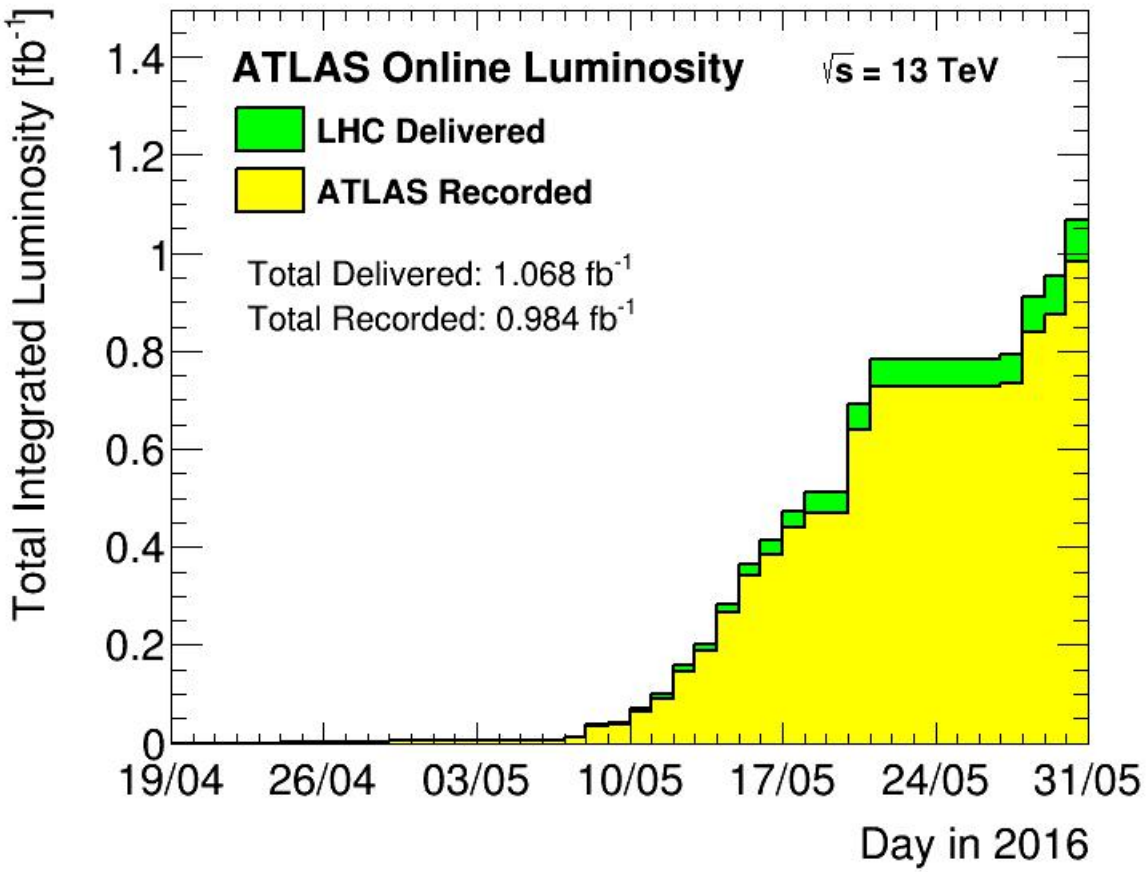
weekly report



410pb^{-1} in GRL

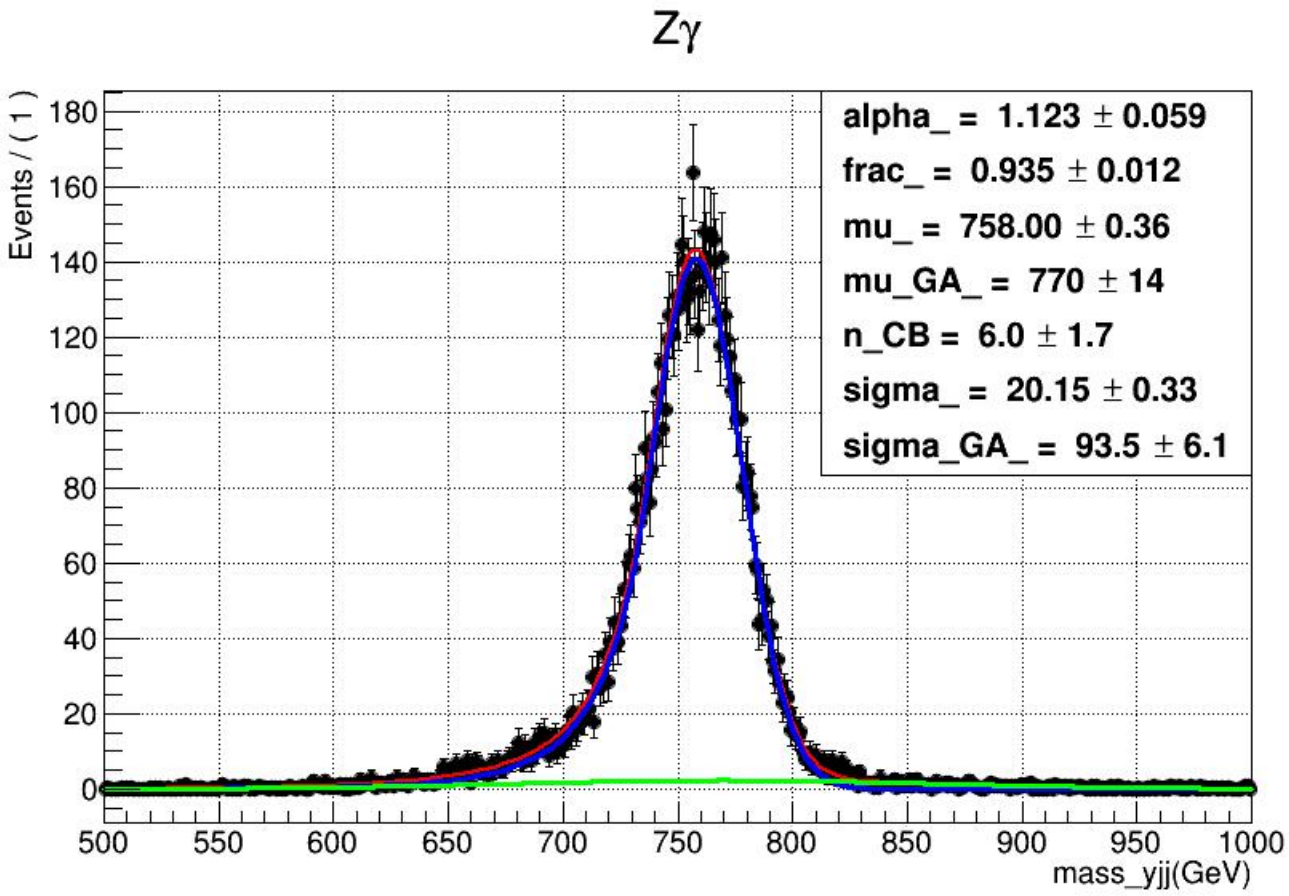
Yu Zhang

05.30

outline

- fit on Z(qq)γ
  - chi2 is shown
- photon photon fusion
  - first VBF-like analysis
- data 2016
  - check the control region

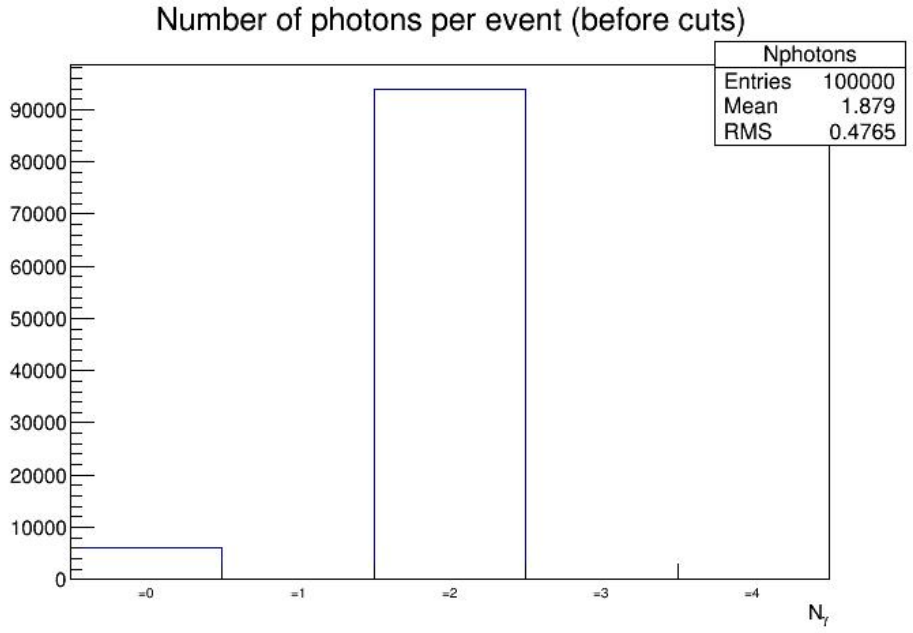
Z(qq)γ

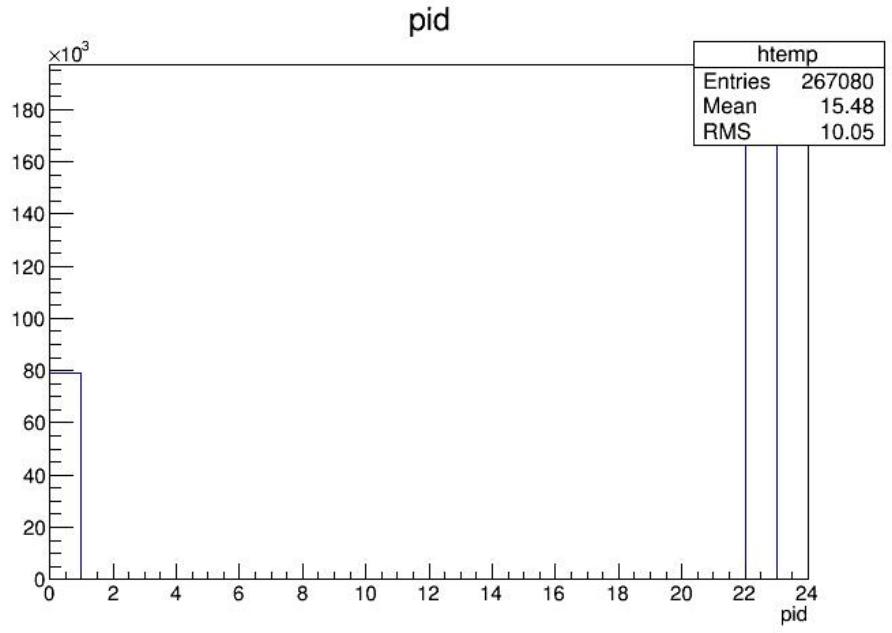


- binned fit, bin width is 1GeV, chi2/ndf=21.36, which is bad

Samples

- Ntuple from Joey
  - http://www.pa.msu.edu/~huston/leshouches_2015/
  - aa_h-h_aa.root, pp_h_aa.root
  - content
    - nparticle * pid * px * py * pz * E *
  - what is pid==0? Suppose it is jet.....
  - some events has 0 photon?(plots in aaH)





Samples

- h011
  - VBF 800 (only 600GeV and 800GeV, no 750GeV)
  - ggH 750 6% width
  - Sherpa diphoton 650-1000GeV
- pythia
  - /afs/cern.ch/work/m/mdyndal/public/gmgmXgmgm_Pythia8/run/EVNT.pool.root is not included...

Selection and variables

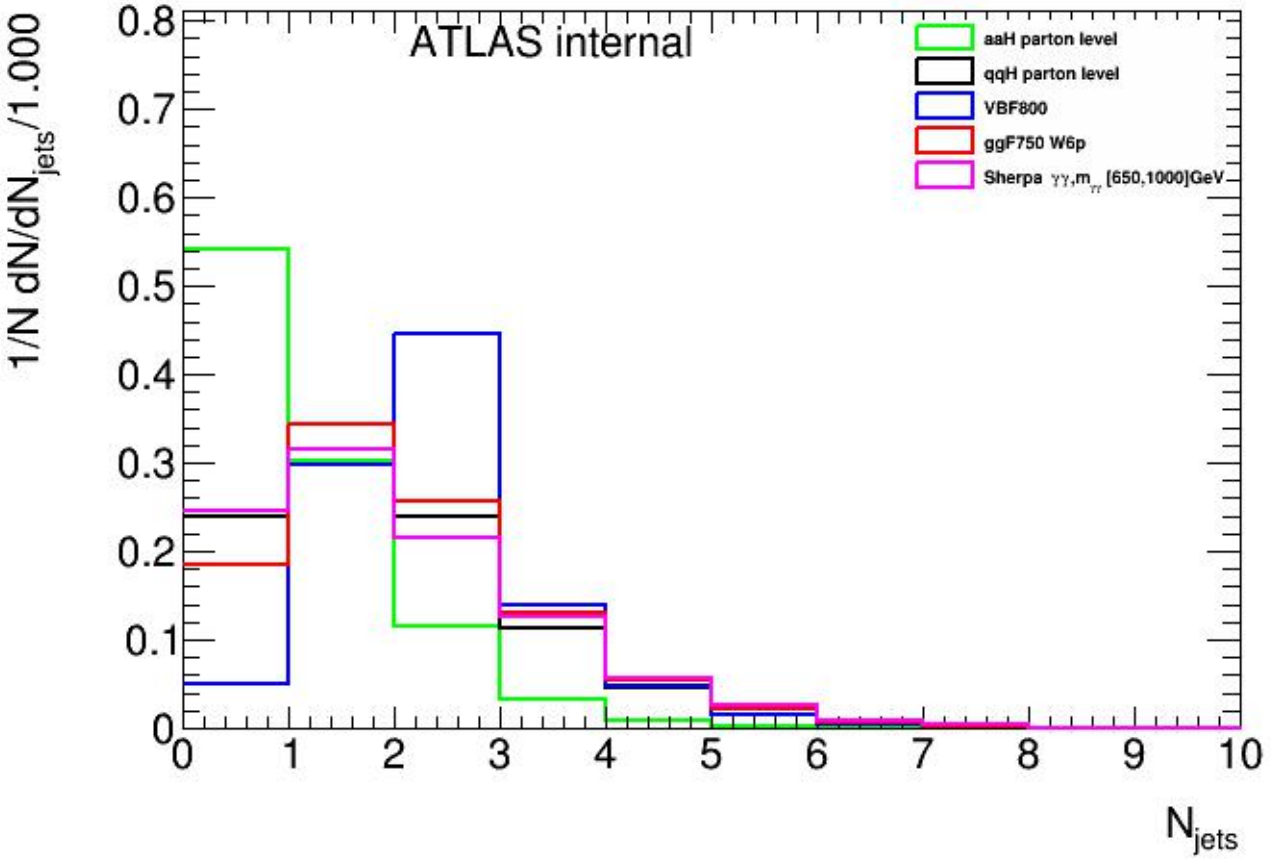
- parton level samples
  - Njet>=2, Nphotons==2
- full simulation samples in h011
  - isPassedLowHighMyy , Njet>=2

    (in the kinematic plots)
- VBF-like analysis : jj_DeltaEta>2
- VBF sensitive variables (used in SM VBF H→γγ)

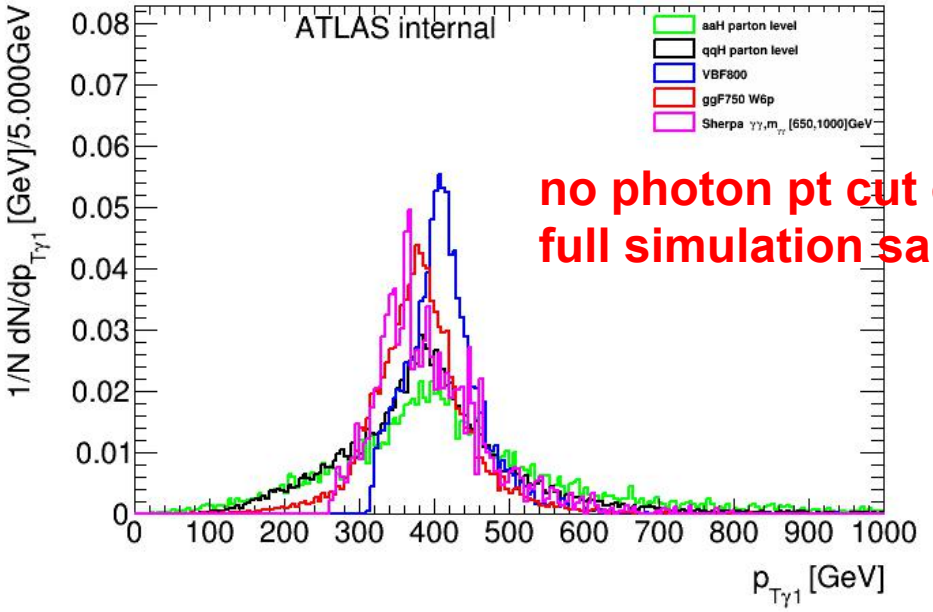
Variables	Definition
m_{jj}	Invariant mass of dijet
$\Delta\eta_{jj}$	Pseudo-rapidity separation of dijet
$\Delta\Phi_{\gamma\gamma,jj}$	Azimuthal angle between diphoton and dijet system
p_{Tt}	Diphoton p_T projected perpendicular to the diphoton thrust axis
$\Delta R^{min}_{\gamma,j}$	Minimum ΔR between either leadingsubleading photon and leadingsubleading jet
$\eta^{Zeppenfeld}$	$\lvert\eta_{\gamma\gamma} - 0.5 * (\eta_{j1} + \eta_{j2})\rvert$

number of jet

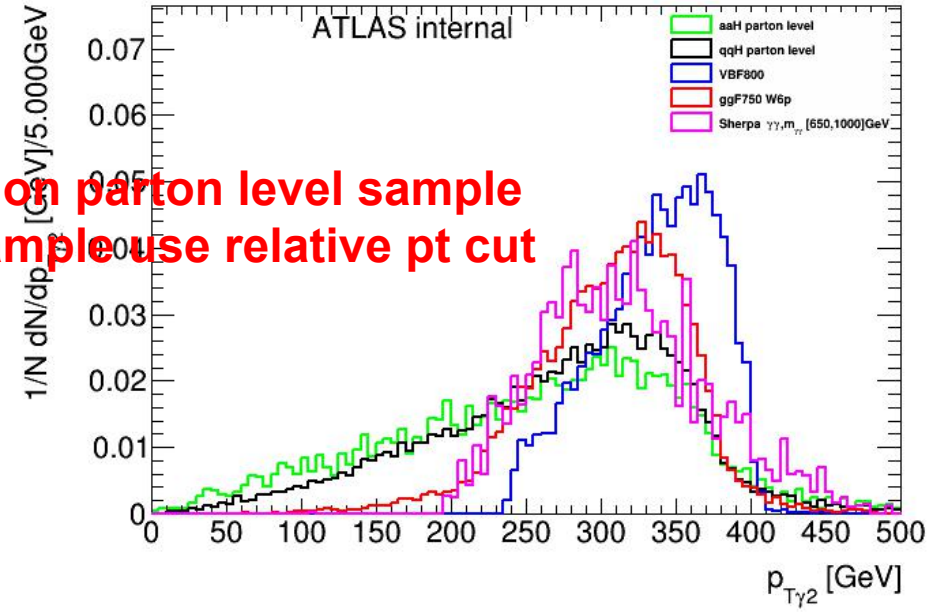
- parton level sample: Nphotons==2
- full simulation sample: pass HighMass Higgs selection
- <20% events have at least 2 jets in aaH

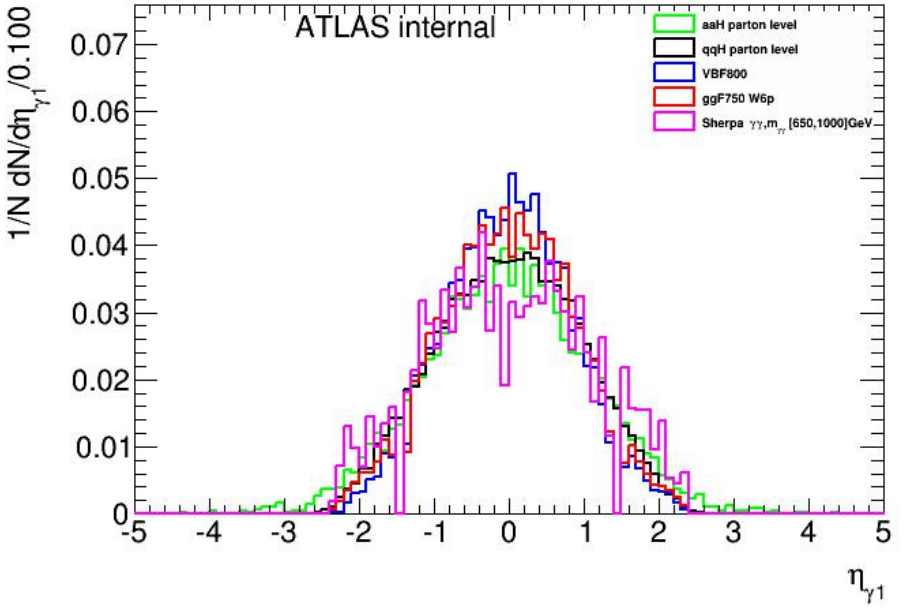


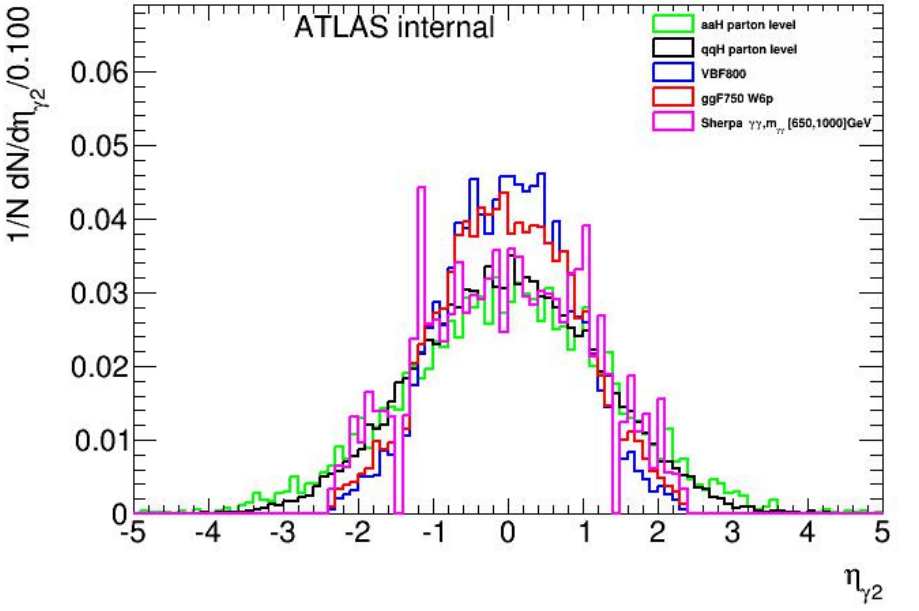
photon kinematics(#jet>=2, $\Delta\eta_{jj}$>2)



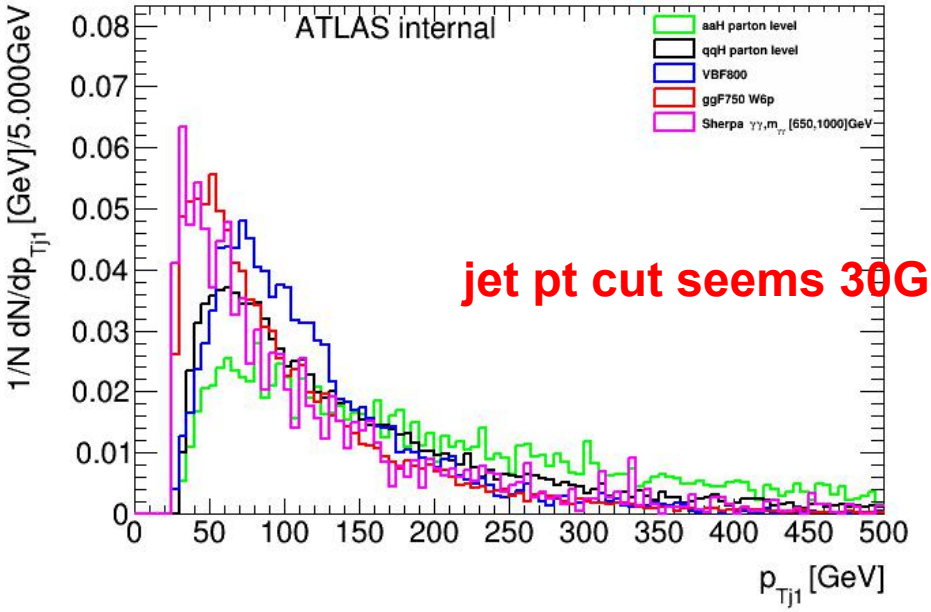
no photon pt cut on parton level sample
full simulation sample use relative pt cut



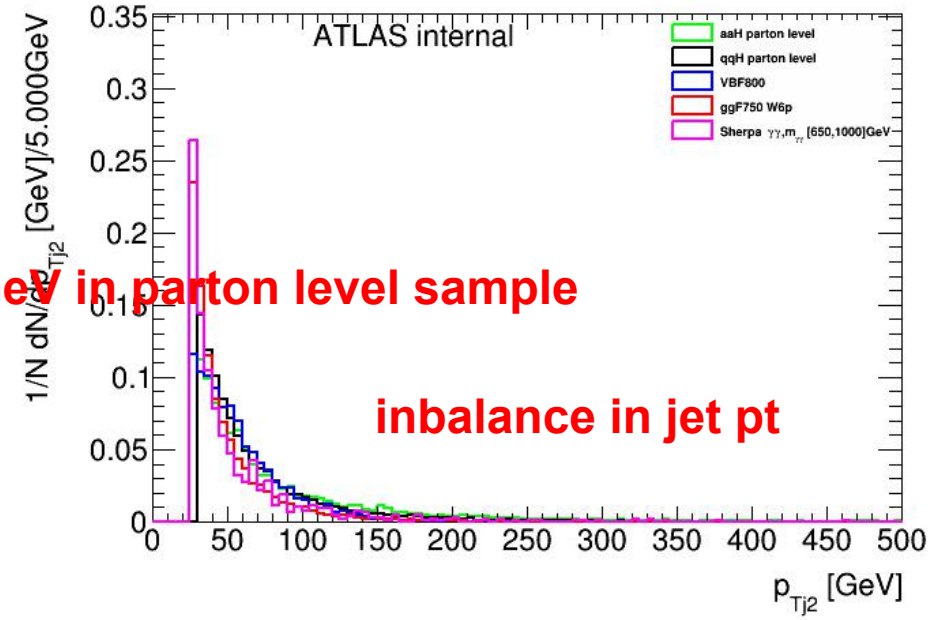




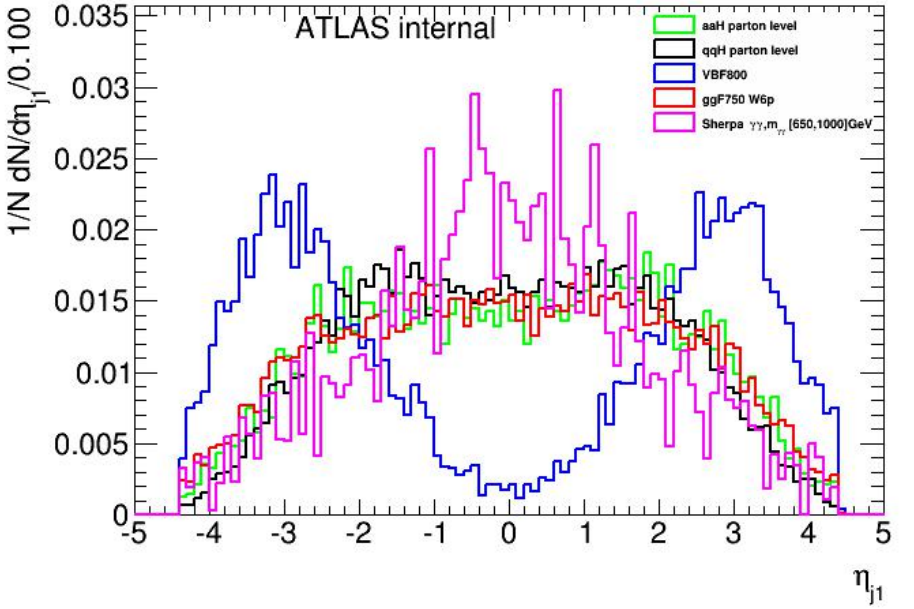
jet kinematics(#jet>=2, $\Delta\ \eta_{jj}$>2)

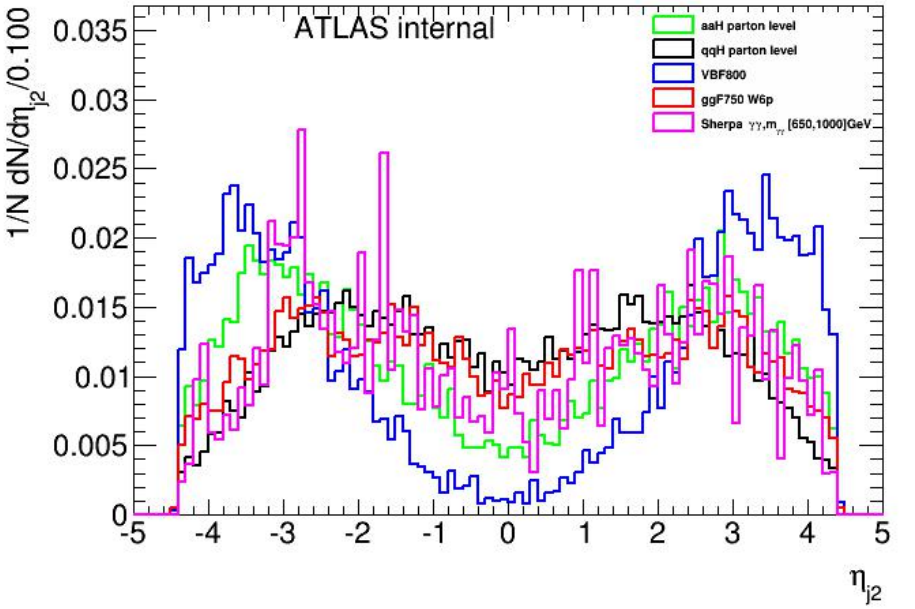


jet pt cut seems 30GeV in parton level sample

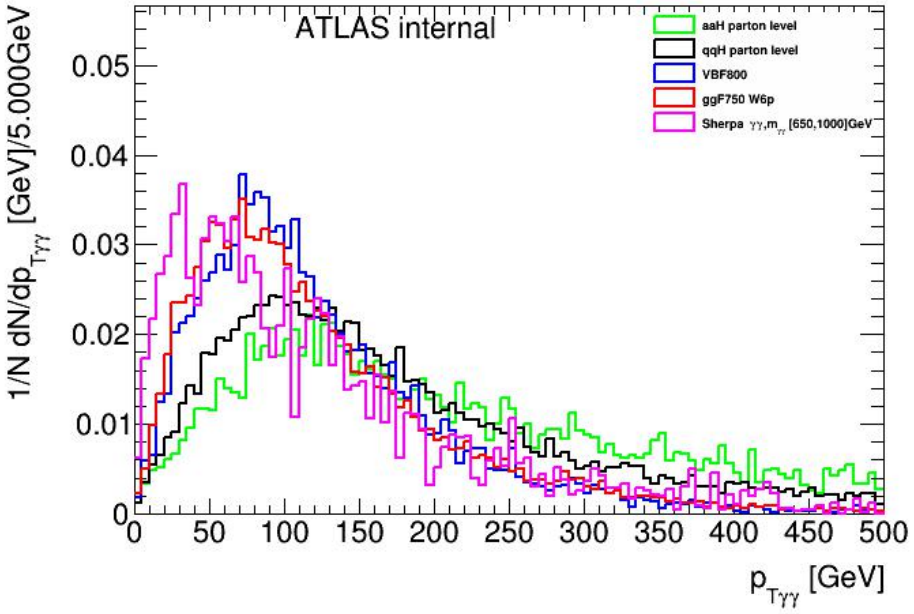


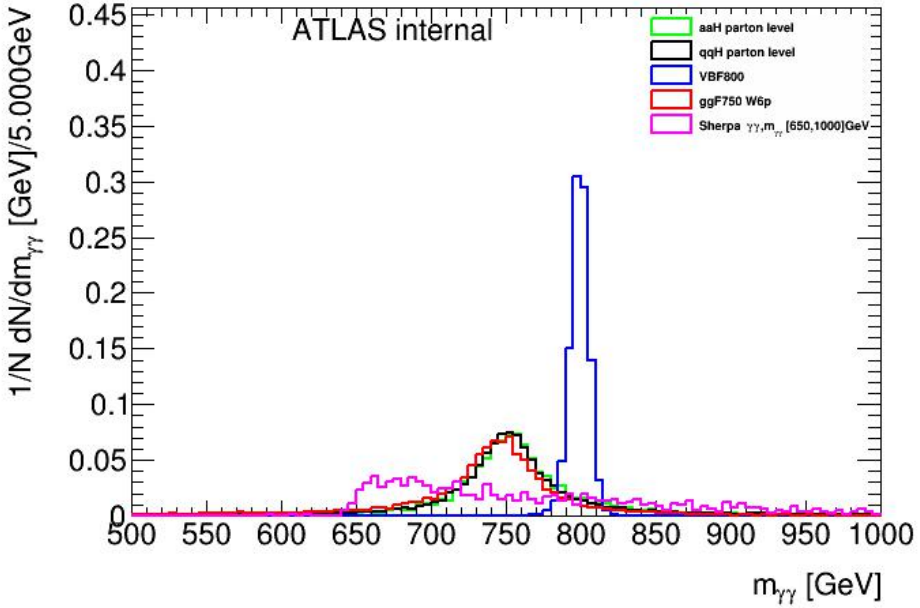
inbalance in jet pt

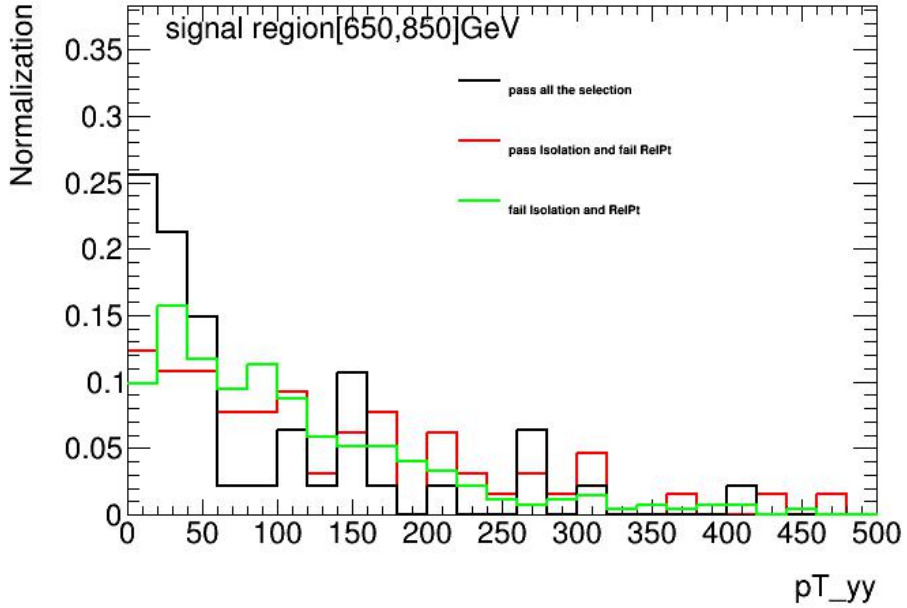




diphoton kinematic(#jet>=2, $\Delta\eta_{jj}$>2)

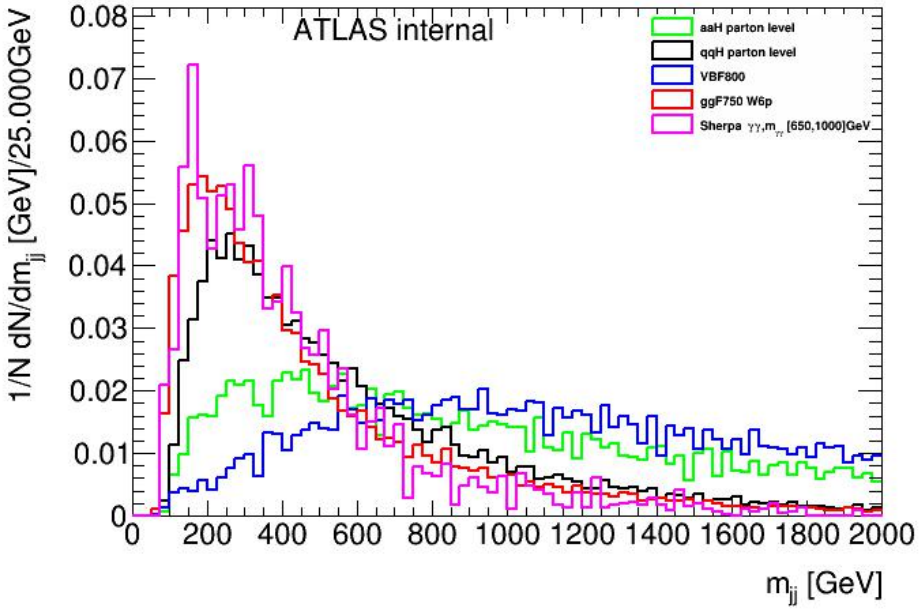


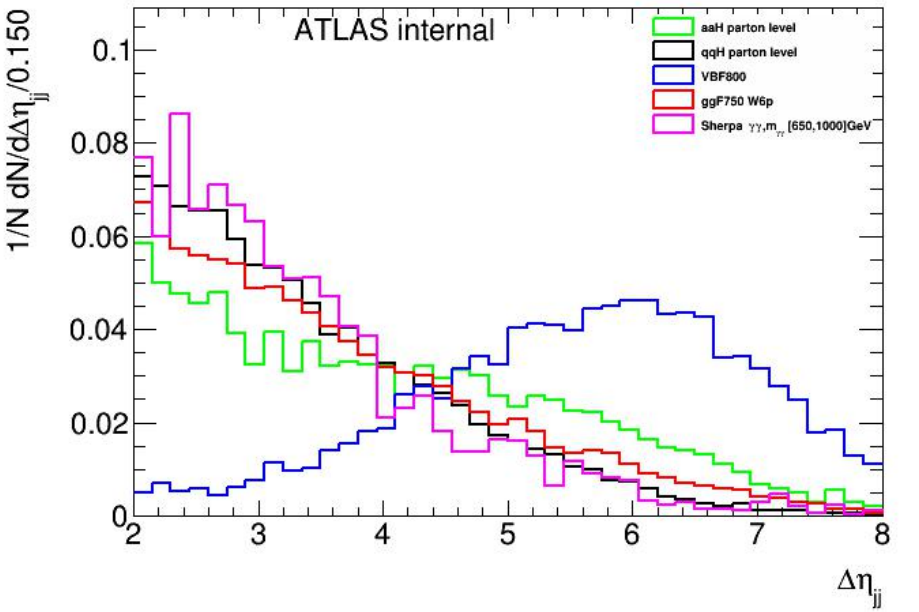


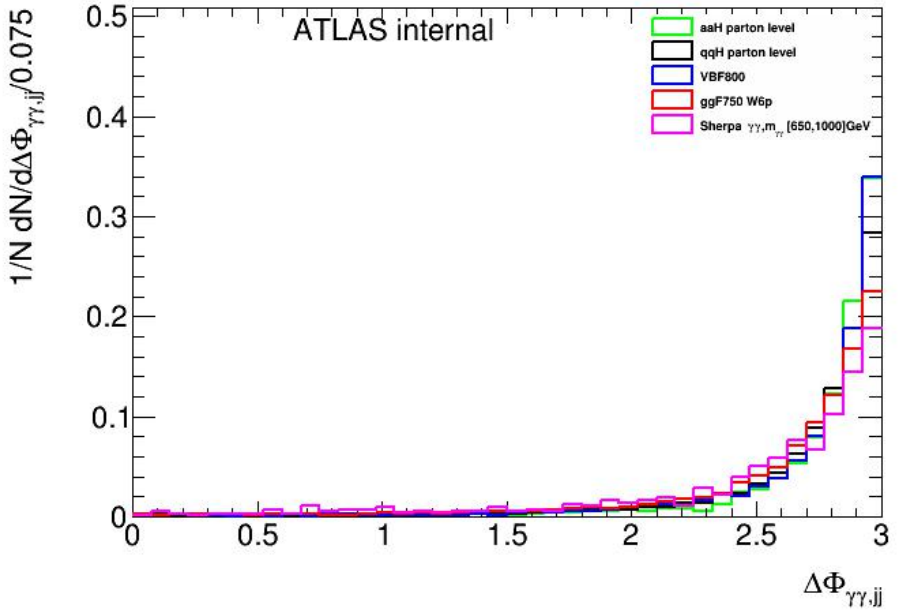


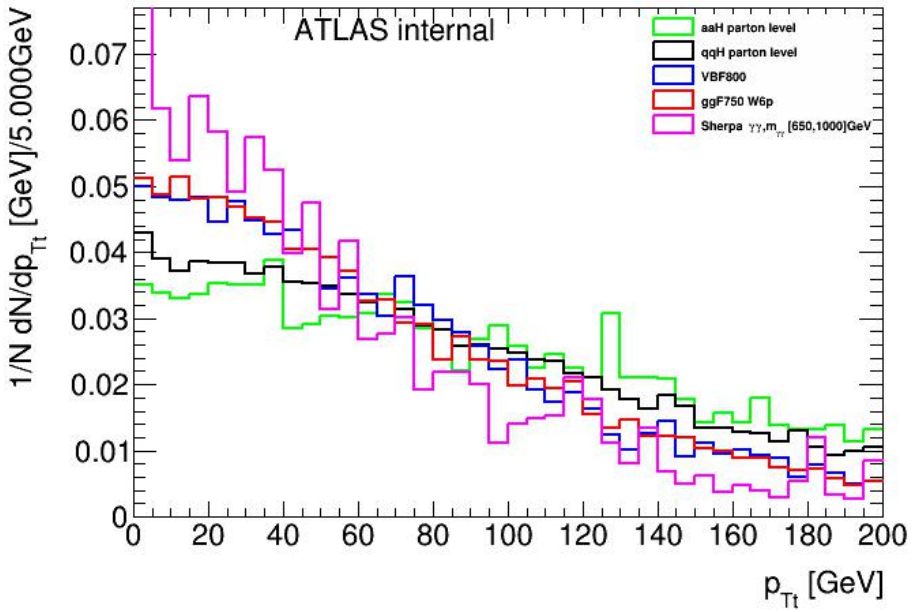
- pTyy is higher in aaH
- data in signal region (black line in bottom left plot) has low pTyy

VBF kinematics(#jet>=2, $\Delta\ \eta_{jj}$>2)

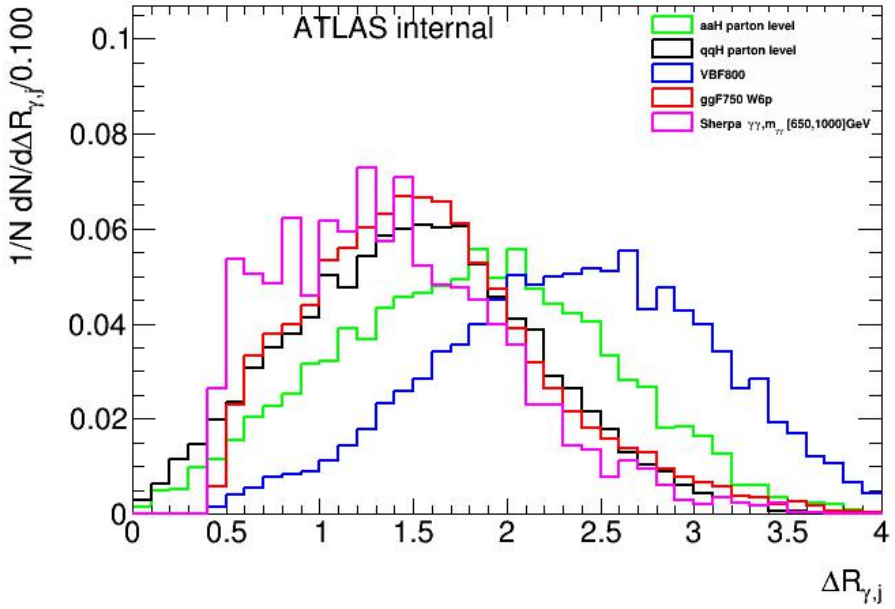


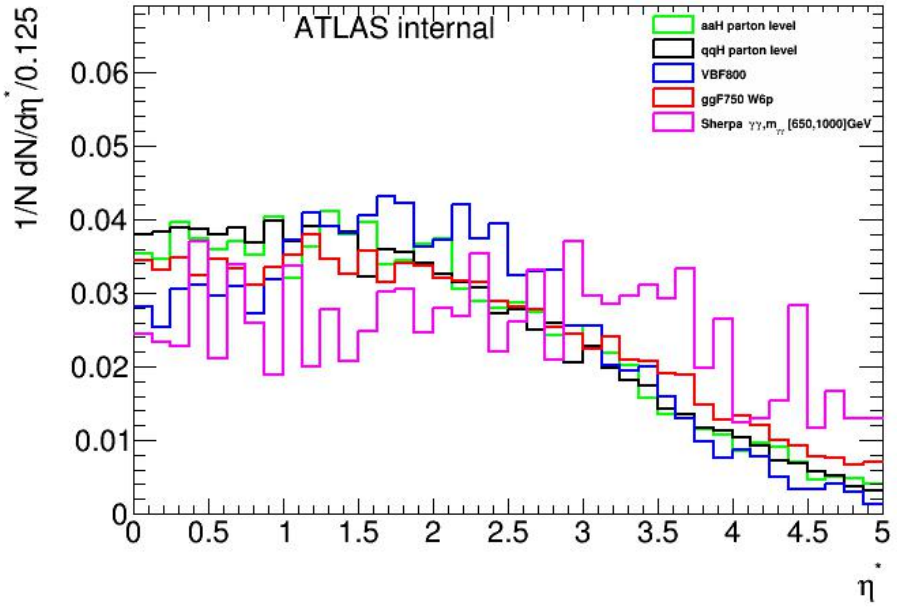






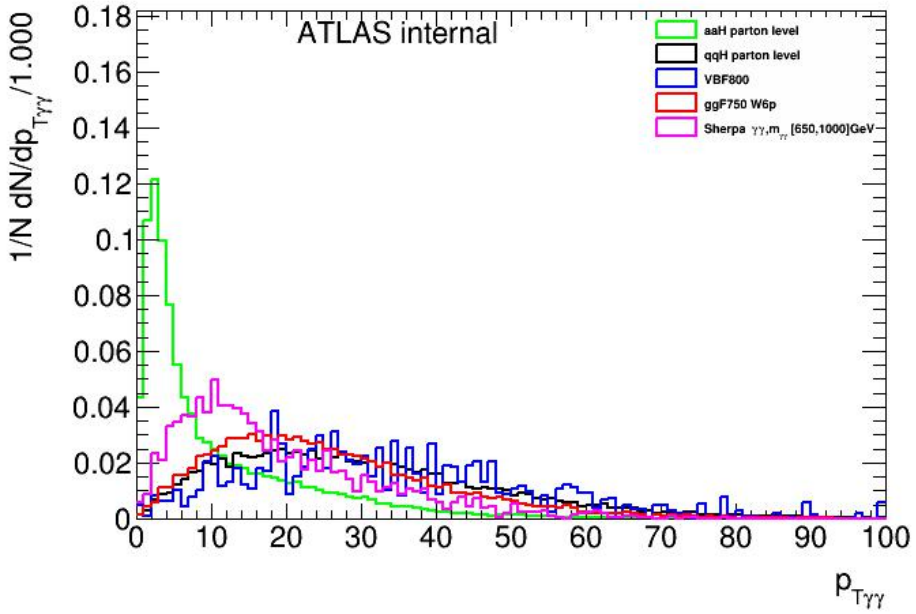
VBF kinematics(#jet>=2, $\Delta\ \eta_{jj}$>2)

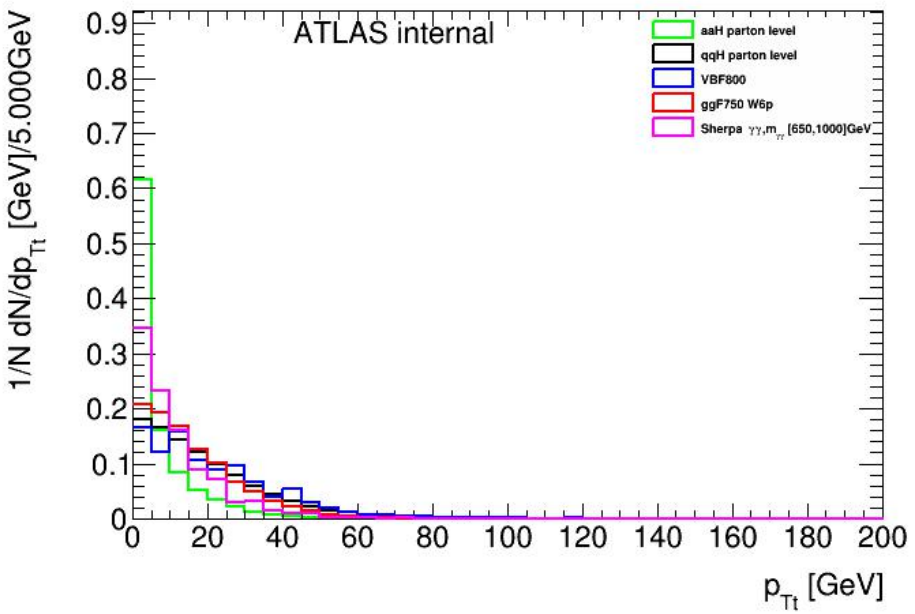




- no overlap removal in parton level sample
- after removal, less jets survive

pTyy and pTt in 0jet bin





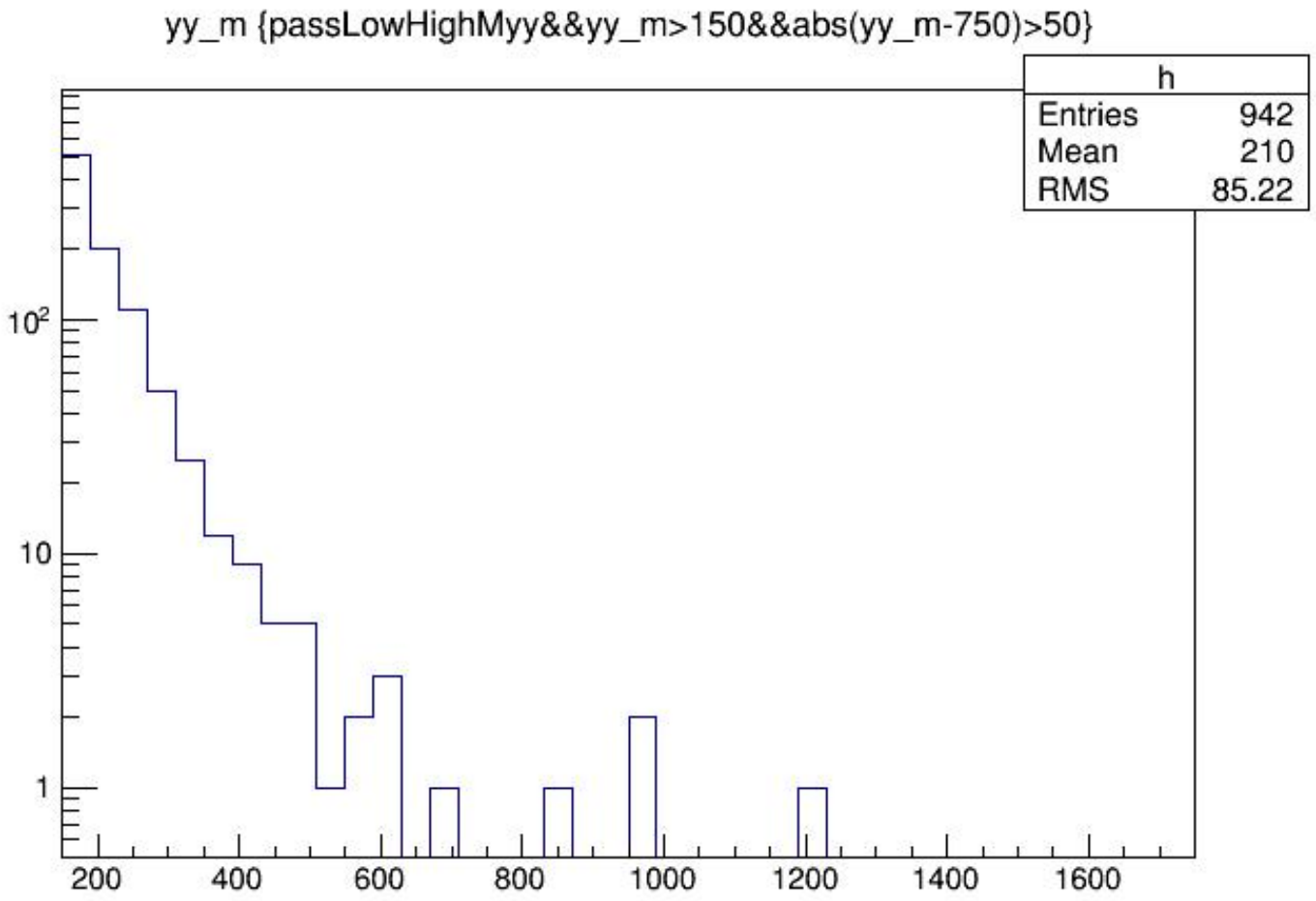
- remember : no kinematic cut is in parton level sample

Summary

- need to comfirm the definition of the contents in the Ntuple
- aaH: ~20% events have >=2 jets, qqH: 1jet dominant
- jet is not forward as VBF
- mjj in aaH is similar with VBF
- to do
  - include the pythia sample(parton level)
  - add new selection based on 2015 selection?
  - think about what to do with the remaining 80% events with <2 jet(corresponding to pTyy)
  - look at other variables

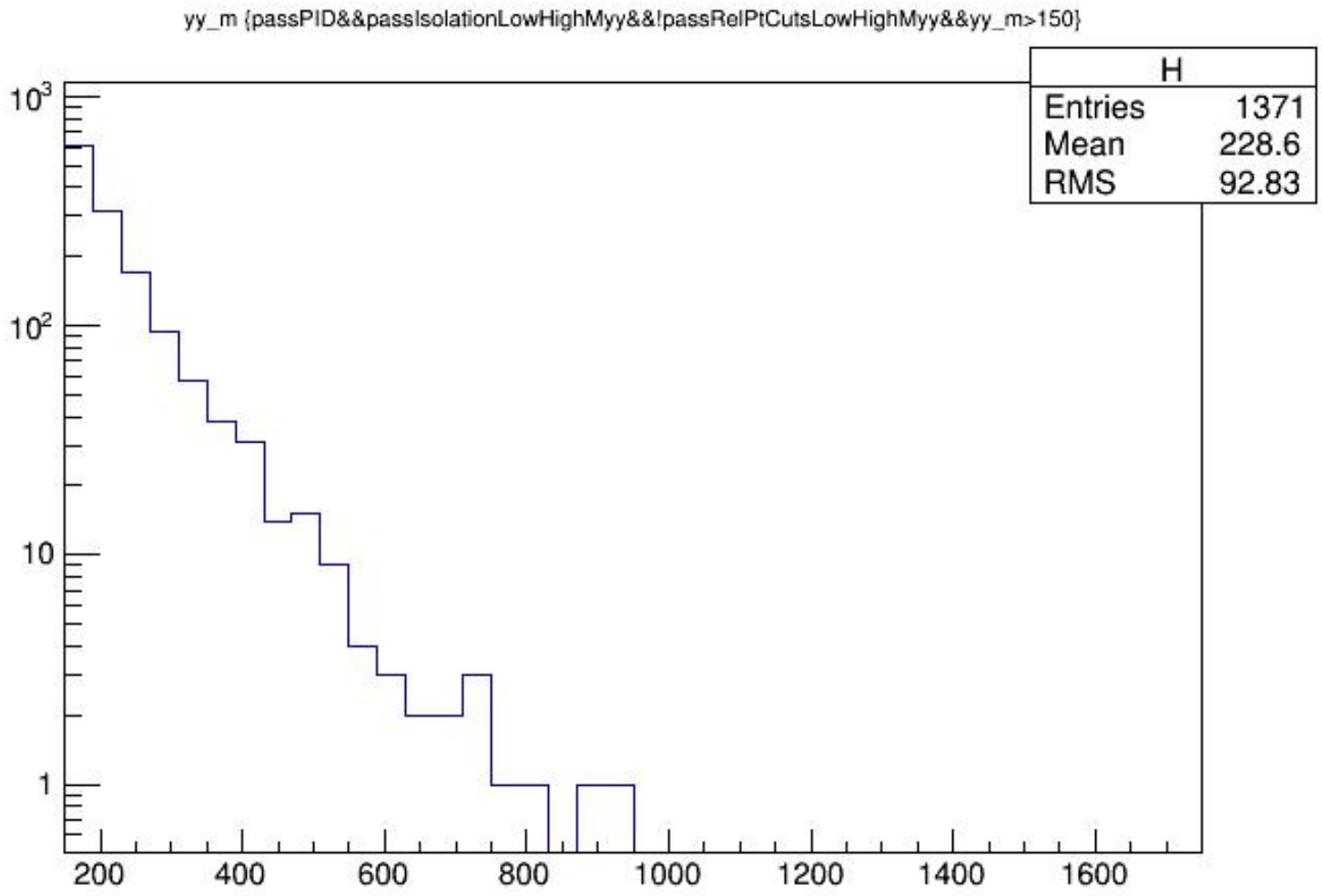
data 2016

- pass all Higgs selection, but exclude [700,800]GeV
- one event in [700,800]GeV



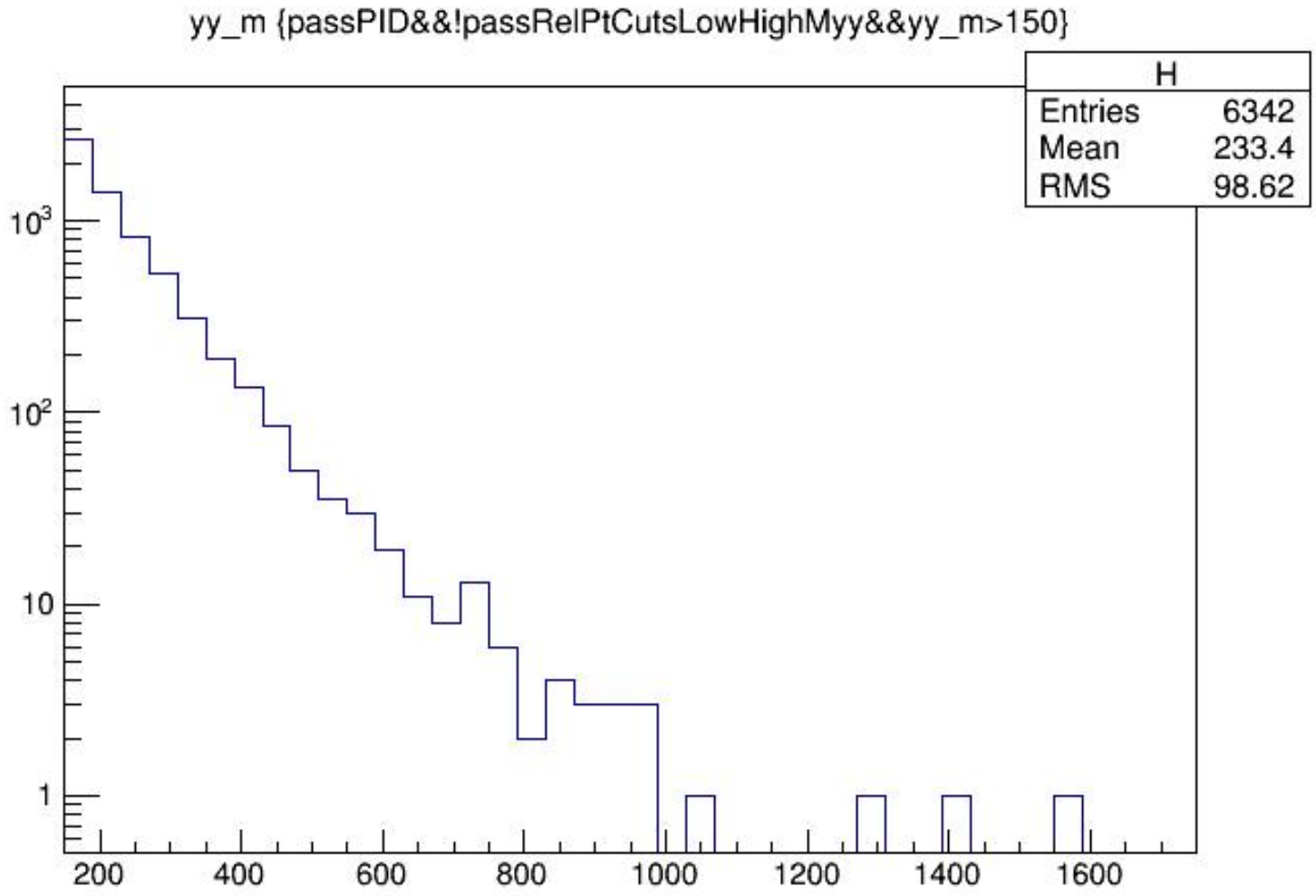
data 2016

- pass ID, pass ISO but fail relative pT myy>150



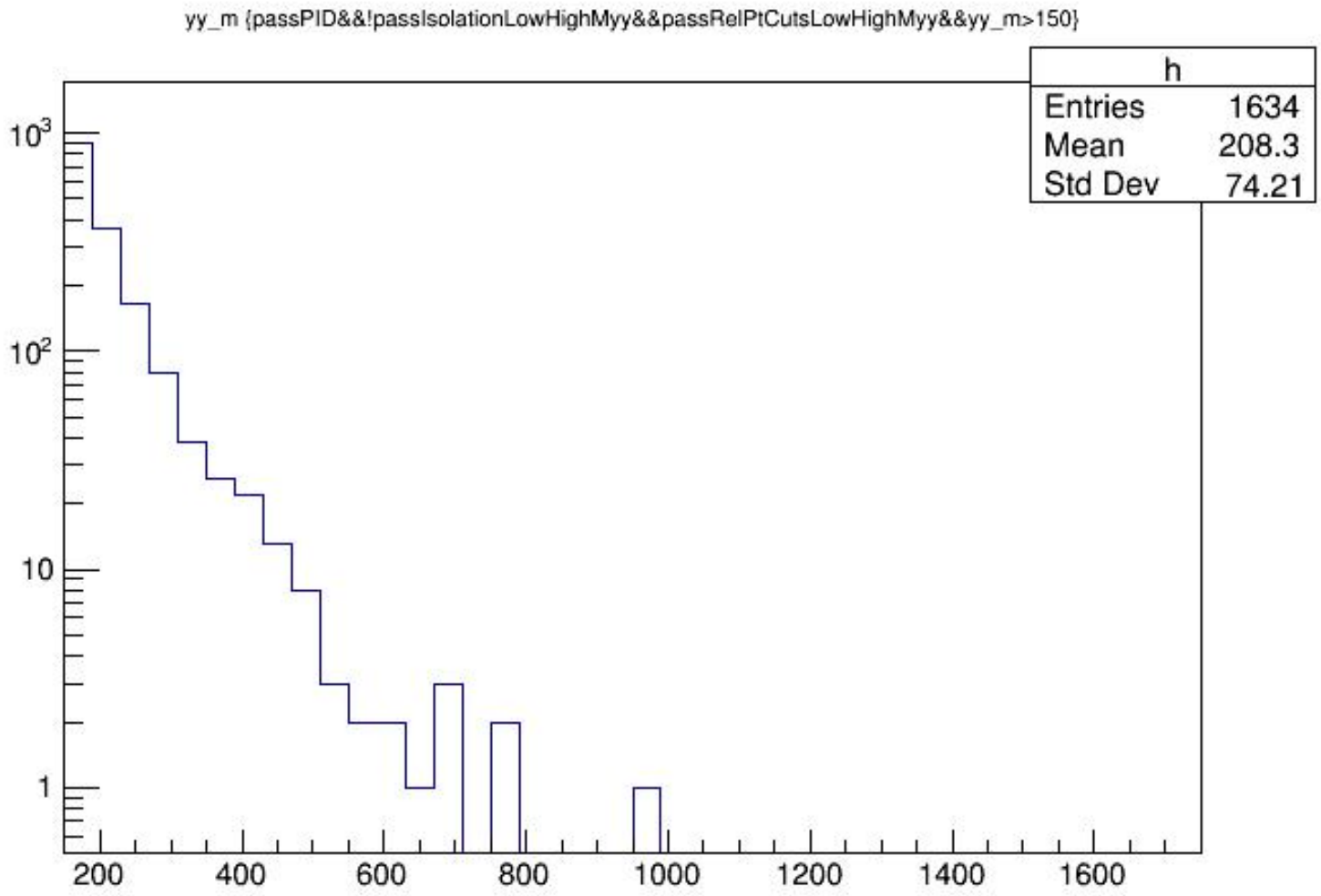
data 2016

- pass ID , no ISO selection but fail relative pT, myy>150



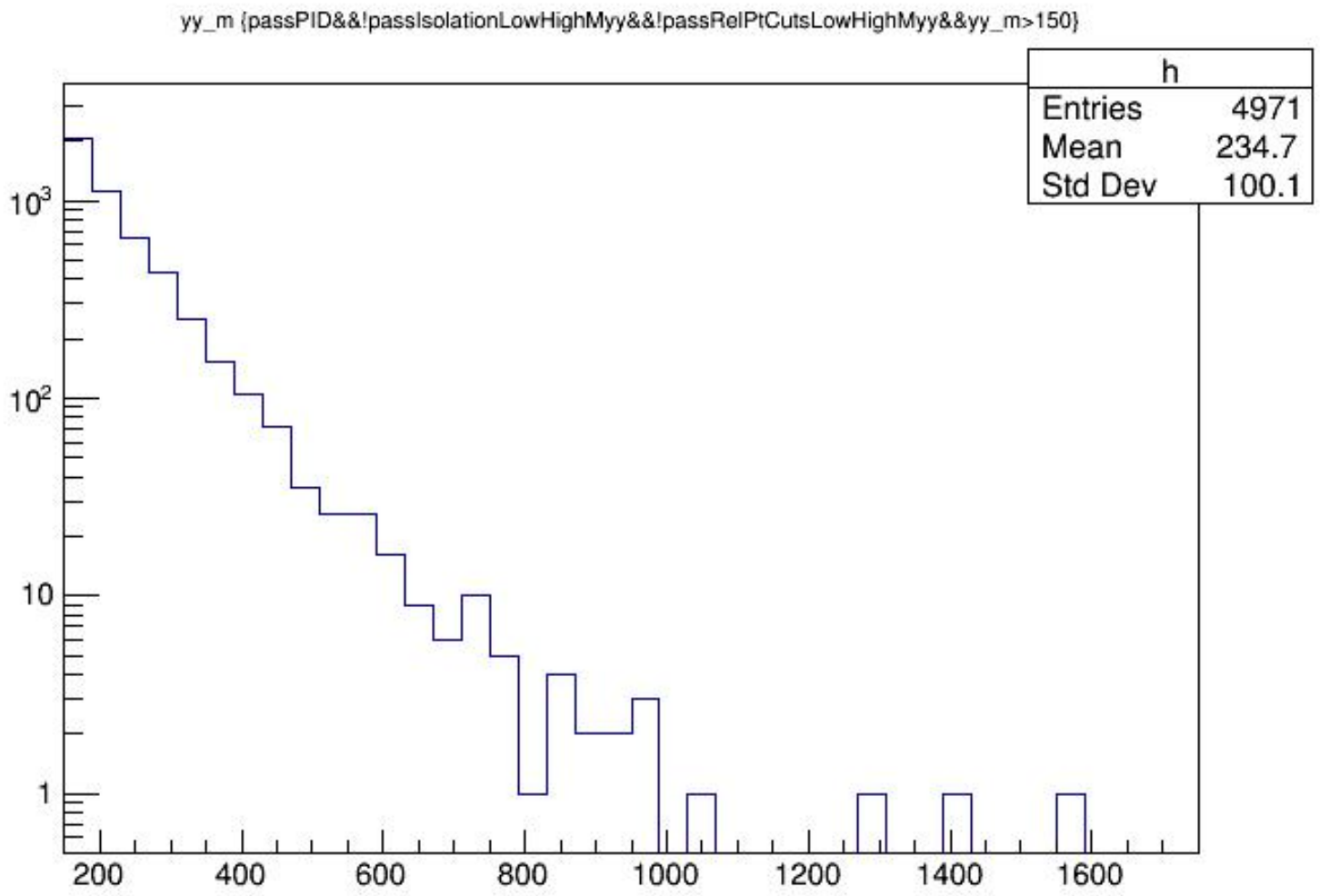
data 2016

- pass ID, pass relative pT but fail Isolation



data 2016

- pass ID but fail Iso and relative pT



- Njet : pass all the Higgs selection , myy>150