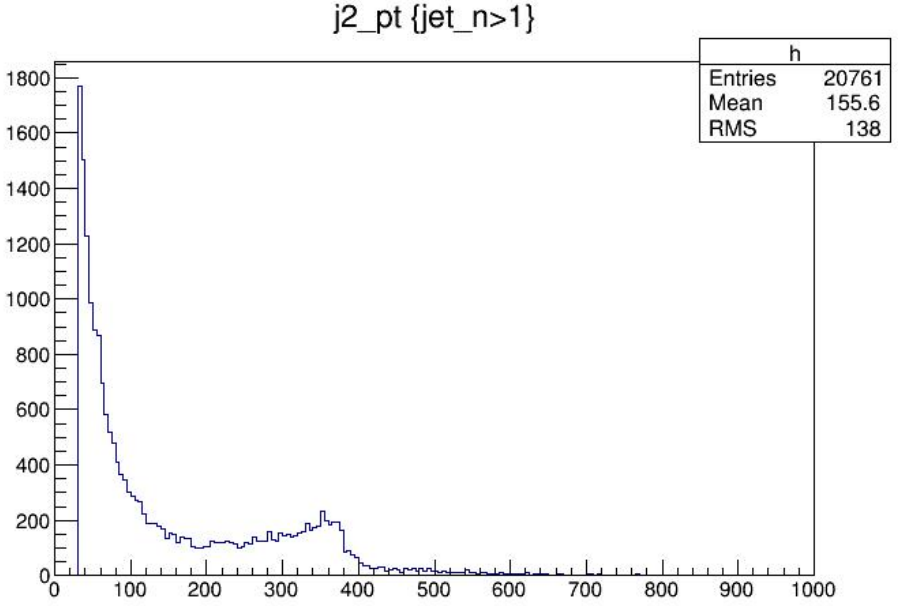
h
Entries 49130
Mean 218.4
RMS 189.9


j2_pt {jet_n>1}
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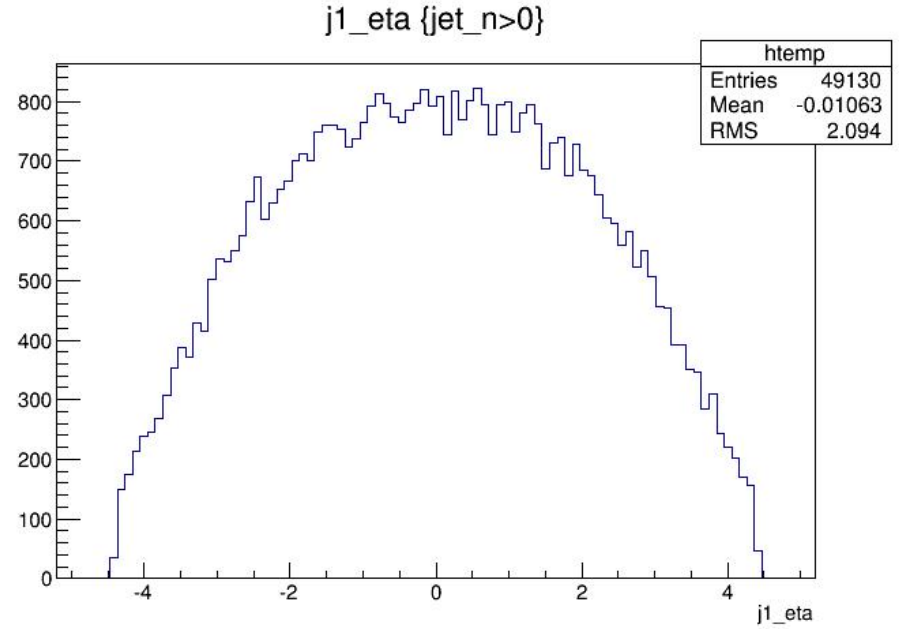
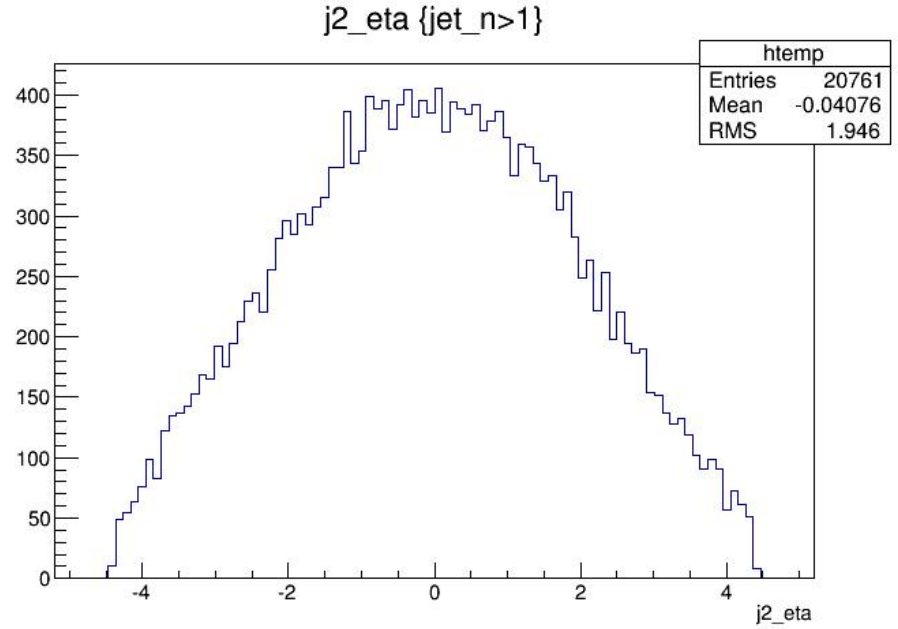
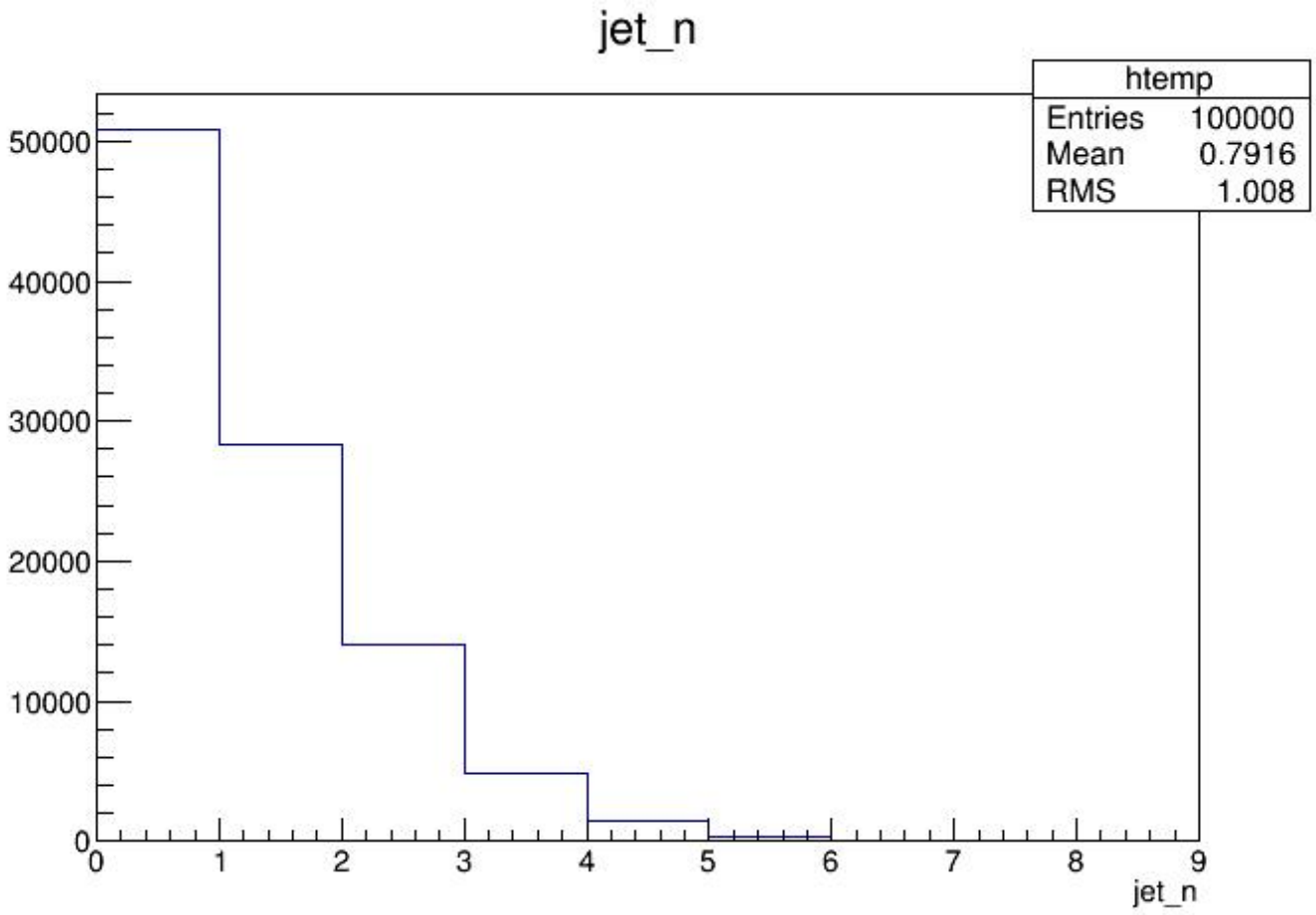
Entries 20761
Mean 155.6
RMS 138


j1_eta {jet_n>0}
htemp
Entries 49130
Mean -0.01063
RMS 2.094
j1_eta


j2_eta {jet_n>1}
htemp
Entries 20761
Mean -0.04076
RMS 1.946
j2_eta


jet_n
htemp
Entries 100000
Mean 0.7916
RMS 1.008
50000
40000
30000
20000
10000
0
0 1 2 3 4 5 6 7 8 9
jet_n