# 13TeV VBF H->γγ Analysis

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11.30

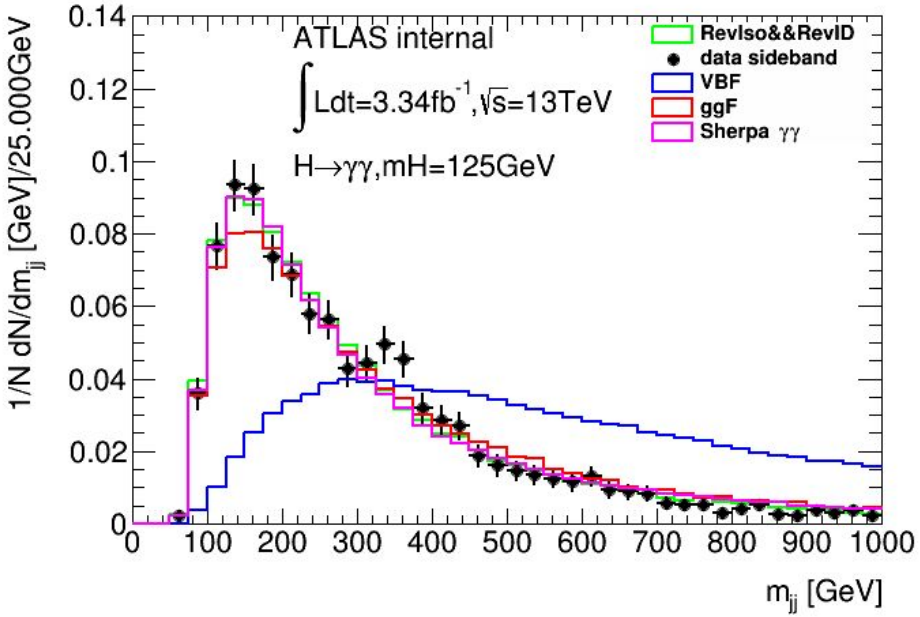
# data status

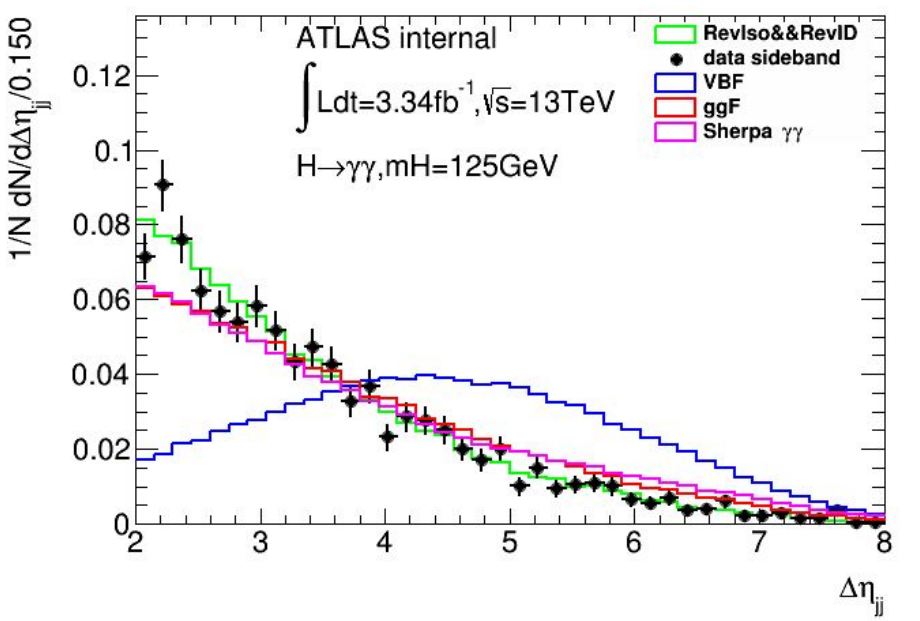


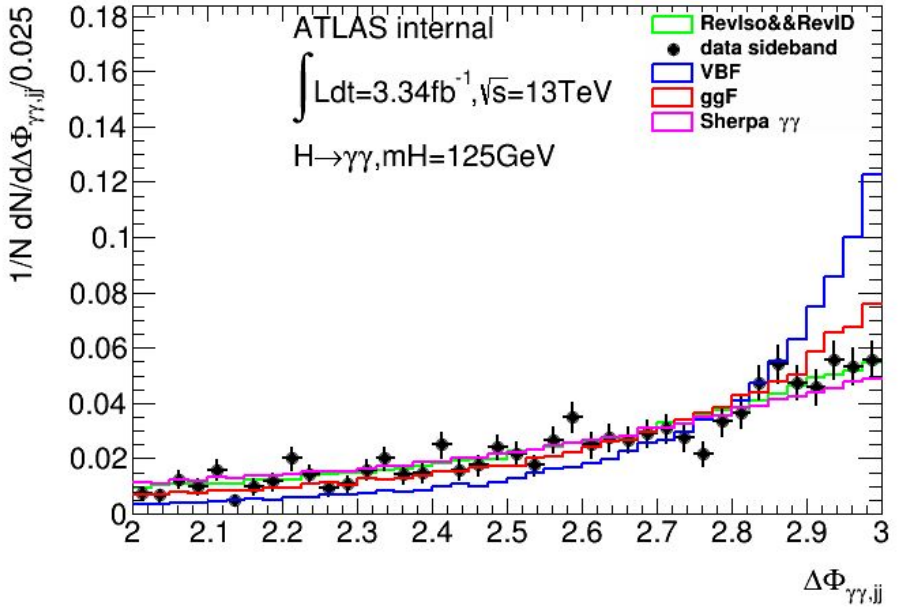
- data samples
  - GRL:3.34fb$^{-1}$->3.32 fb$^{-1}$ ,haven't update it.
  - after inclusive selection: 27491
  - at least 2 jets: 6747
  - VBF preselection 2516

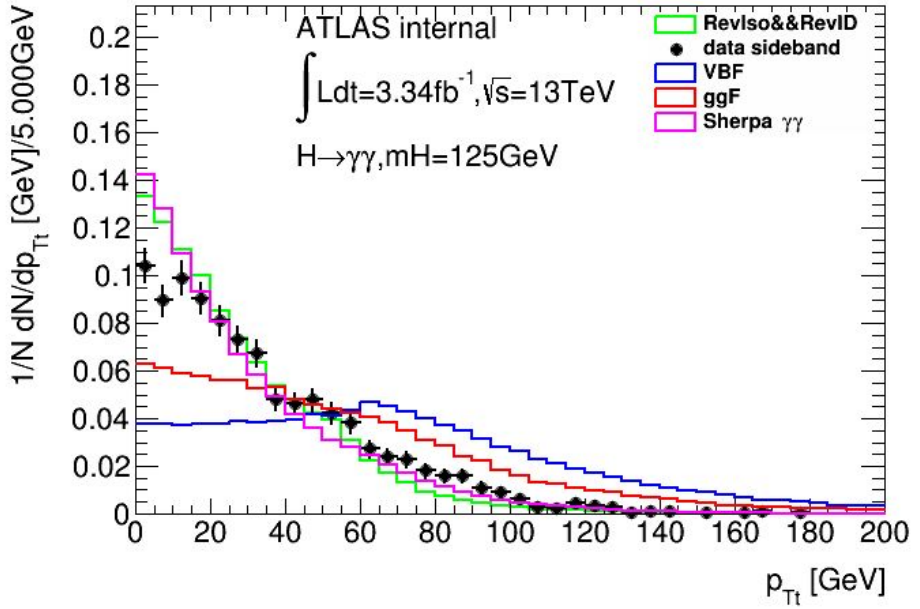
# variables




ATLAS internal
∫Ldt=3.34fb-1,√s=13TeV
H→γγ,mH=125GeV
RevIso&&RevID
data sideband
VBF
ggF
Sherpa γγ
1/N dN/dmjj [GeV]/25.000GeV
mjj [GeV]

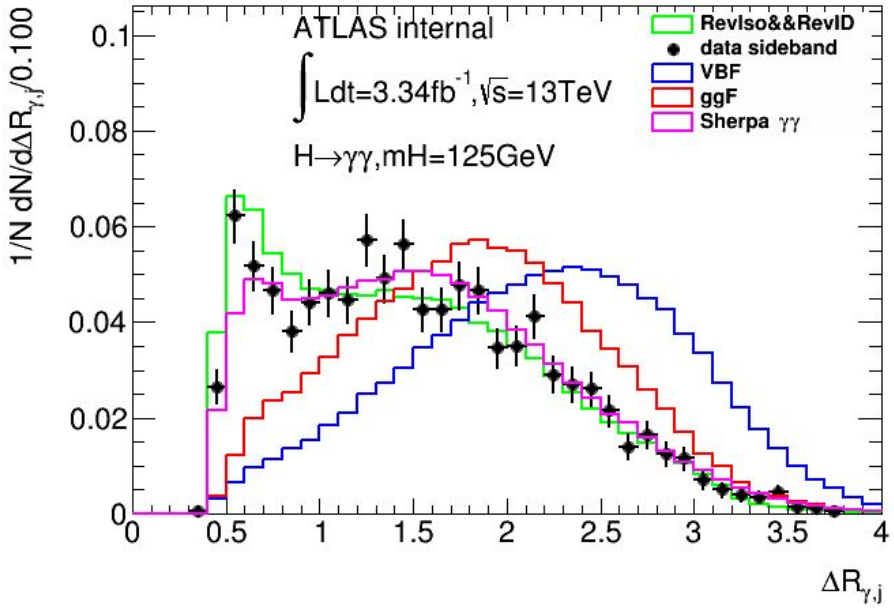

ATLAS internal
∫Ldt=3.34fb-1,√s=13TeV
H→γγ,mH=125GeV
RevIso&&RevID
data sideband
VBF
ggF
Sherpa γγ
1/N dN/dΔηjj/0.150
Δηjj

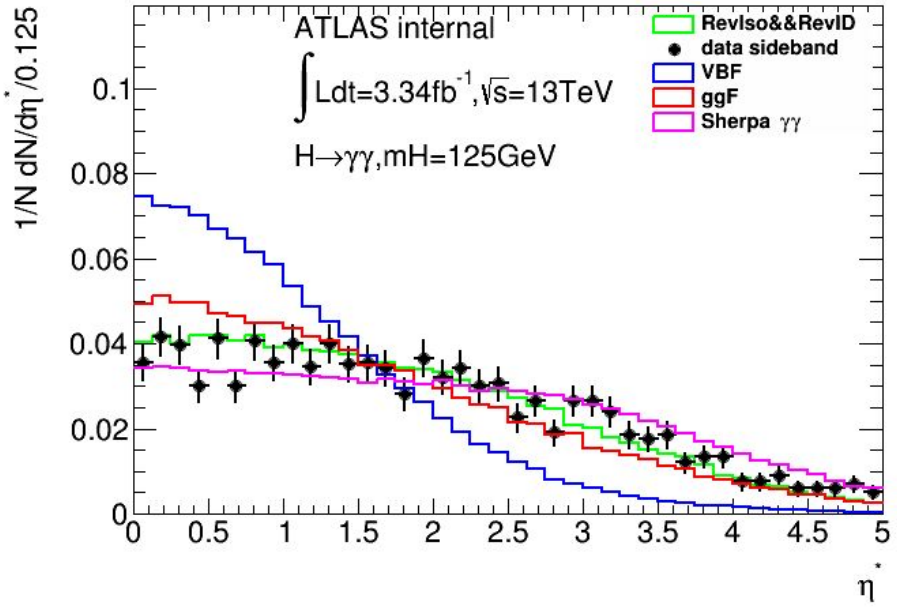

ATLAS internal
∫Ldt=3.34fb-1,√s=13TeV
H→γγ,mH=125GeV
RevIso&&RevID
data sideband
VBF
ggF
Sherpa γγ
1/N dN/dΔΦγγ,jj/0.025
ΔΦγγ,jj

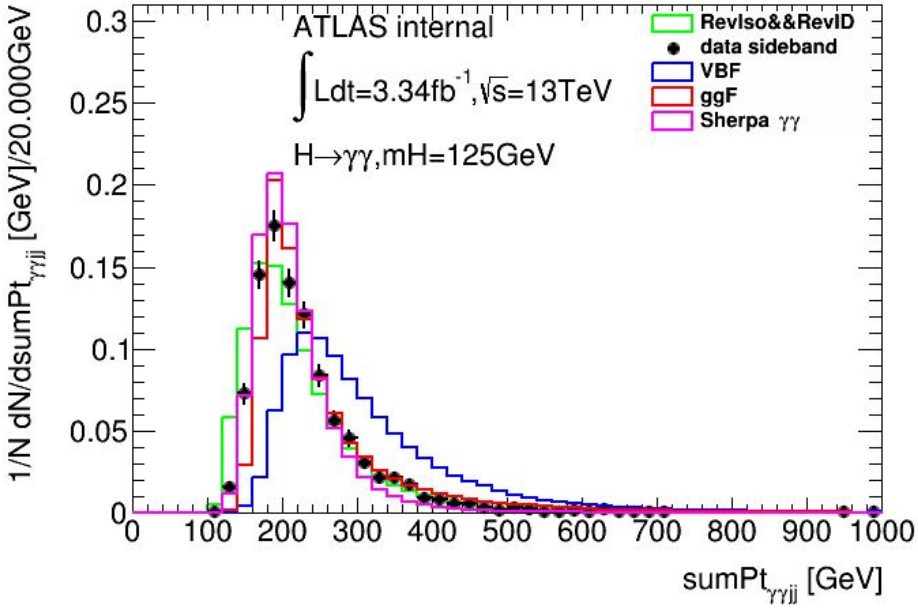

ATLAS internal
∫Ldt=3.34fb-1,√s=13TeV
H→γγ,mH=125GeV
RevIso&&RevID
data sideband
VBF
ggF
Sherpa γγ
1/N dN/dpTt [GeV]/5.000GeV
pTt [GeV]

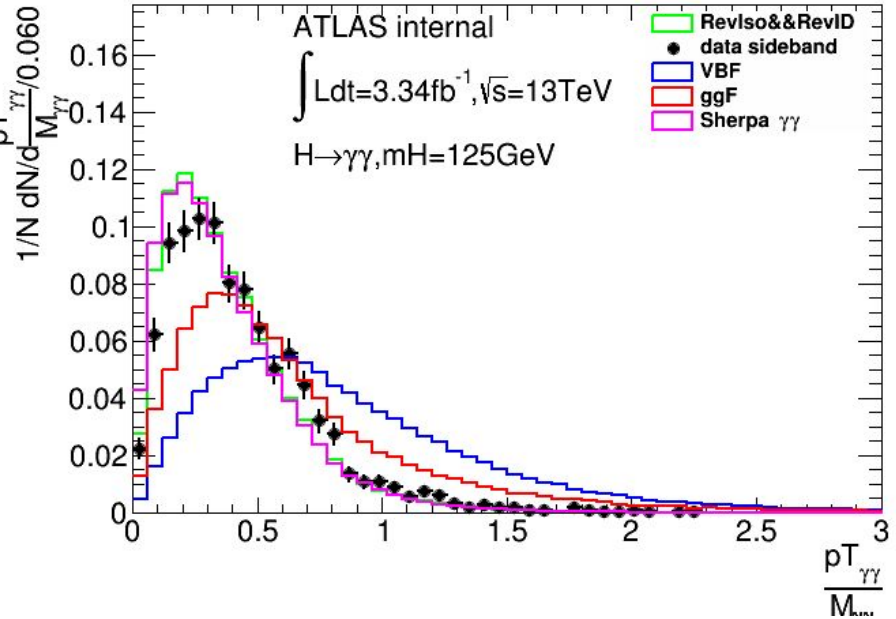
# variables




ATLAS internal
∫Ldt=3.34fb$^{-1}$,√s=13TeV
H→γγ,mH=125GeV
RevIso&&RevID
data sideband
VBF
ggF
Sherpa γγ
1/N dN/dΔR$_{γ,j}$/0.100
ΔR$_{γ,j}$

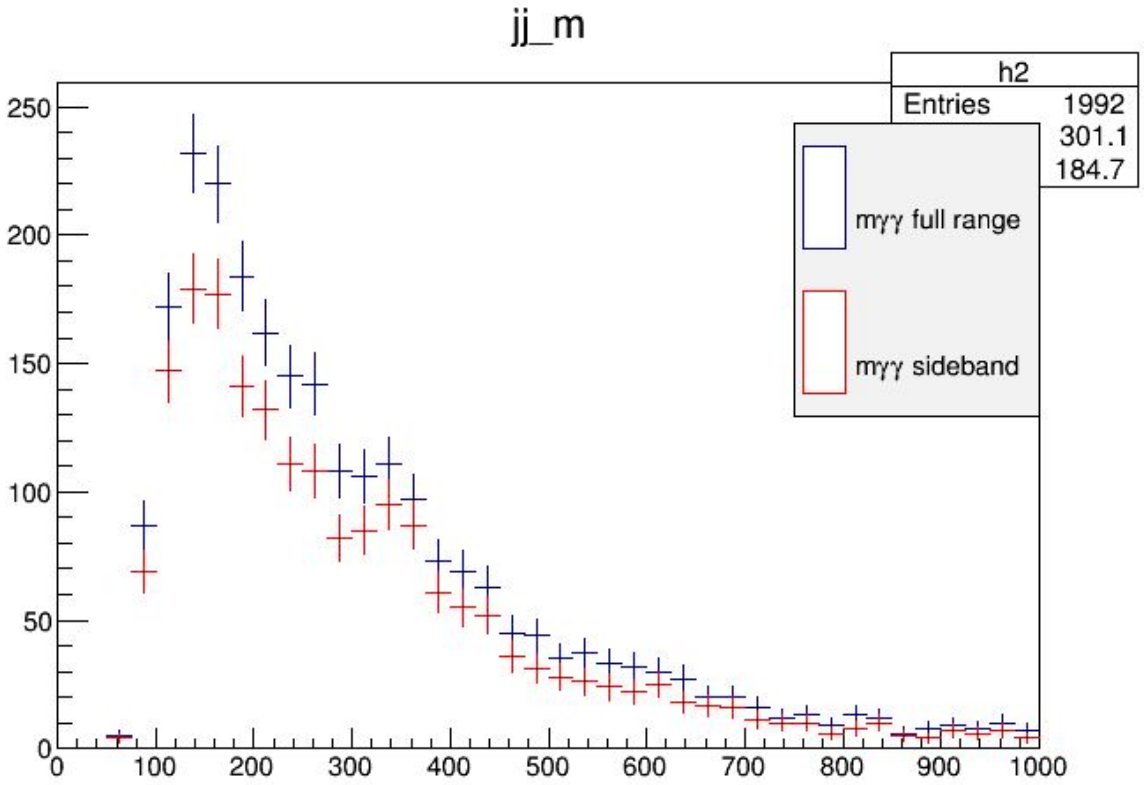

ATLAS internal
∫Ldt=3.34fb$^{-1}$,√s=13TeV
H→γγ,mH=125GeV
RevIso&&RevID
data sideband
VBF
ggF
Sherpa γγ
1/N dN/dη$^{*}$/0.125
η$^{*}$


ATLAS internal
∫Ldt=3.34fb$^{-1}$,√s=13TeV
H→γγ,mH=125GeV
RevIso&&RevID
data sideband
VBF
ggF
Sherpa γγ
1/N dN/dsumPt$_{γγjj}$ [GeV]/20.000GeV
sumPt$_{γγjj}$ [GeV]


ATLAS internal
∫Ldt=3.34fb$^{-1}$,√s=13TeV
H→γγ,mH=125GeV
RevIso&&RevID
data sideband
VBF
ggF
Sherpa γγ
1/N dN/d(pT$_{γγ}$/M$_{γγ}$)/0.060
pT$_{γγ}$/M$_{γγ}$

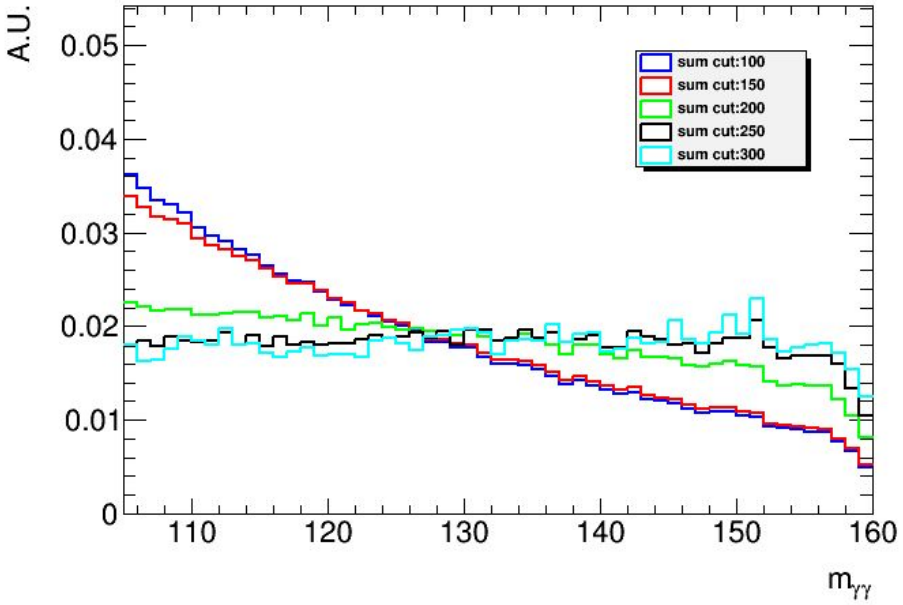
# jj_m

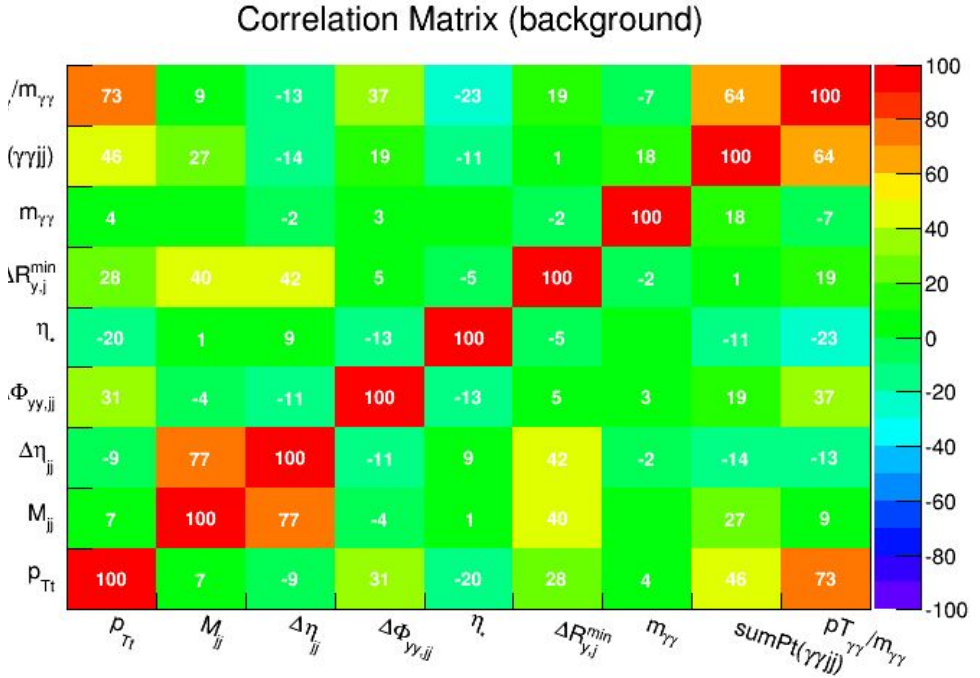



jj_m
h2
Entries 1992
301.1
184.7
mγγ full range
mγγ sideband
250
200
150
100
50
0
0
100
200
300
400
500
600
700
800
900
1000

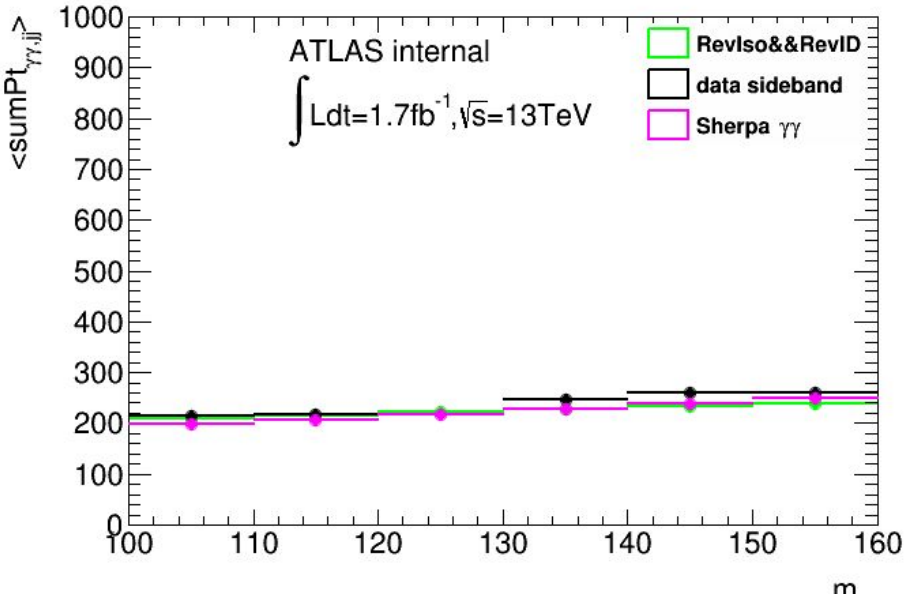
# correlation:pT sum of yyjj





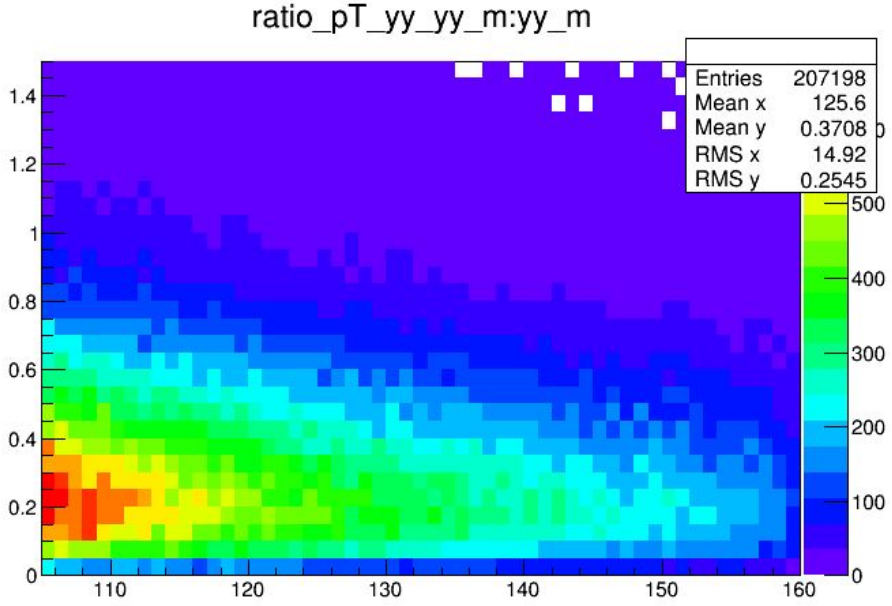



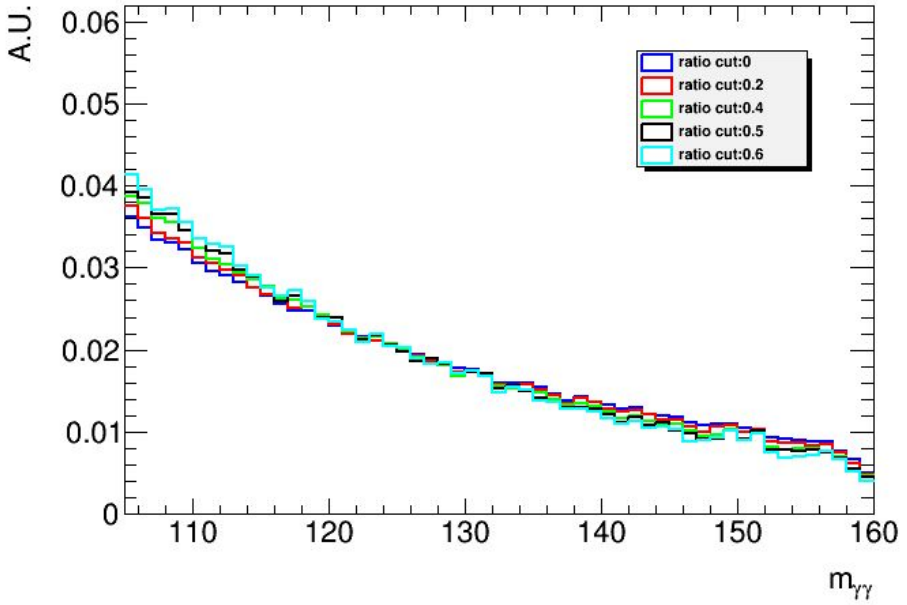

- pT sum of yyjj:linear correlation with myy is 0.18 in bkg sample



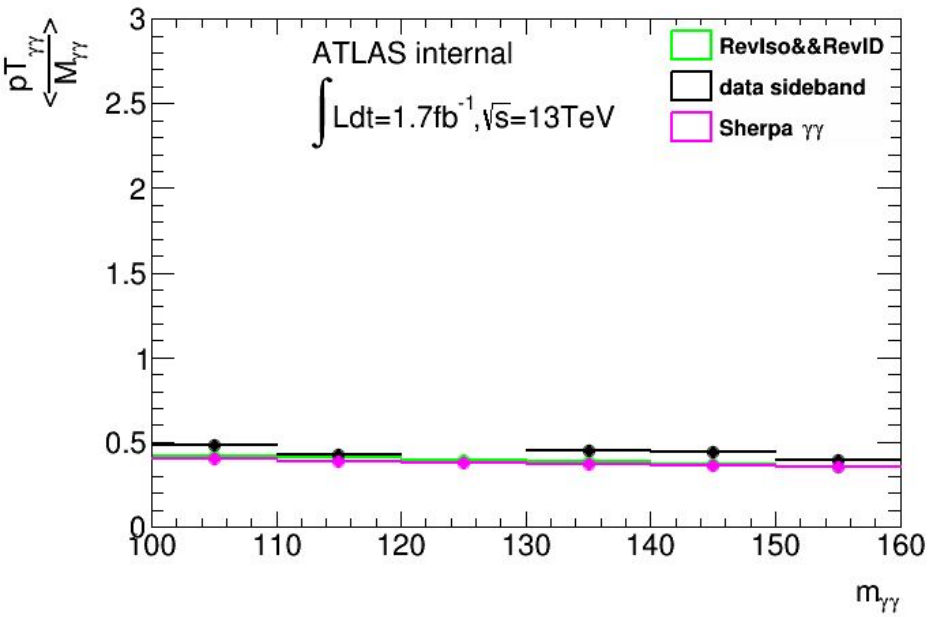
# correlation:pT_yy/m_yy





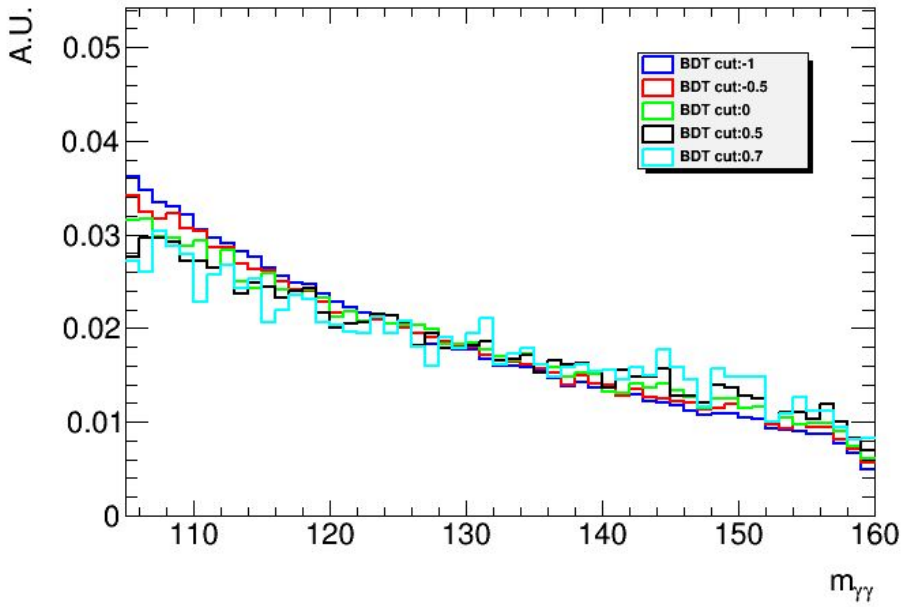



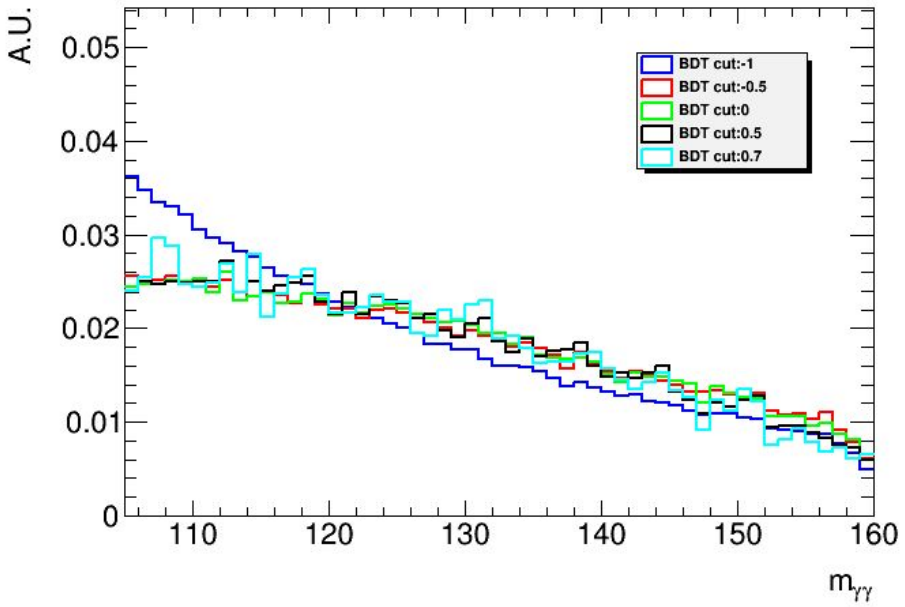

- check the correlation in bkg sample



# correlation:BDT vs myy






- left plot is myy shape in bkg sample with different 6var BDT response, right is with 8var BDT response
- 8var BDT response changes the bkg shape significantly.

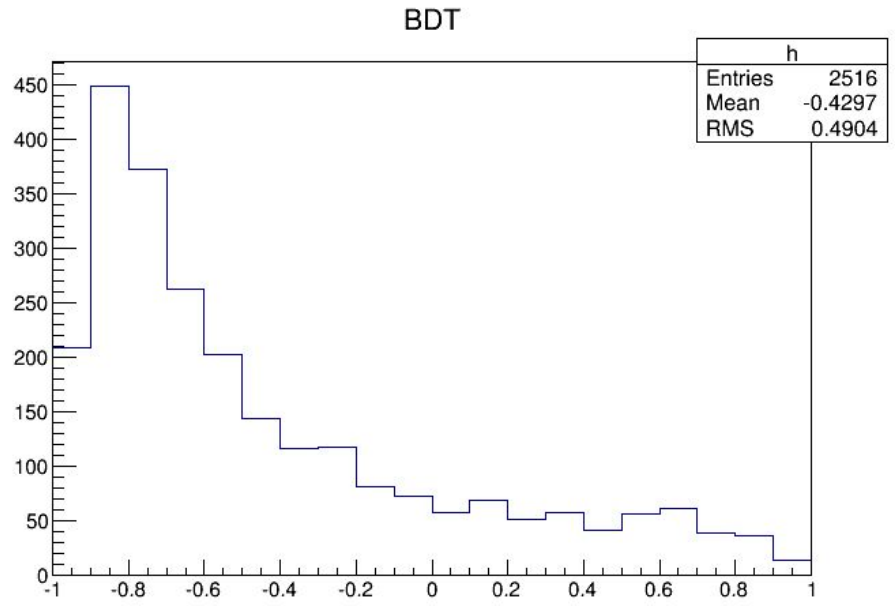
# other check

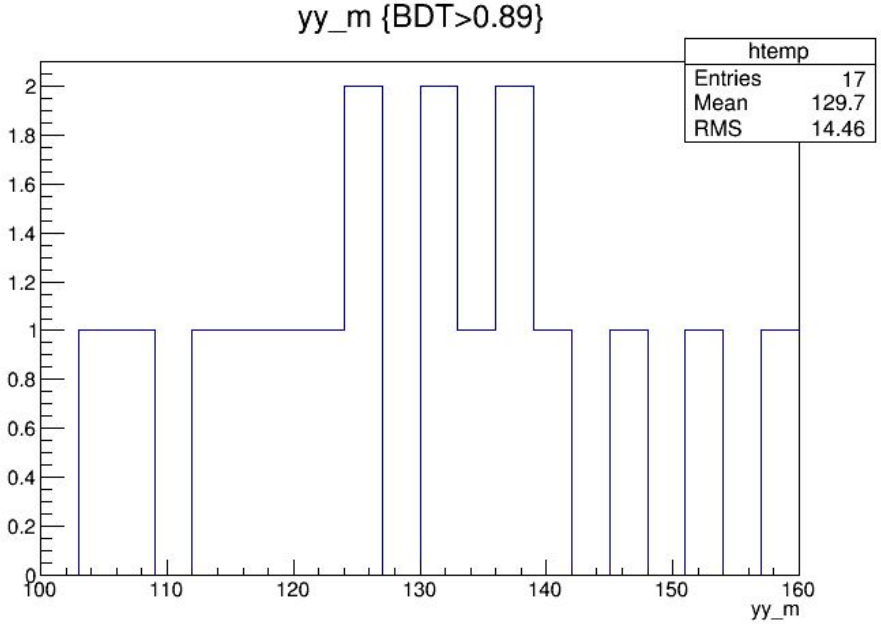


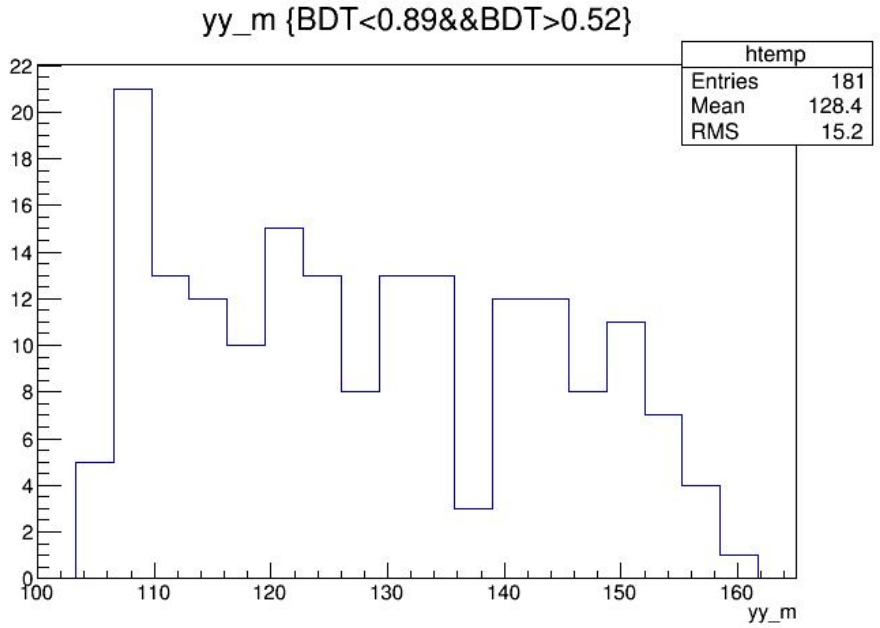
- Marc suggests to check the correlation eta_Zeppenfeld and pTt to make sure where the separation power of eta_Zeppenfeld come from.
- Compare the performance of eta_Zeppenfeld and Dy_yy_jj to decide which shoule be used.

# BDT




BDT
h
Entries 2516
Mean -0.4297
RMS 0.4904


yy_m {BDT>0.89}
htemp
Entries 17
Mean 129.7
RMS 14.46
yy_m


yy_m {BDT<0.89&&BDT>0.52}
htemp
Entries 181
Mean 128.4
RMS 15.2
yy_m