H$\rightarrow \gamma\gamma$, studies with DELPHES

all of us...,

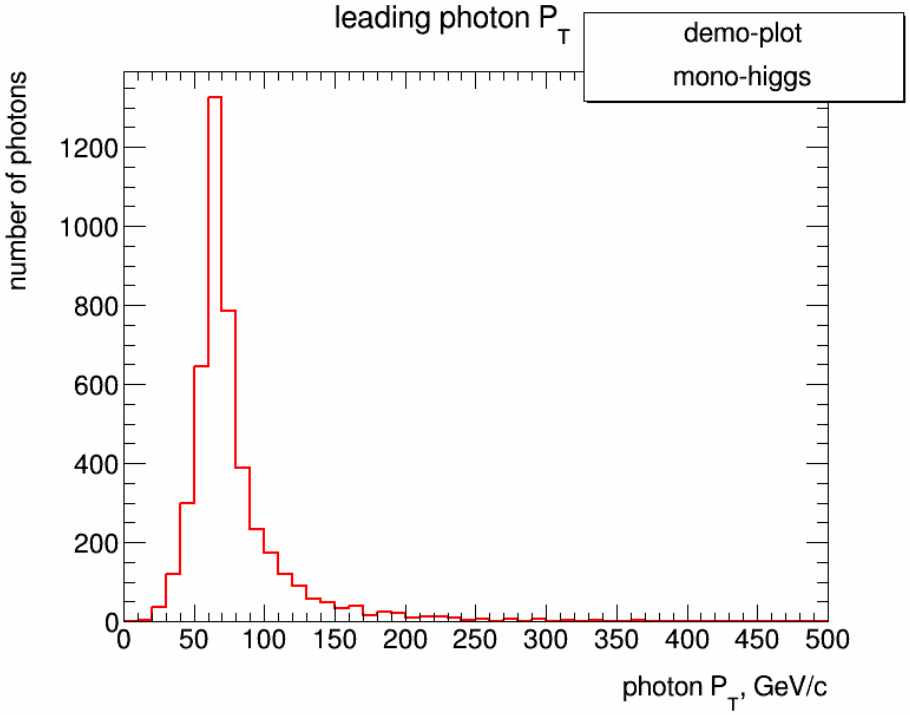
Les Houches Working Output

IPNL

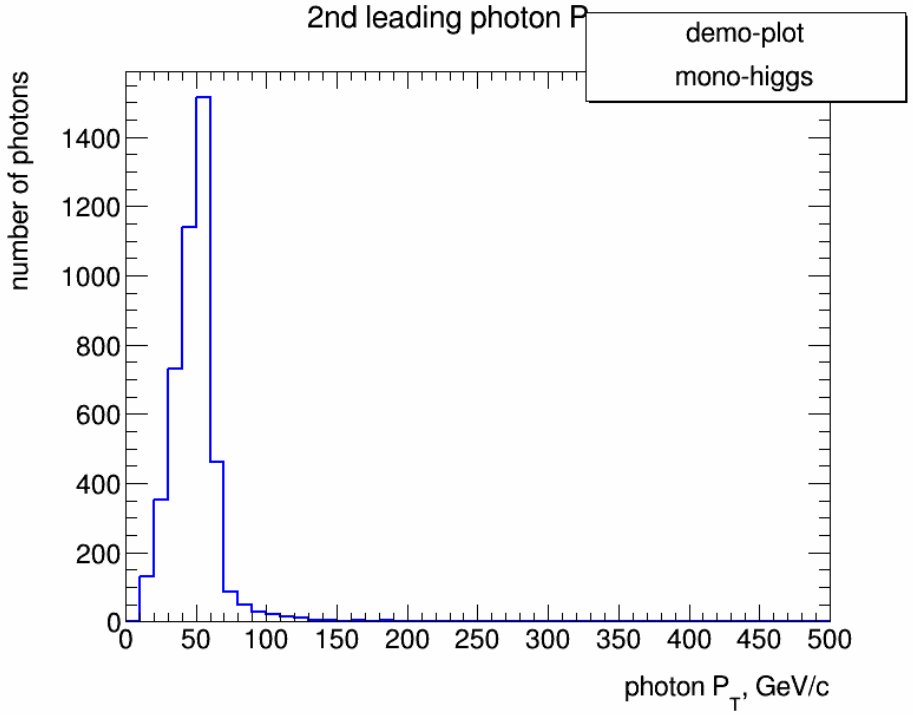
19/06/2015

DELPHES validation with m_H=125GeV, γ p_T distributions

p_T^{Lead}, m_H=125GeV



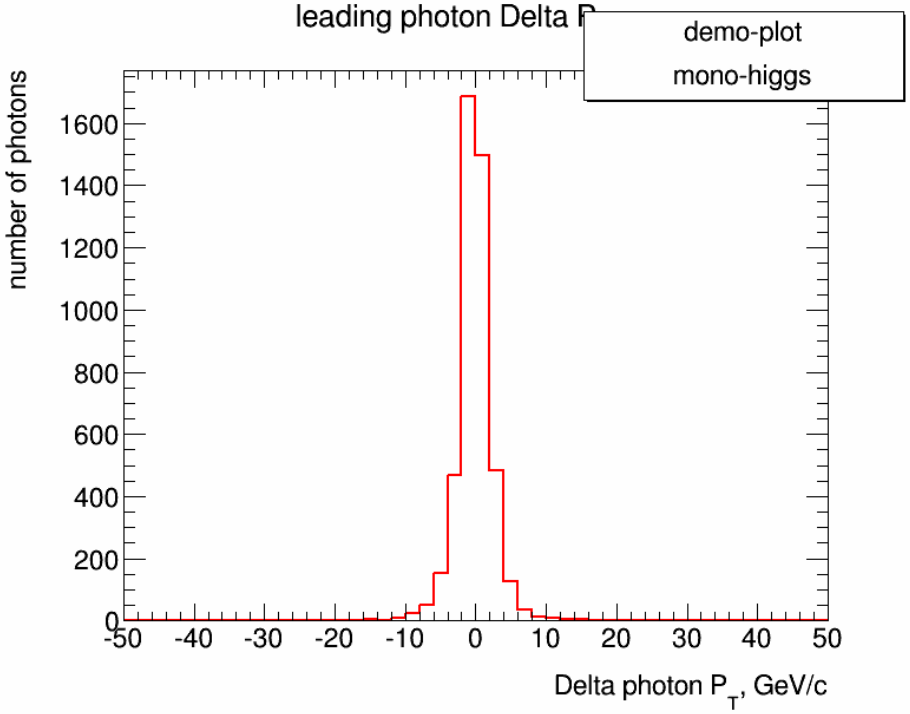
p_T^{Trail}, m_H=125GeV



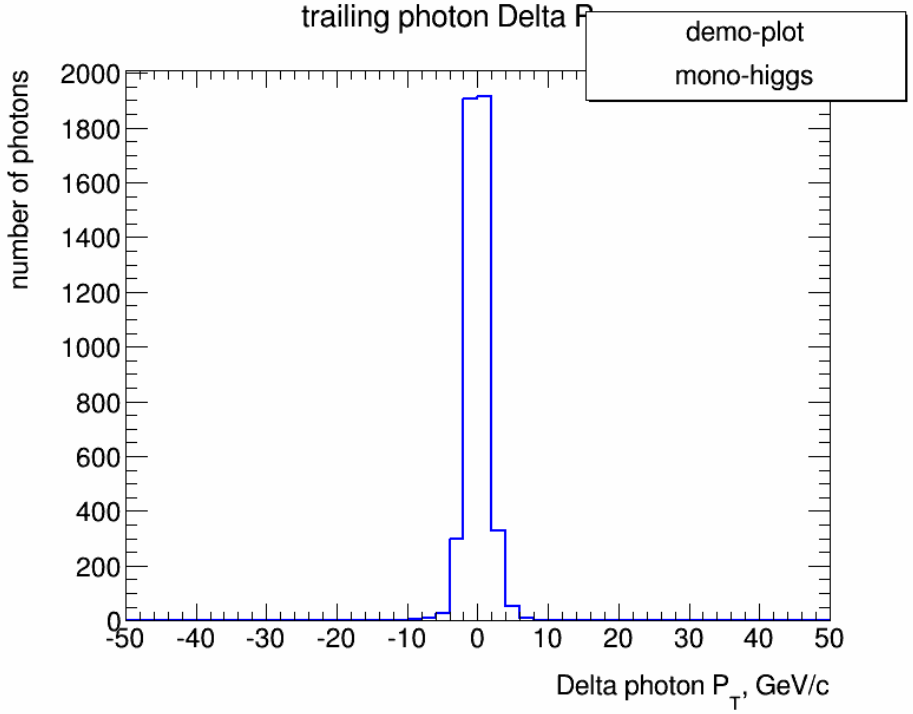
The leading a subleading photons in a SM sample

DELPHES validation with m_H=125GeV, Resolution, $\Delta\gamma$ p_T distributions

Δp_T^{Lead}, m_H=125GeV

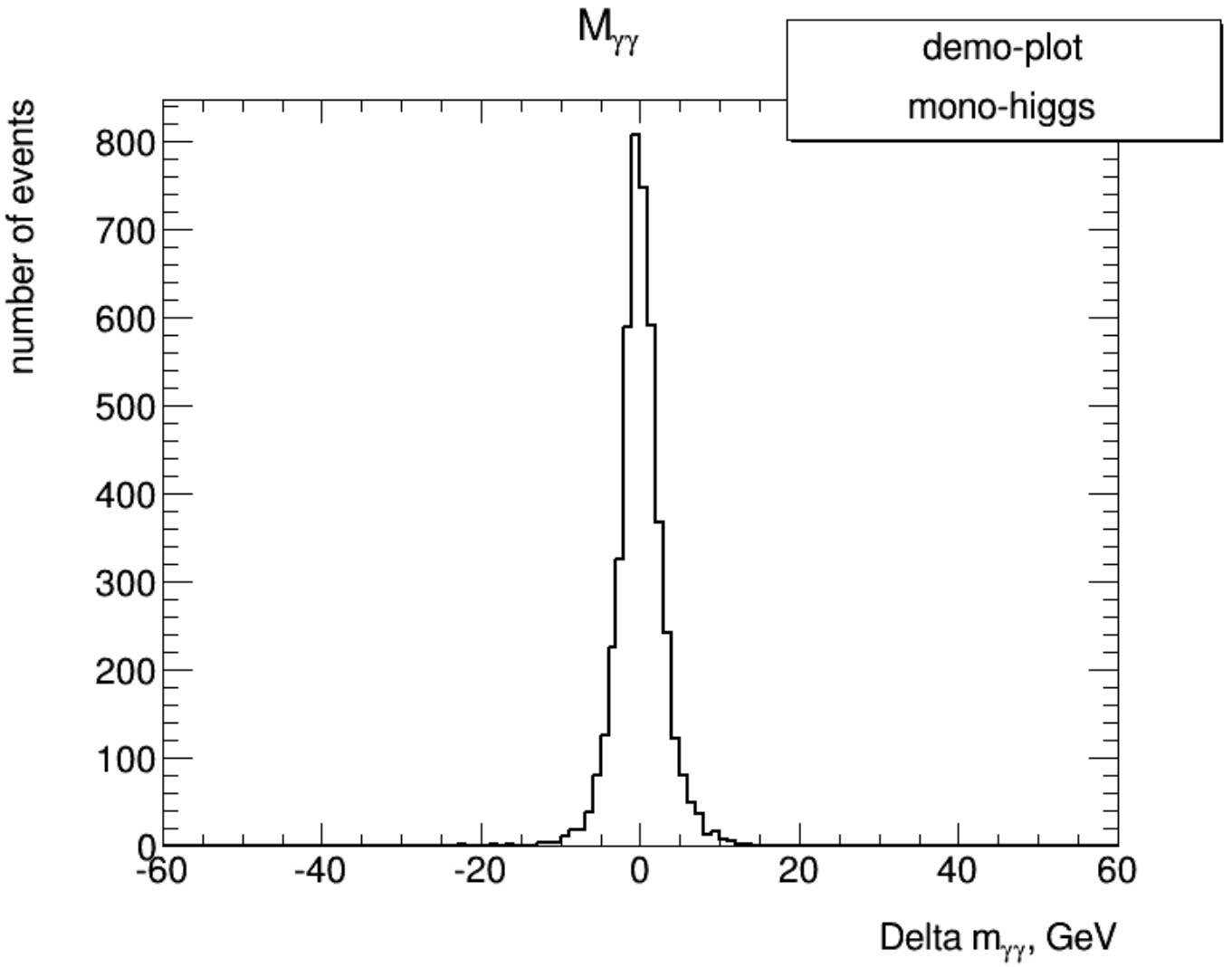


Δp_T^{Trail}, m_H=125GeV



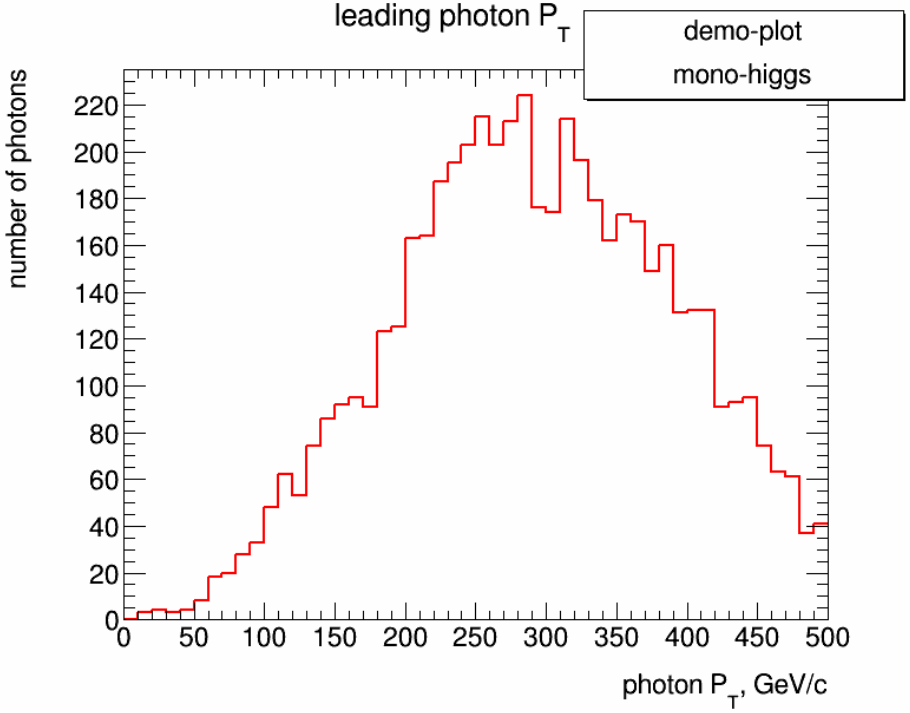
The difference between generated p_T^{γ} - reco-p_T^{γ}

DELPHES validation with m_H=125GeV, Mass Resolution, m_H - $m_{\gamma\gamma}$

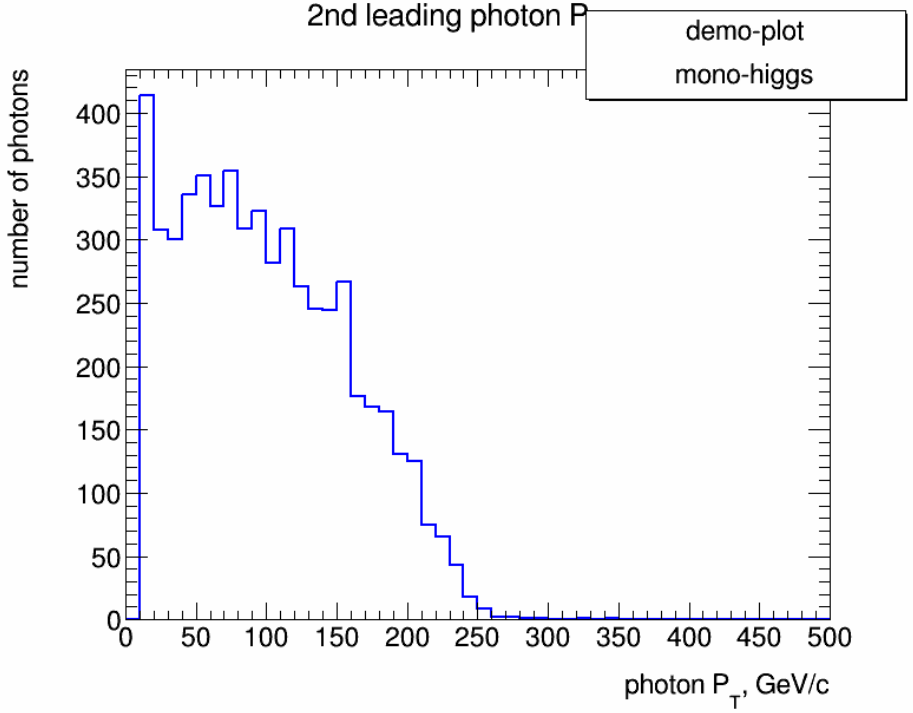


DM candidate 1000GeV, γ p_T distributions

p_T^{Lead}, m_{DM}=1000GeV



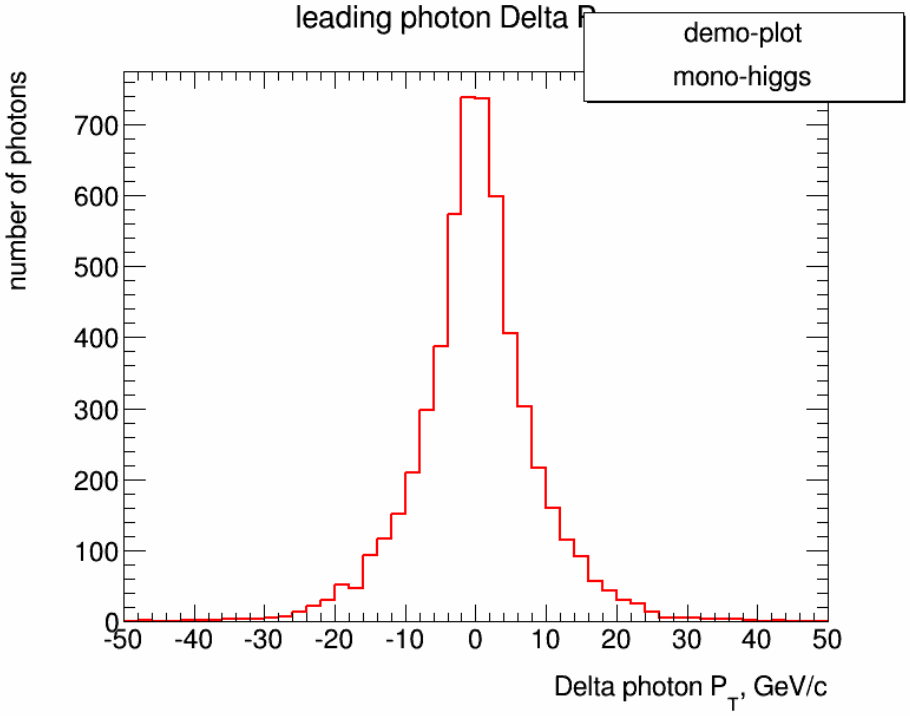
p_T^{Trail}, m_{DM}=1000GeV



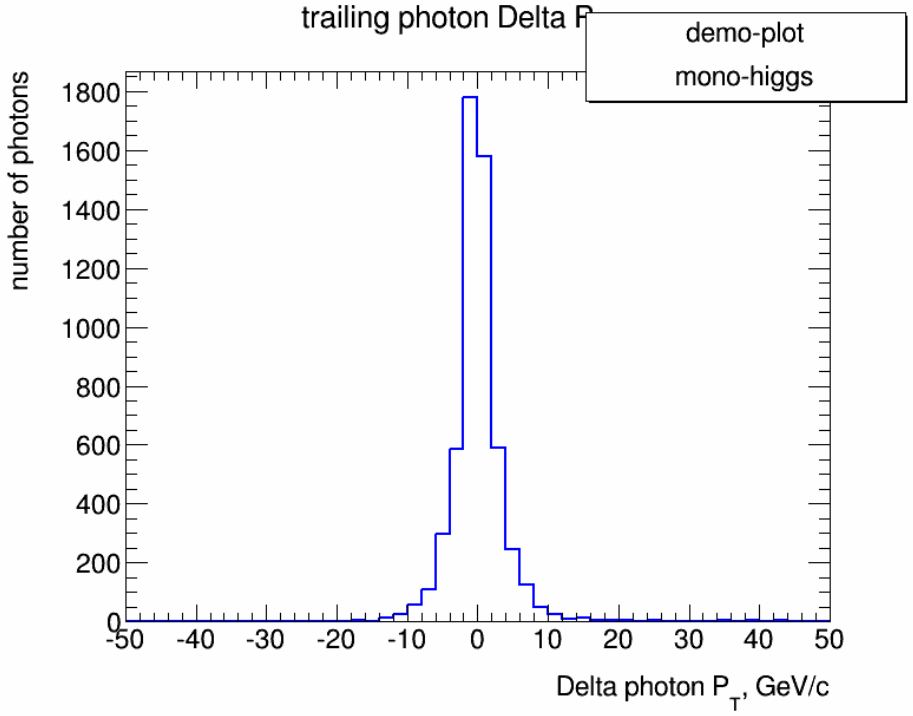
The leading a subleading photons in a DM sample

DM candidate 1000GeV, Resolution, $\Delta\gamma$ p_T distributions

Δp_T^{Lead}, m_{DM}=1000GeV

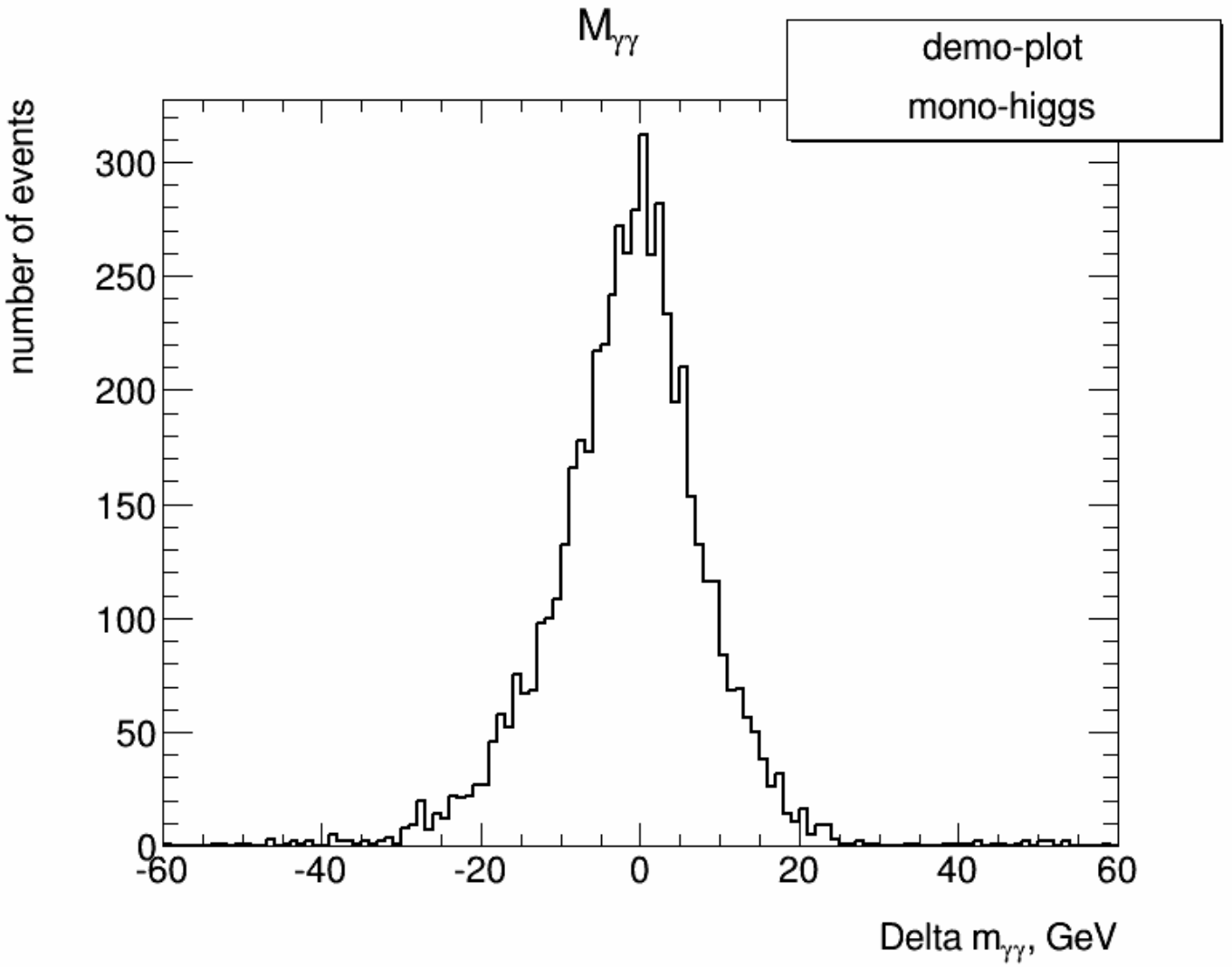


Δp_T^{Trail}, m_{DM}=1000GeV



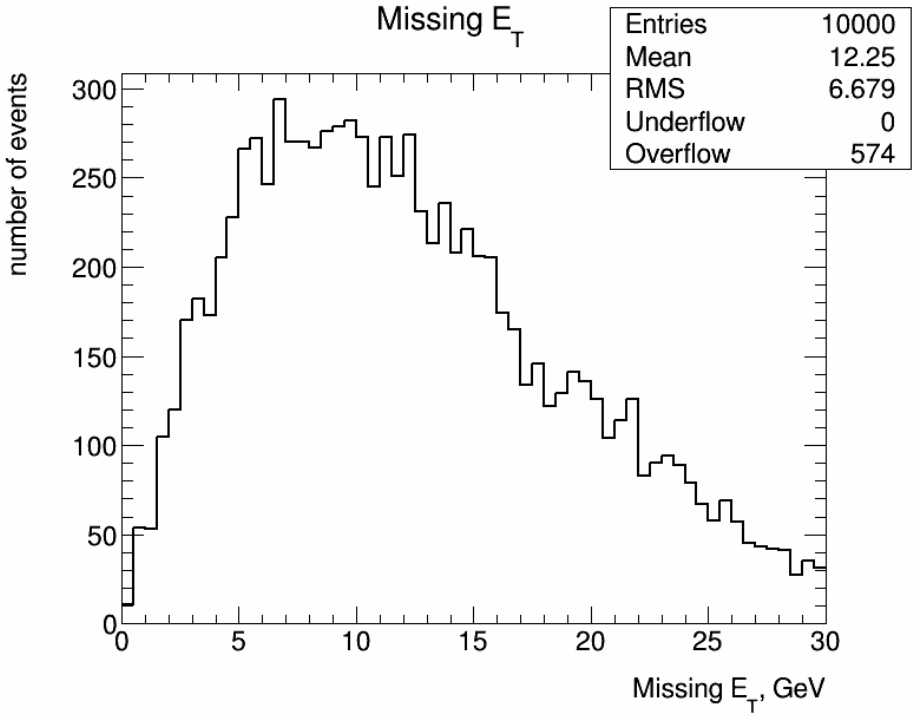
The difference between generated p_T^{γ} - reco-p_T^{γ}

DM candidate 1000GeV, Mass Resolution, m_H - $m_{\gamma\gamma}$

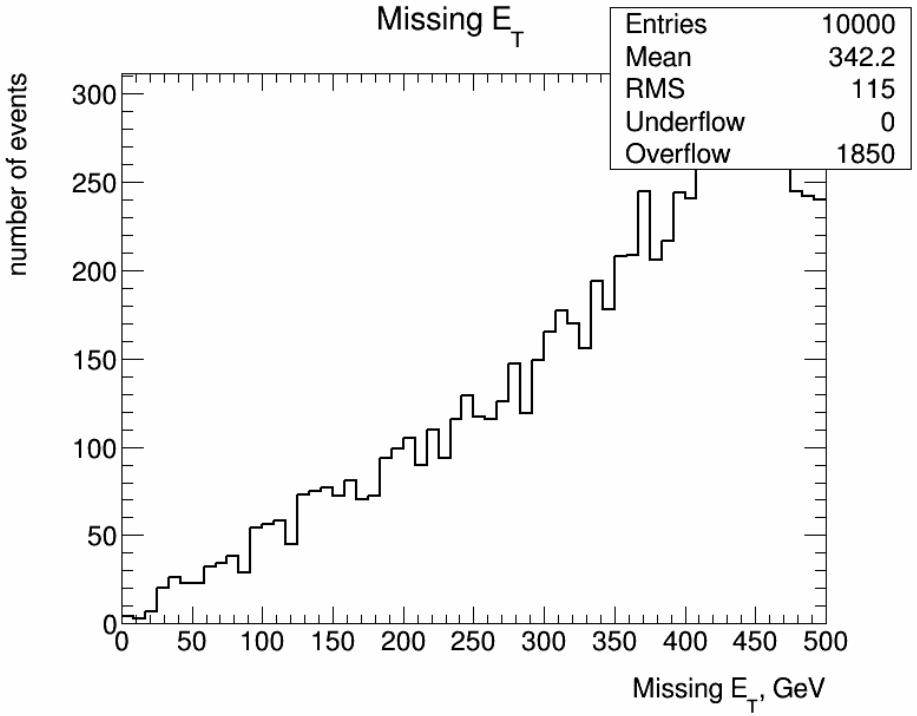


MET comparison

MET, m_H=125GeV



MET, m_{DM}=1000GeV



What's next?

- Preselection.
- More LHE files....

Backup

BACKUP

Preselection Cuts Run-I

Table 18: Preselection cuts.

	Barrel		Endcap		Both Barrel and Endcap		
R9	HoE	CovIEtaIEta	HoE	CovIEtaIEta	EtCorrHcalIso	EtCorrTrkIso	ChargedPFIso
≤ 0.9	< 0.075	< 0.014	< 0.075	< 0.034	< 4 GeV	< 4 GeV	< 4 GeV
> 0.9	< 0.082	< 0.014	< 0.075	< 0.034	< 50 GeV	< 50 GeV	< 4 GeV

Preselection Efficiency Run-I

	DATA			MC		R	
	Eff.	Stat. Err.	Syst. Err.	Eff.	Stat. Err.	Eff.	Err.
7 TeV							
Barrel; R_9 >0.90	0.9872	0.0003	0.0025	0.9908	0.0002	0.996	0.003
Barrel; R_9 <0.90	0.9619	0.0006	0.0050	0.9670	0.0005	0.995	0.006
Endcap; R_9 >0.90	0.9906	0.0004	0.0085	0.9824	0.0004	1.008	0.009
Endcap; R_9 <0.90	0.9606	0.0012	0.0150	0.9560	0.0011	1.005	0.018
8 TeV							
Barrel; R_9 >0.90	0.9879	0.0002	0.0030	0.9864	0.0001	0.999	0.003
Barrel; R_9 <0.90	0.9566	0.0006	0.0055	0.9610	0.0002	0.995	0.006
Endcap; R_9 >0.90	0.9838	0.0003	0.0090	0.9789	0.0002	1.005	0.009
Endcap; R_9 <0.90	0.9545	0.0009	0.0170	0.9445	0.0005	1.011	0.018

Table 19: Photon identification efficiencies measured in the 4 photon categories using tag and probe with Z→ee events (for all cuts except electron rejection).

Another way to see the preselection

for leading and sub-leading photon as defined in: AN 2013/253

	EB	EE
r9 $>$ 0.9	HoE $<$ **0.082** $\sigma_{i\eta,i\eta} < 0.014$	HoE < 0.075 $\sigma_{i\eta,i\eta} < 0.034$
	hcalTowerSumEtConeDR03 - 0.005 * pt $<$ **50.0** trkSumPtHollowConeDR03 - 0.002 * pt $<$ **50.0** pfChgIsoWrtChosenVtx02 < 4.0	
r9 $\leq$ 0.9	HoE < 0.075 $\sigma_{i\eta,i\eta} < 0.014$	HoE < 0.075 $\sigma_{i\eta,i\eta} < 0.034$
	hcalTowerSumEtConeDR03 - 0.005 * pt < 4.0 trkSumPtHollowConeDR03 - 0.002 * pt < 4.0 pfChgIsoWrtChosenVtx02 < 4.0	

Cat definition:

	EB	EE
r9 $>$ 0.9	Cat0	Cat2
r9 $\leq$ 0.9	Cat1	Cat3

For low-mass EB-path **Cat0**.