weekly report

Yu Zhang

04.18

outline

- high-mass diphoton
  - general information
- Zgam
  - preliminary cuts
  - kinematic plots
  - brief plan

high-mass diphoton

- go to paper
- first meeting on Tuesday 9:00 am CERN time
- https://indico.cern.ch/event/522115/

09:00 → 09:10 Introduction
Speakers: Leonardo Carminati (Università degli Studi e INFN Milano (IT)) , Tancredi Carli (CERN)

09:20 → 09:35 First results on rel20.7 derivations

09:45 → 10:00 Signal Monte Carlo simulation
Speaker: Martin John White (University of Adelaide (AU))

10:10 → 10:25 Studies on end-cap photons
Speakers: Isabelle Wingerter (LAPP-CNRS) , Alexis Roger Louis Vallier (Centre National de la Recherche Scientifique (FR))

10:35 → 10:50 Cut optimisation
Speaker: Elisabeth Petit (LPSC Grenoble)

The Glance Project — Analysis Tracking - Papers

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HIGG-2016-08: HGam LPX high mass diphoton 2015
Creation Date: 2016/01/22
atlas-higg-2016-08-editorial-board - Go to archive
atlas-higg-2016-08-editors (atlas-higg-2016-08-analysis-team) - Go to archive
atlas-higg-2016-08-contact-editors - Go to archive

Go to EDIT MODE

Paper Summary | Phase 1 | Phase 2 | Final Submission

Paper Summary Data

Reference Code	HIGG – 2016 – 08
Status	Phase 1: Active / Phase 2: Not Started / Submission: Not Started
Short Title	HGam LPX high mass diphoton 2015
Full Title	Search for resonances in diphoton events with the ATLAS detector at $\sqrt{s}$=13 TeV
Data Used*	Run 2
Comments	
ECM	13 TeV
Integrated Luminosity	3.2 femtobarn^{-1}
HEP Data URL	no link
Rivet Routines URL	no link
Planned Journal	
Leading Group	HIGG – Higgs WG
Other Groups	EXOT
Sub Groups	EXOT-LPX HIGG-HSG1
Supporting Internal Documents	Cross checks supporting note; Purity checks supporting note; Isolation supporting note; Calibration supporting note; Scalar support note; 13 TeV supporting note; 8 TeV supporting note

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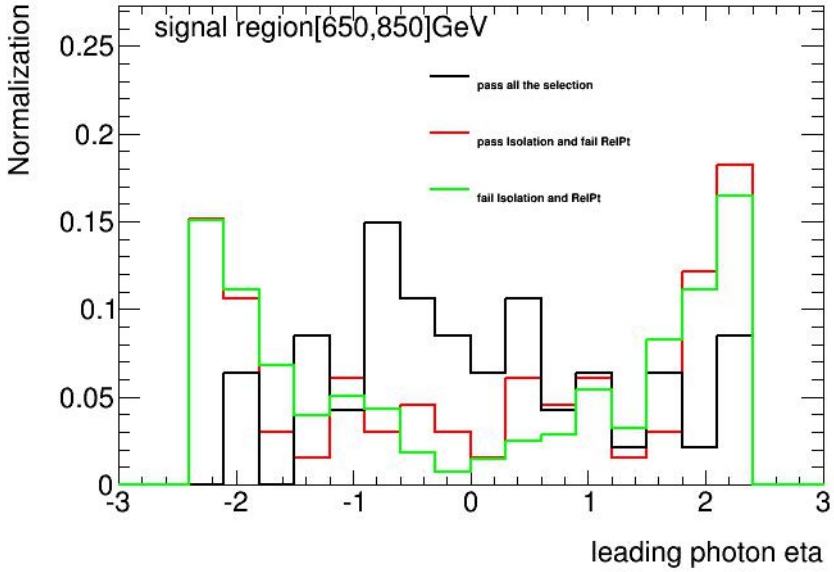
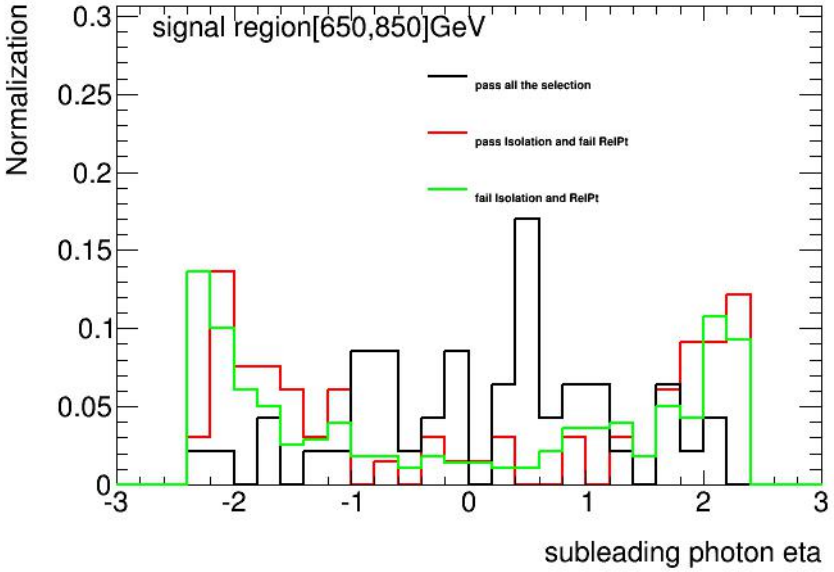
Additional member in the editors egroup

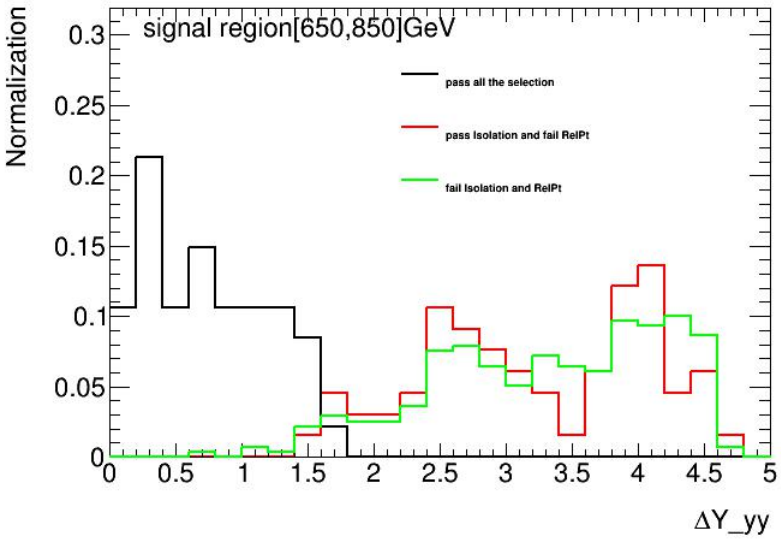
No members selected.

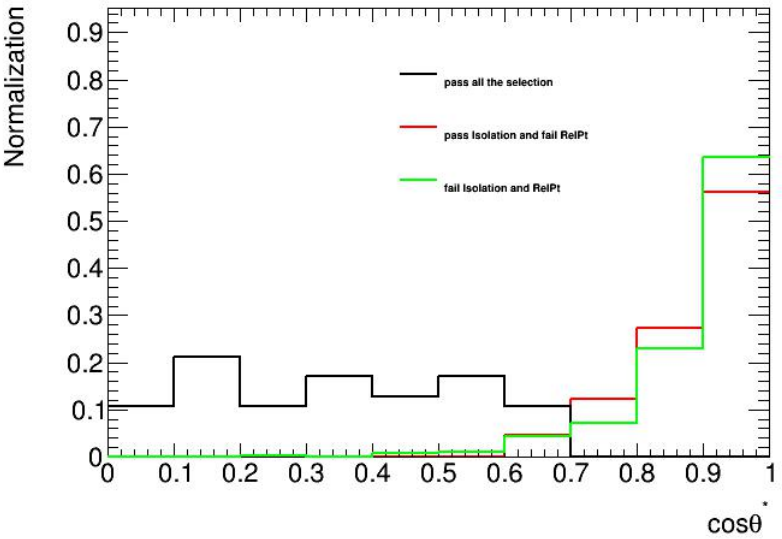
high-mass diphoton

- remind:end-cap photon is interesting?









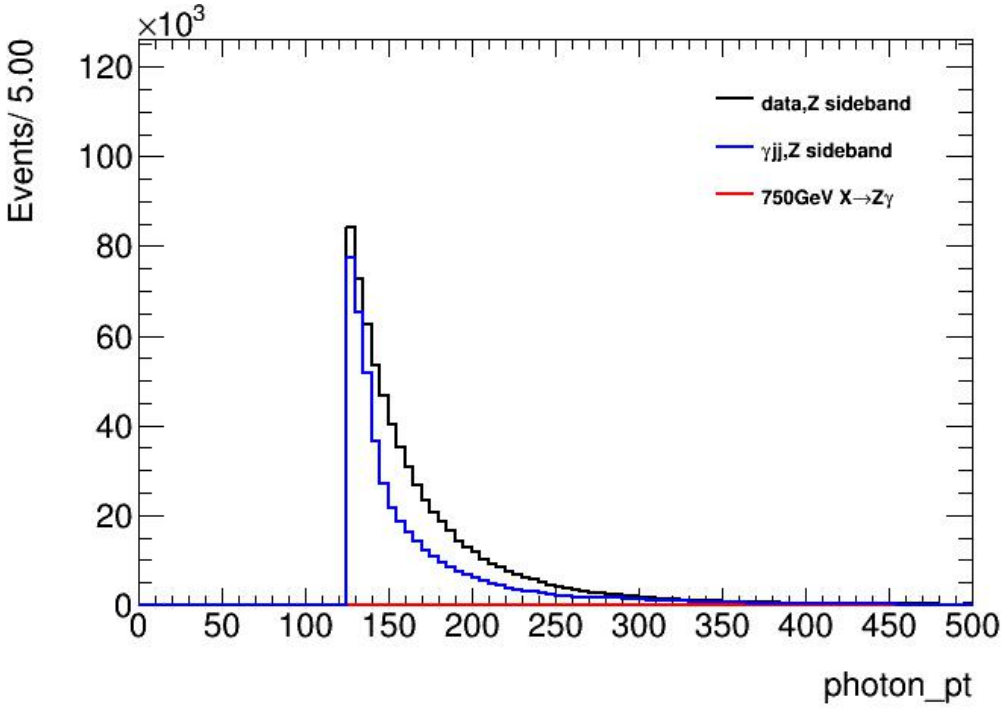
resovled Z(qq) γ

Introduction

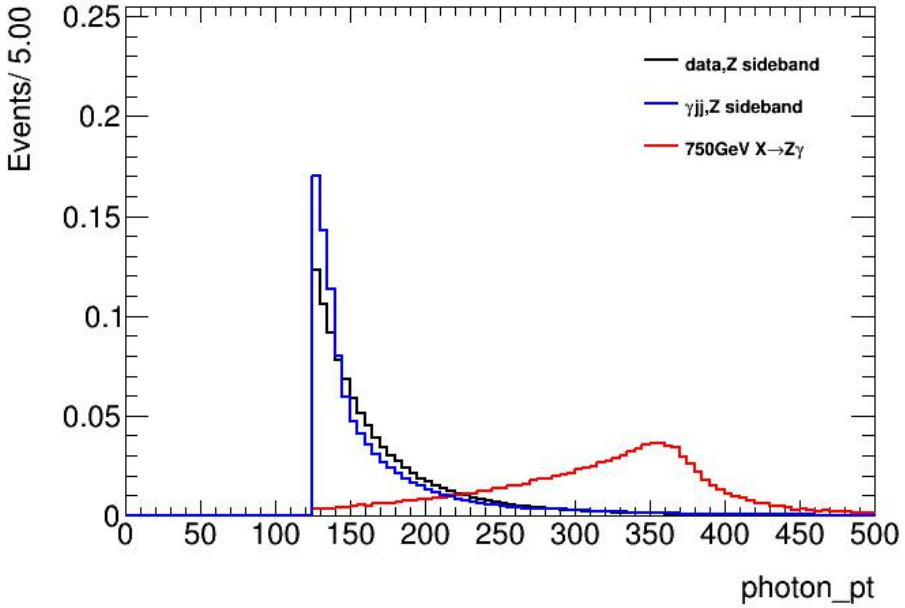
- Samples
  - signal:EXOT6 derivation is running, use AOD *ggH750_Zqqgam*
  - bkg:mc15_13TeV*SinglePhotonPtXX_XX*EXOT6*p2419
- Selection(preliminary, not decided)
  - GRL,DQ,PV, trigger:HLT_g120_loose
  - Photon:
    - pT>125GeV, |eta|<2.37,remove crack region
    - Author, OQ, Ambiguity, Tight ID
    - Isolation: FixedCutCaloOnly, topoetcone40<0.022*Et+2.45GeV
  - Jet:
    - pT>25GeV, |eta|<4.4, JVT>0.64, jet cleaning
    - Overlap Removal
  - Select leading dijet as Z candidate
  - Z sideband: |m γ jj-90|>15GeV

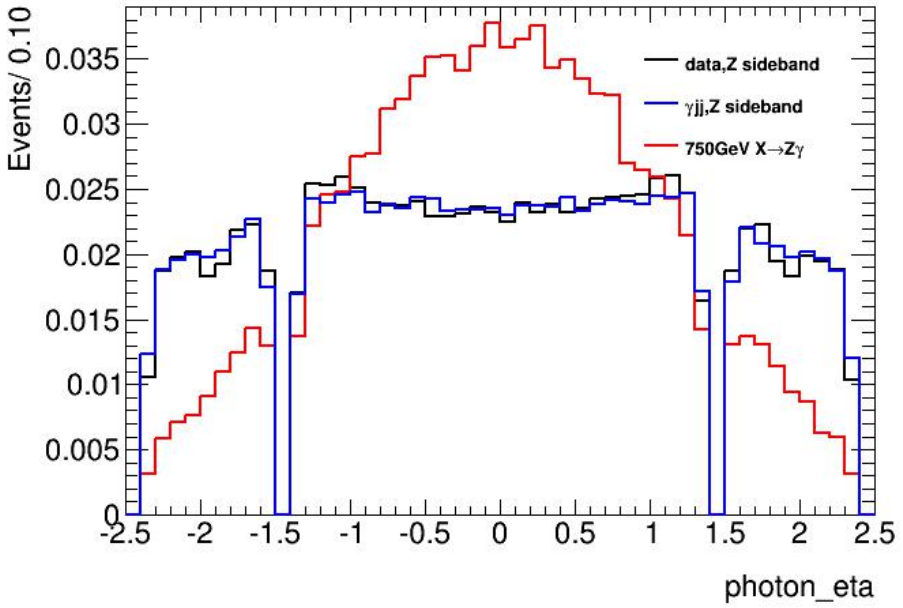
Normalization

- Normalize to 1
- Nomalize to cross section
  - mcEventWeight
  - Xsec*kFactor*filterEff (other weight is off)
  - sumWeight: total number of events in AOD
  - weightFinal=mcEventWeight*Xsec*kFactor*filterEff/sumWeight
- not consistent
  - weight problem?
  - other background?

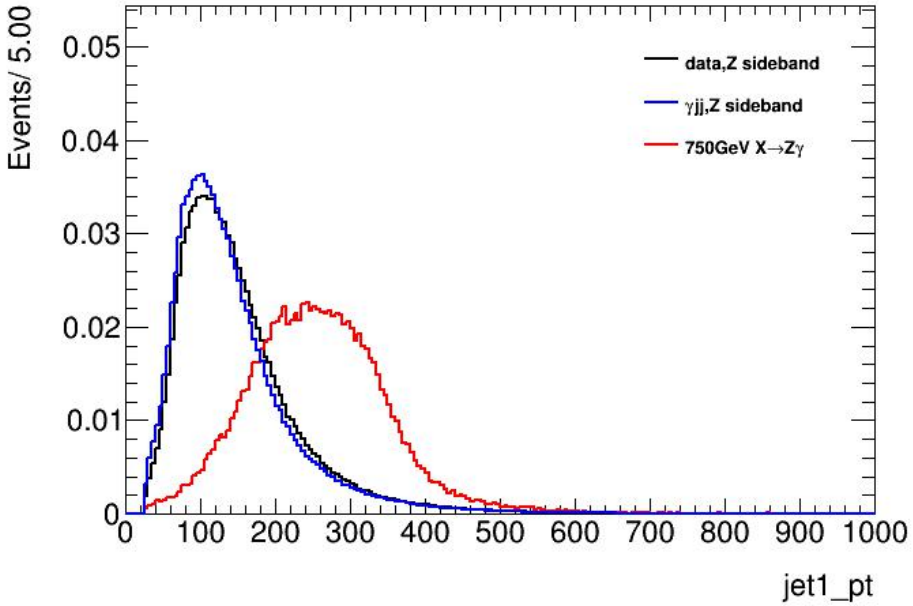


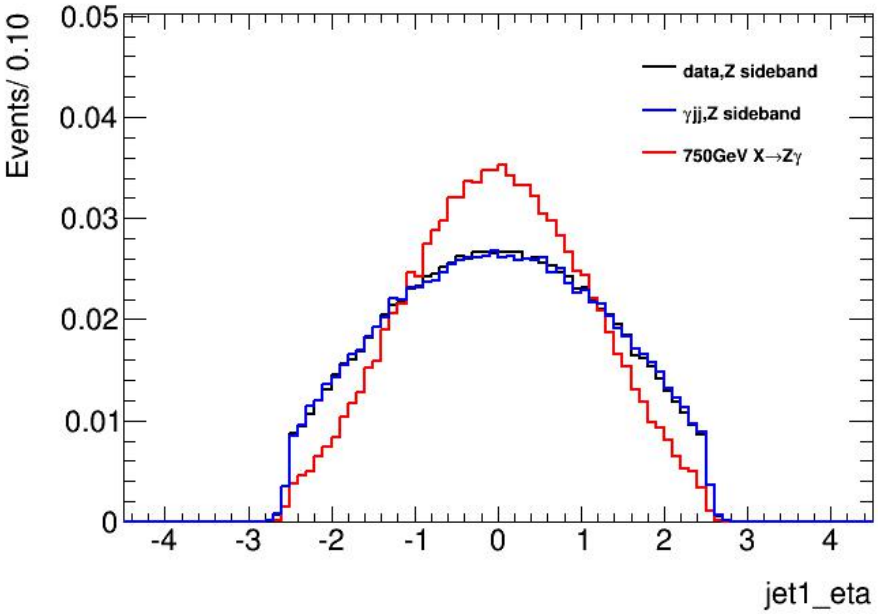
photon kinematics

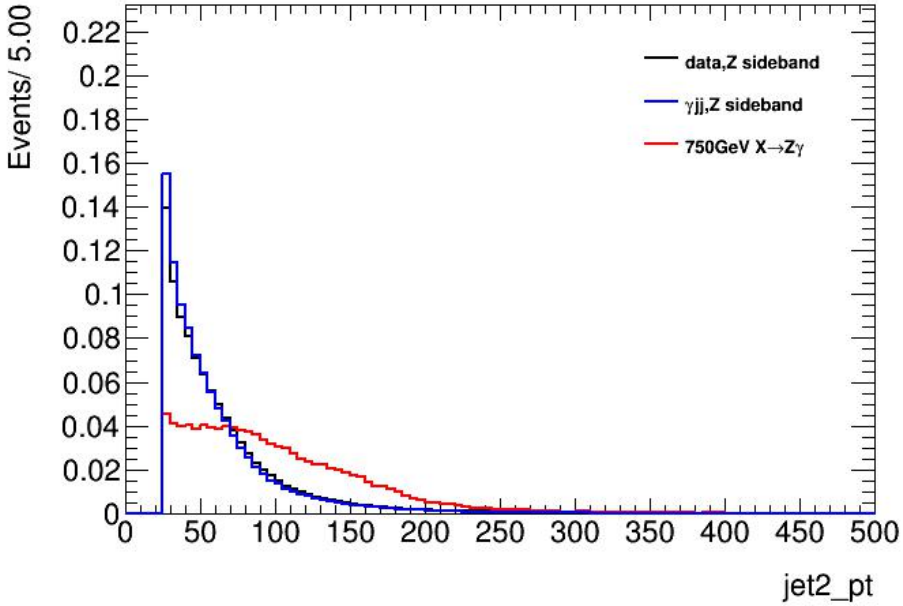


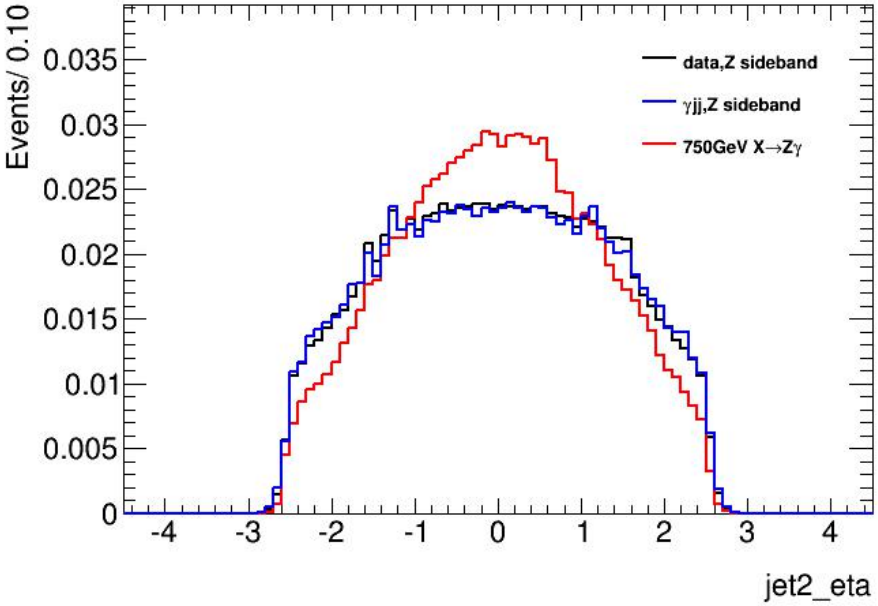


jets kinematics

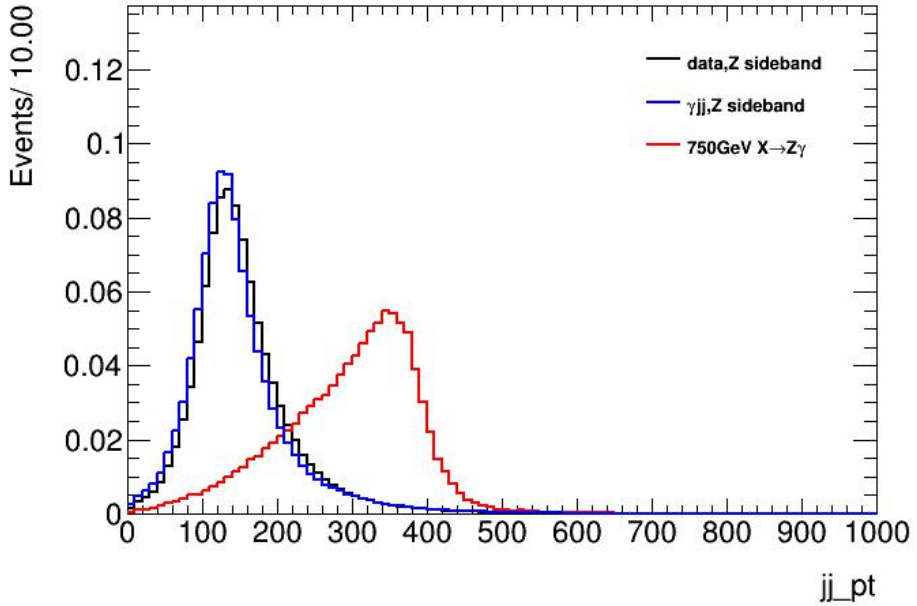


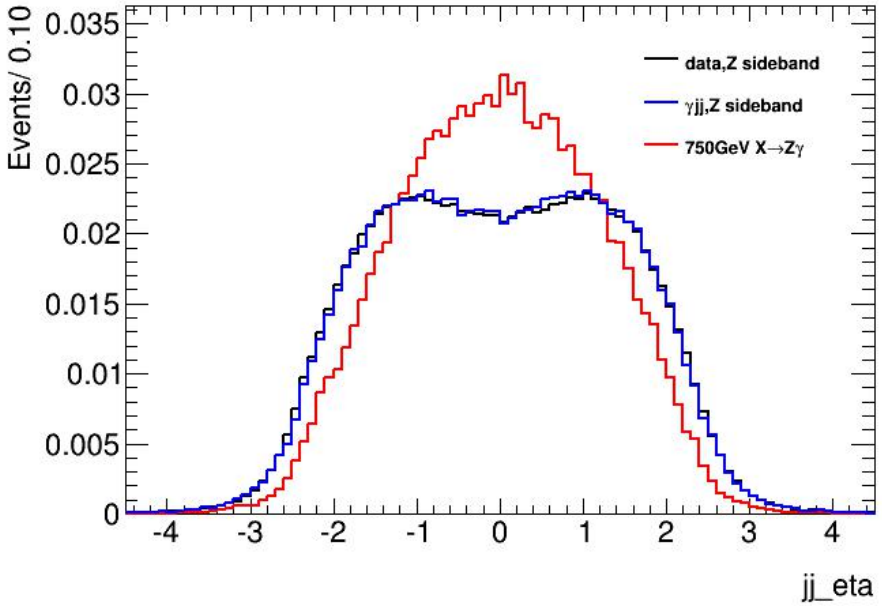


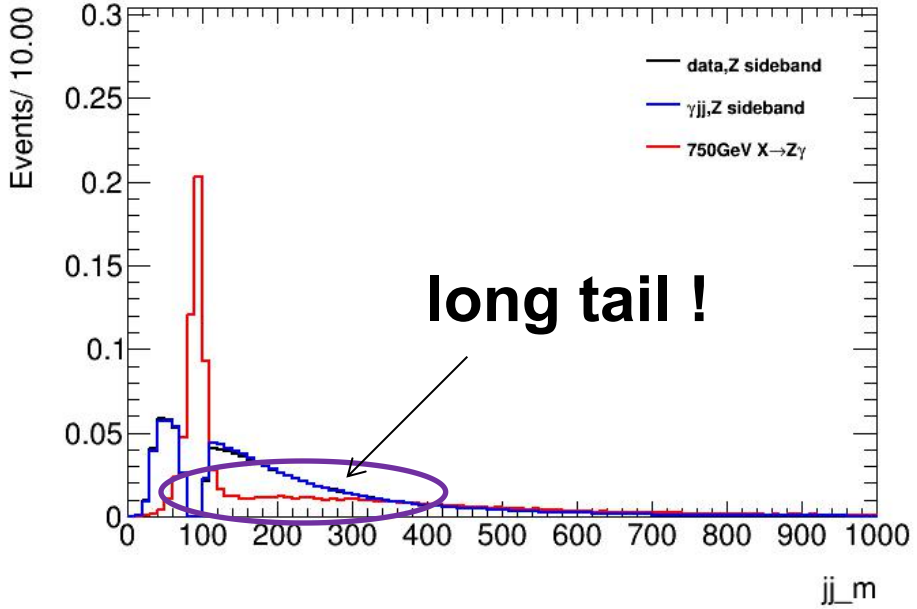




dijet kinematics

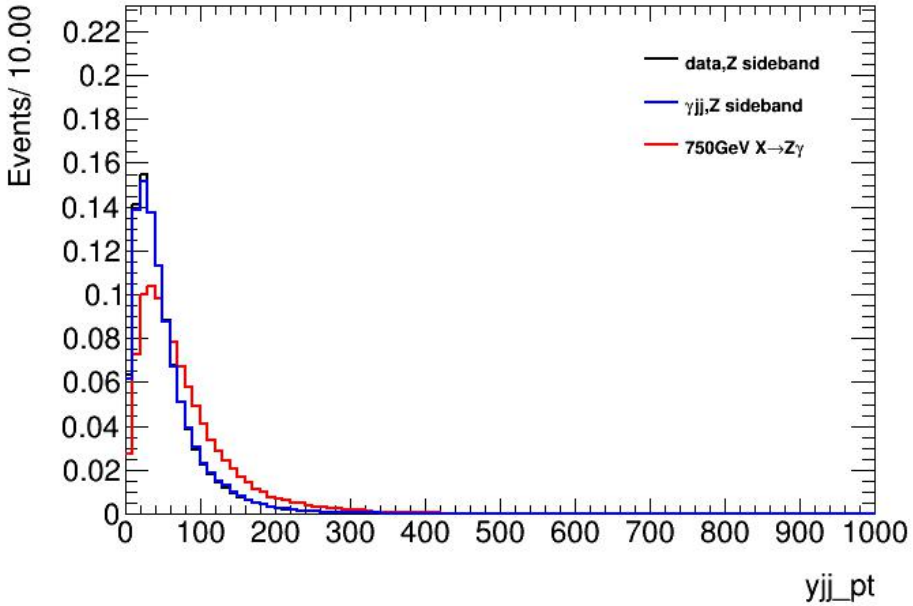


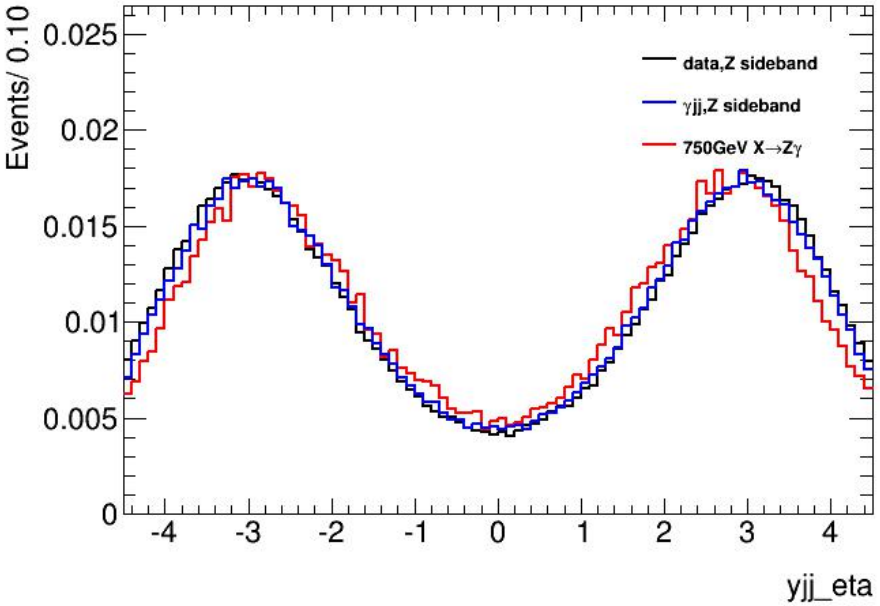


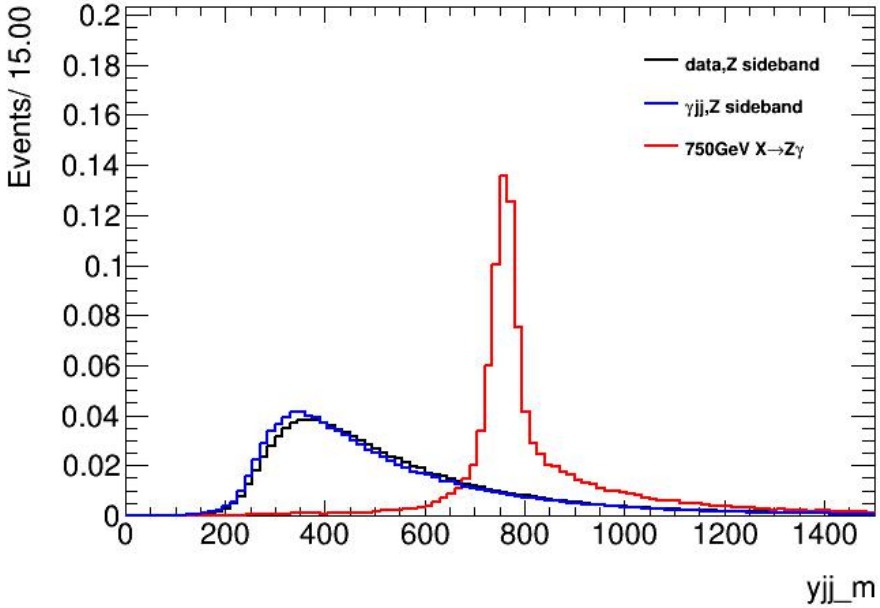


- in signal sample:
  39677 events of 66607
  (about 60%)
  |jj_m-90|>15GeV

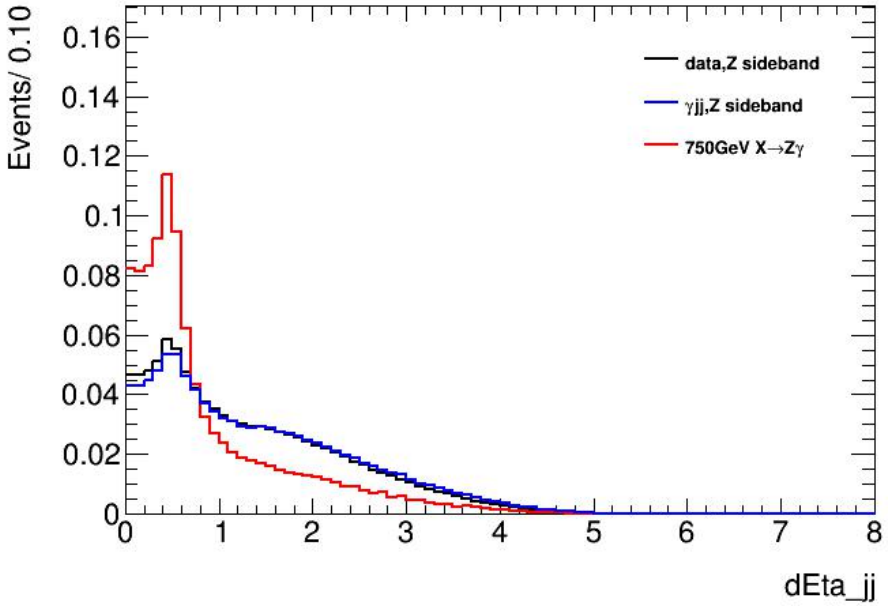
yjj kinematics

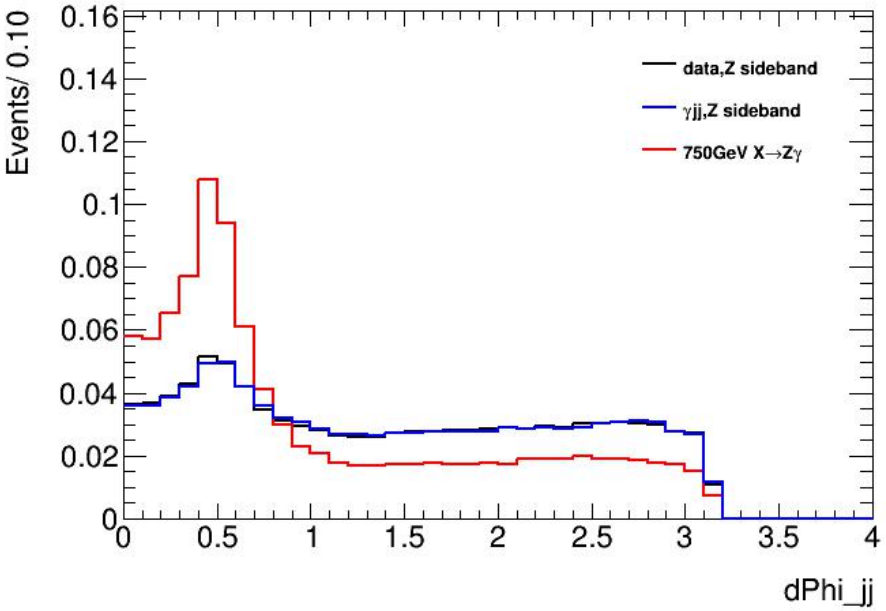


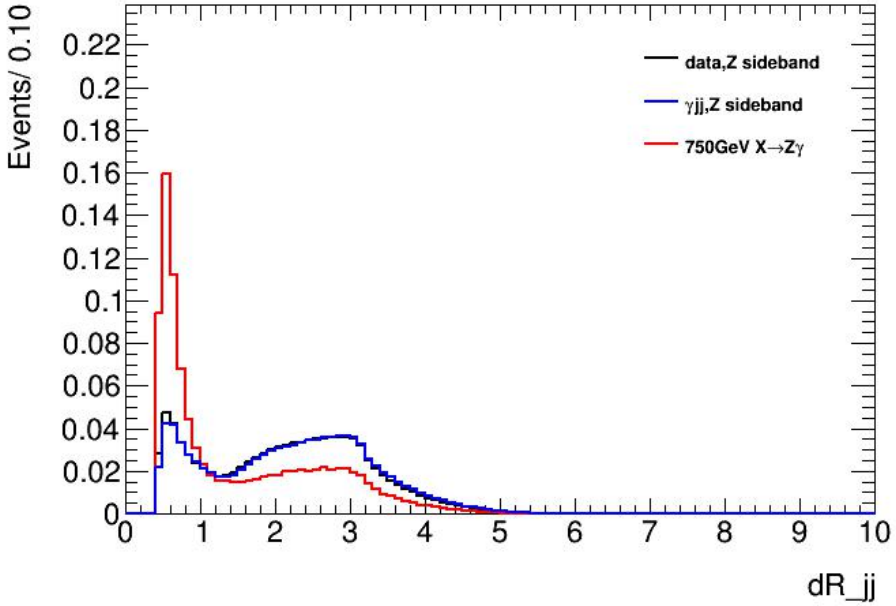




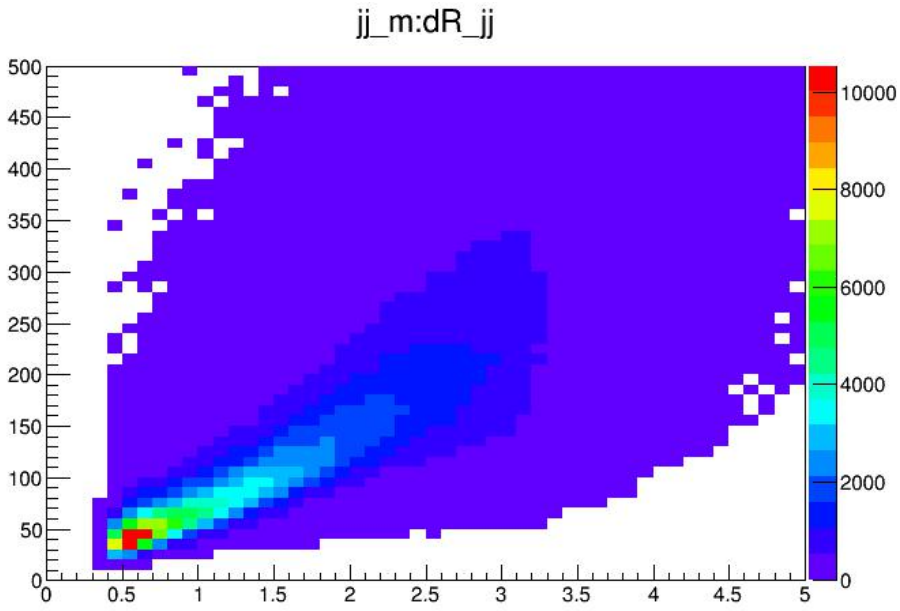
dijet kinematic

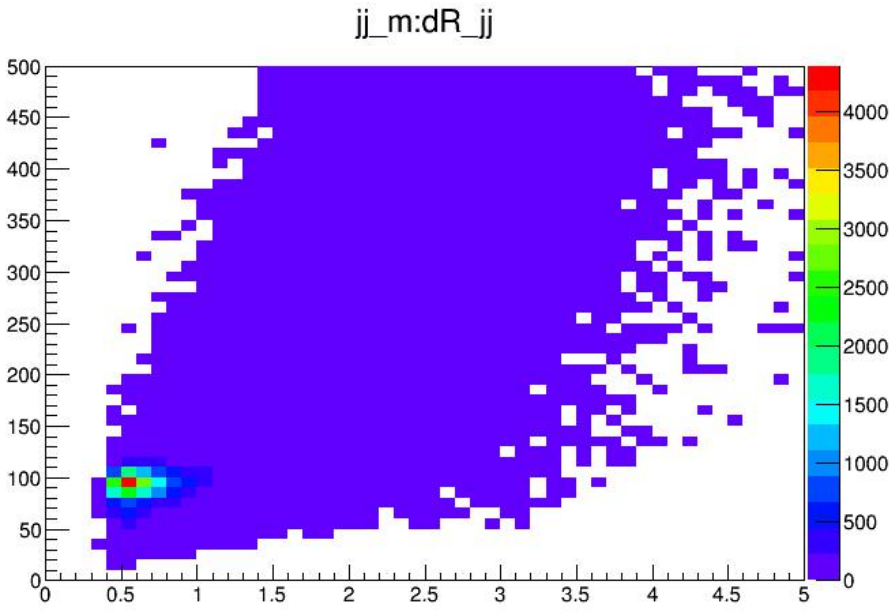






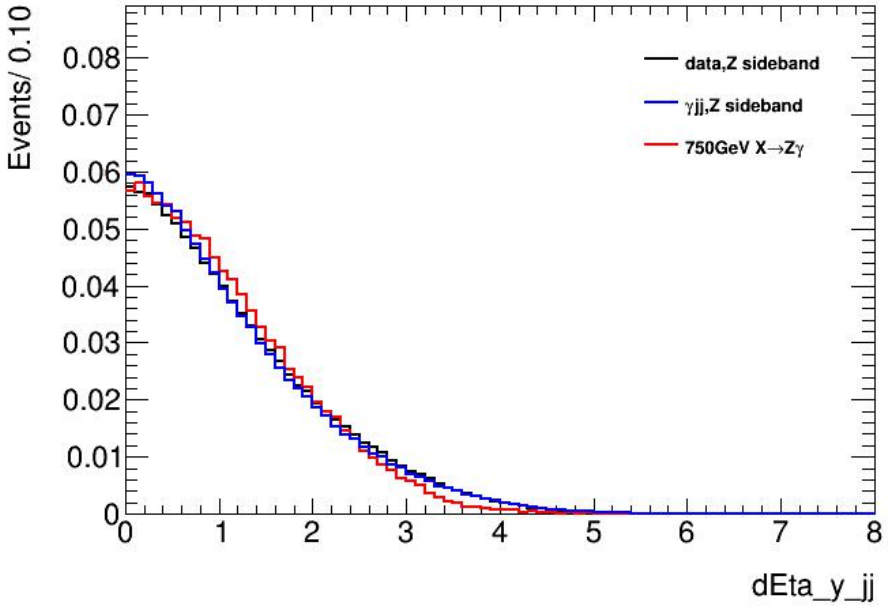
correlation:jj_m vs dR_jj

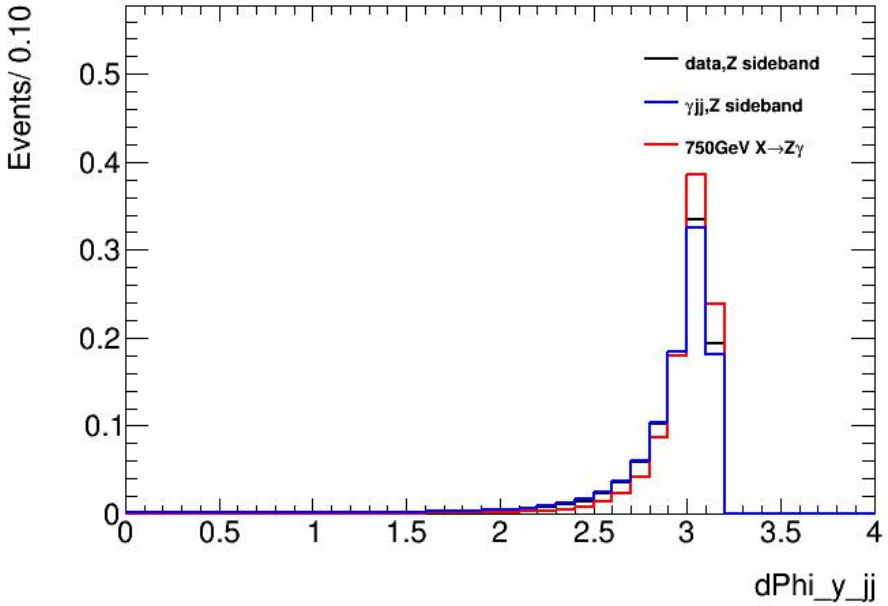


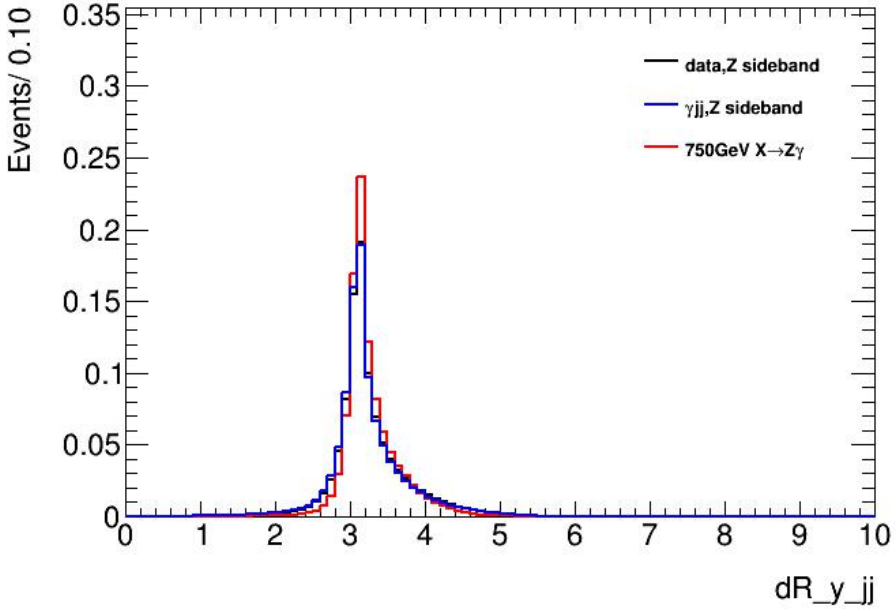


- left is data, right is signal MC
- in data sample, significant correlation
- in signal sample, many events are off Z mass
- indicate mis-combination

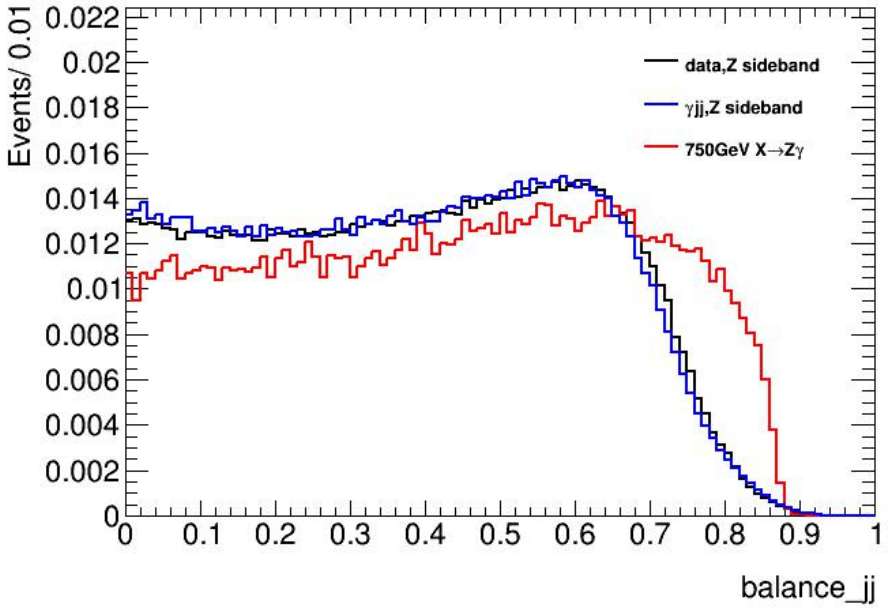
yjj kinematics

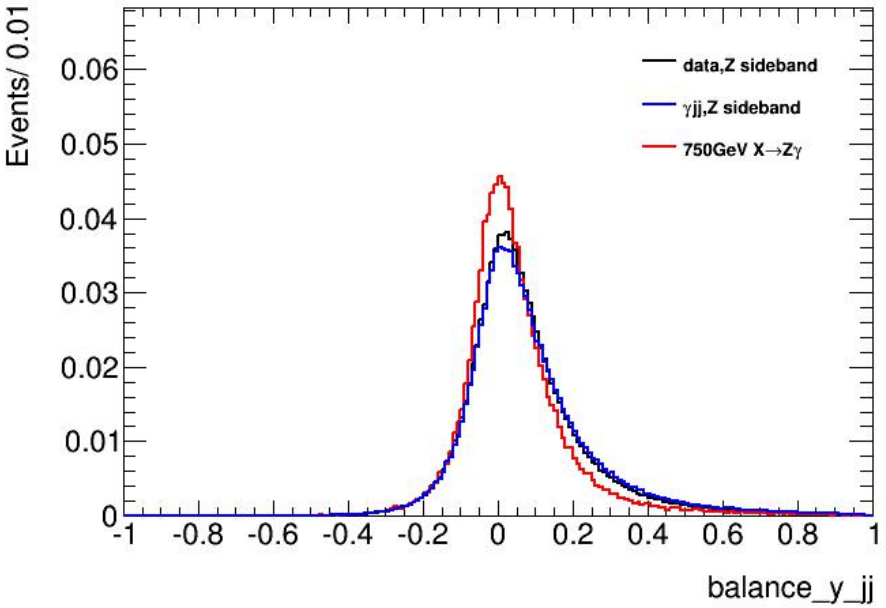






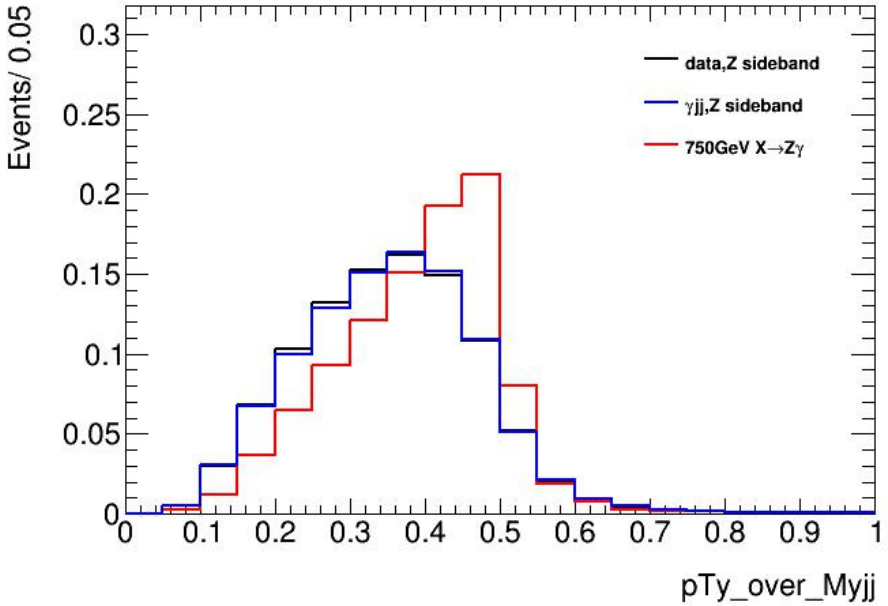
pT balance

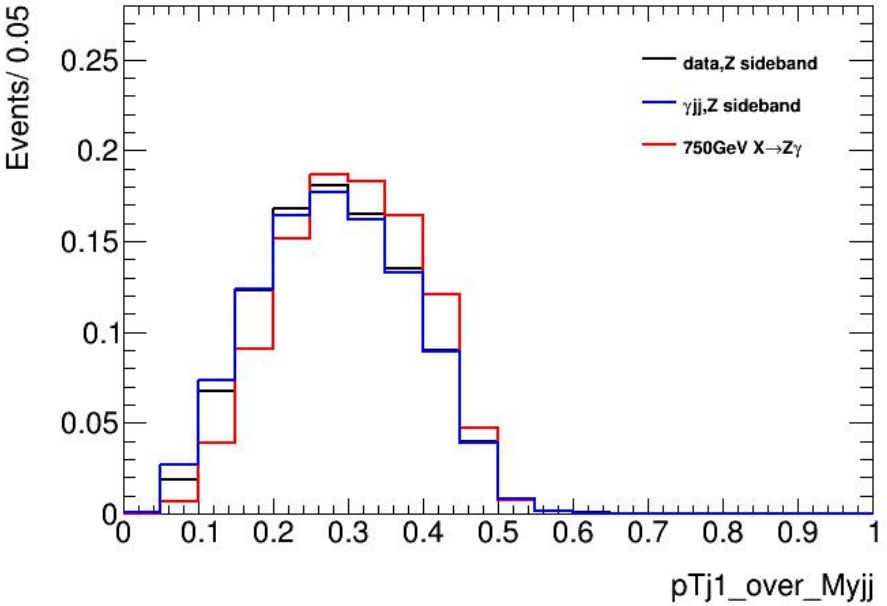


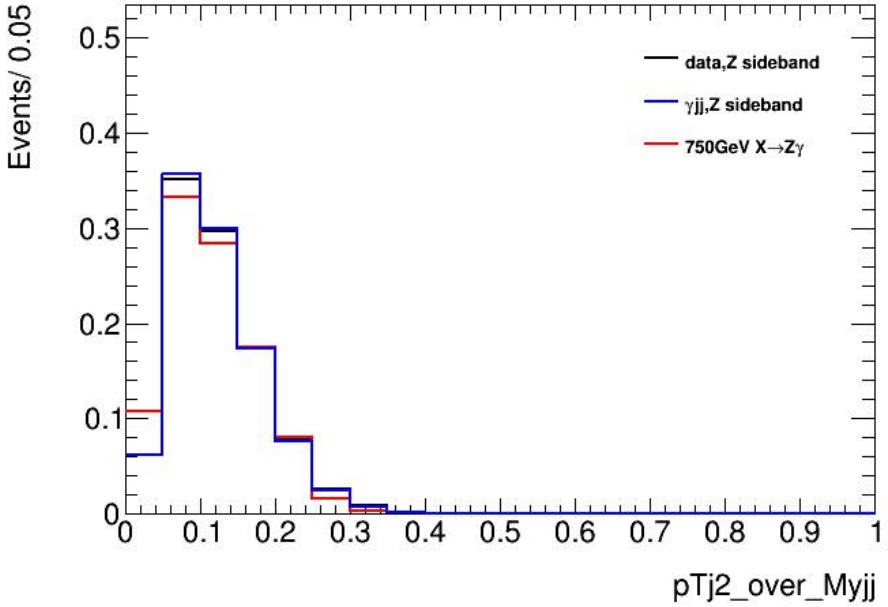


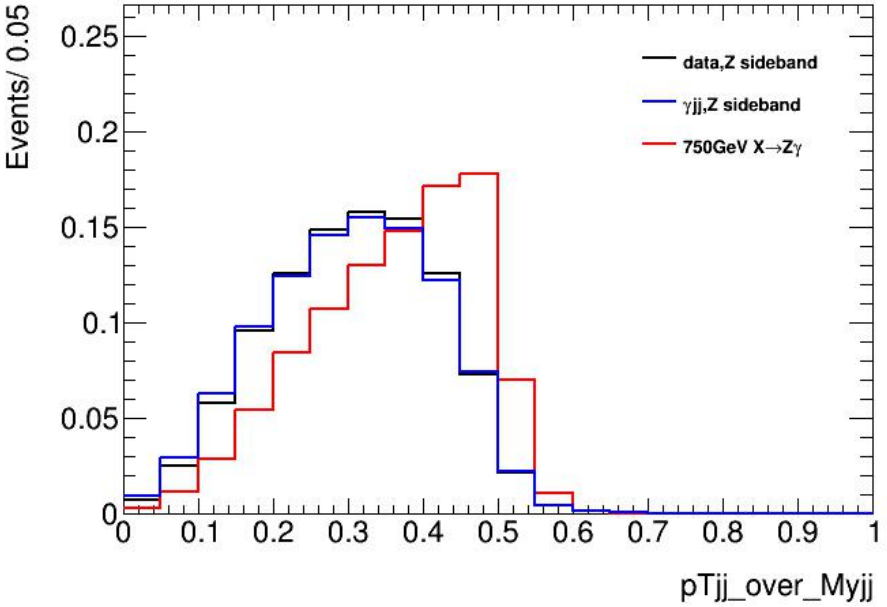
- left is $(pT_{j1}-pT_{j2}) / (pT_{j1}+pT_{j2})$
- right is $(pT_{y}-pT_{jj})/(pT_{y}+pT_{jj})$

relative pT


Events/ 0.05
data,Z sideband
γjj,Z sideband
750GeV X→Zγ
pTy_over_Myjj


Events/ 0.05
data,Z sideband
γjj,Z sideband
750GeV X→Zγ
pTj1_over_Myjj

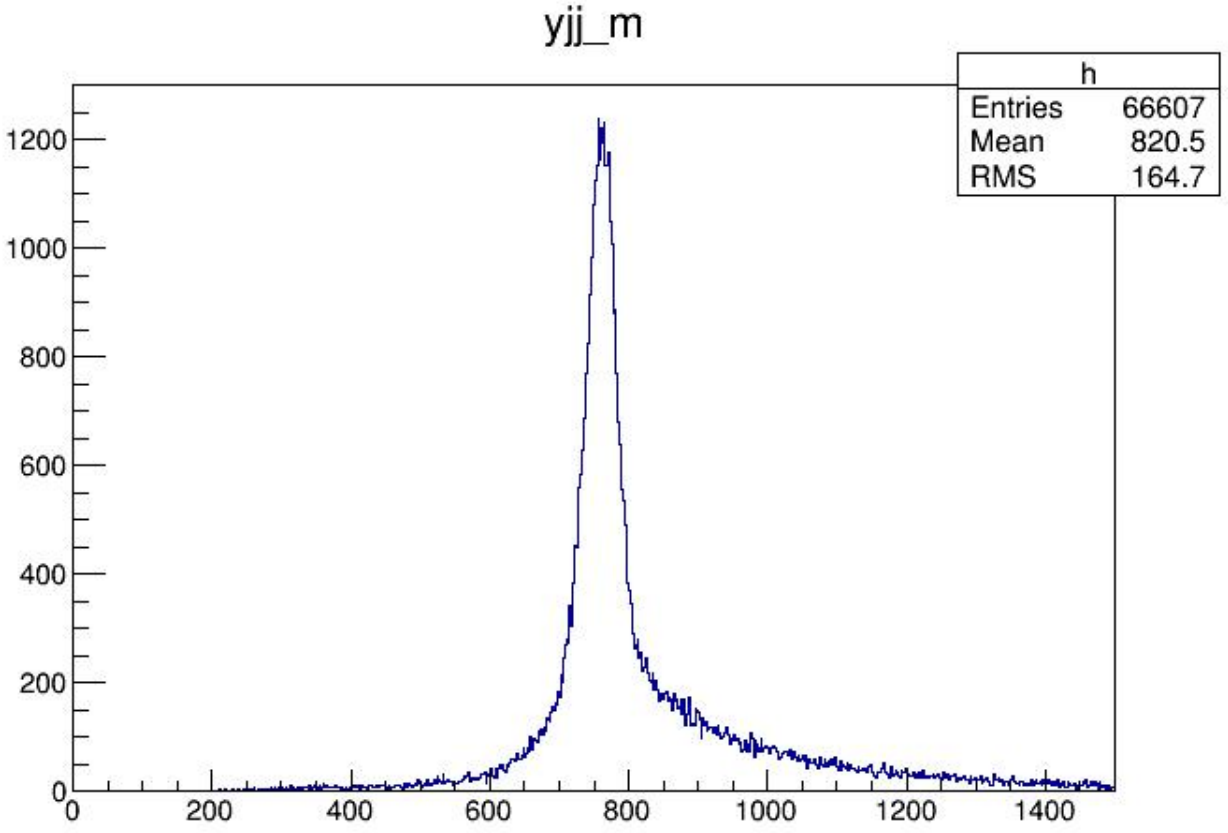

Events/ 0.05
data,Z sideband
γjj,Z sideband
750GeV X→Zγ
pTj2_over_Myjj

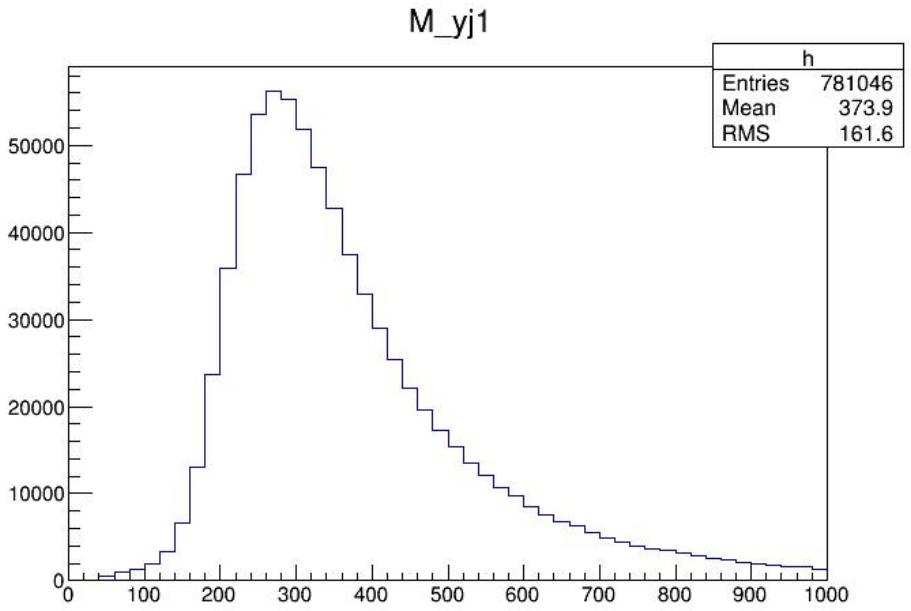

Events/ 0.05
data,Z sideband
γjj,Z sideband
750GeV X→Zγ
pTjj_over_Myjj

Summary

- use loose cuts to give a first impression
- long tail indicates miscombination
- dR_jj shows large overlap with boosted analysis(dR_jj~0.1)
- to do
  - check the trigger efficiency and try to fix photon pt cut
  - go back to truth match and give optimal dijet combination
  - test some further cuts
  - check the overlap with boosted analysis(eventNumber list)
- discussion
  - trigger eeficiency: TProfile plot of efficiency vs leading non-calibrated-loose photon pt ? sample-independent ?
  - truth match: some soft jets can not be matched

backup


yjj_m
h
Entries 66607
Mean 820.5
RMS 164.7
1200
1000
800
600
400
200
0
0
200
400
600
800
1000
1200
1400


M_yj1
h
Entries 781046
Mean 373.9
RMS 161.6
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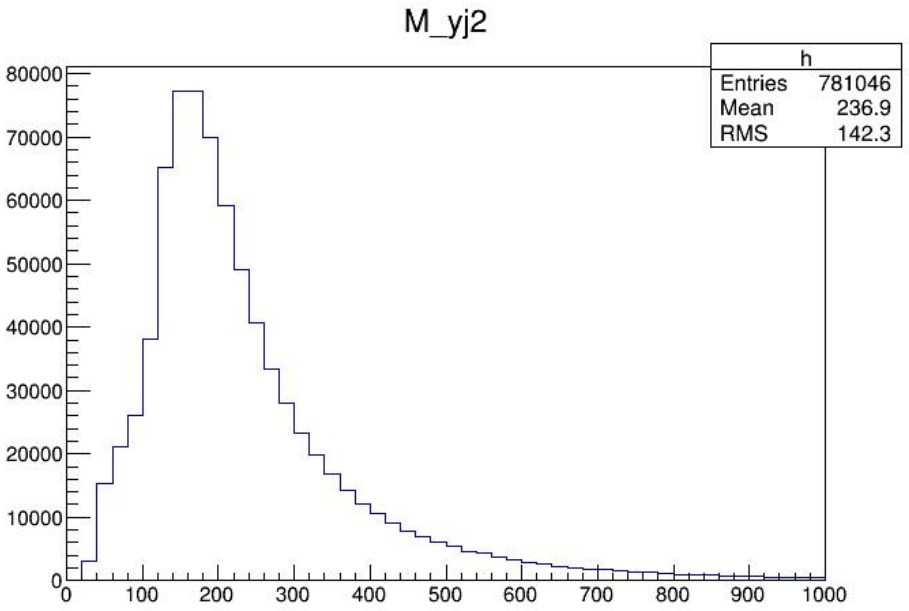
0 100 200 300 400 500 600 700 800 900 1000


M_yj2
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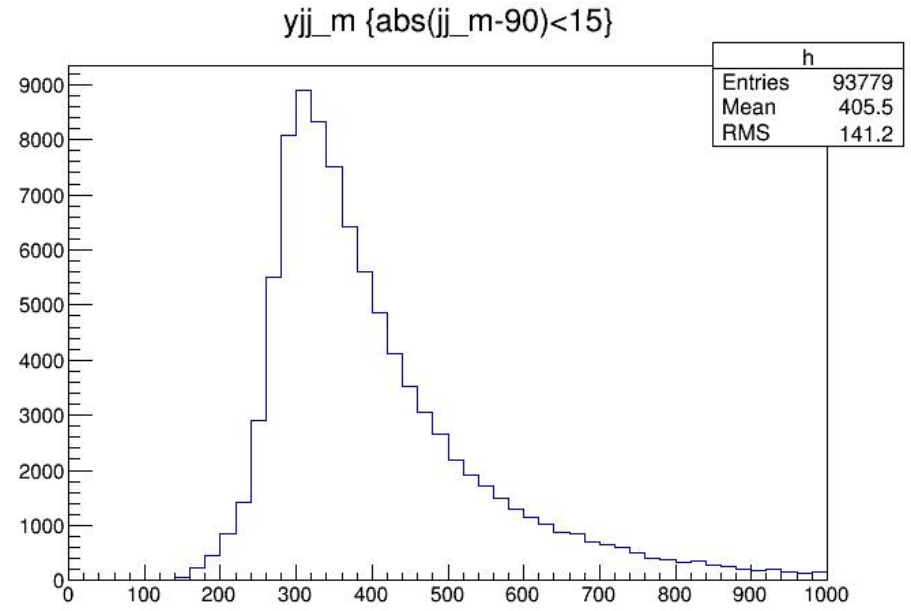
yjj_m {abs(jj_m-90)<15}
h
Entries 93779
Mean 405.5
RMS 141.2
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0 100 200 300 400 500 600 700 800 900 1000