TRIGGER & PRESELECTION

Offline Trigger like requirements

OLD

Category		R9	H/E	$\sigma_{i\eta i\eta}$	Pho Iso	Trk Iso
Both photons in EB		> 0.5	< 0.07	< 0.0105	< 4 GeV	< 6 GeV
At least one Photon in EE	Second photon in EB	> 0.85	< 0.07	< 0.0105	< 4 GeV	< 6 GeV
At least one Photon in EE	Second photon in EE	> 0.9	< 0.035	< 0.0275	< 4 GeV	< 6 GeV

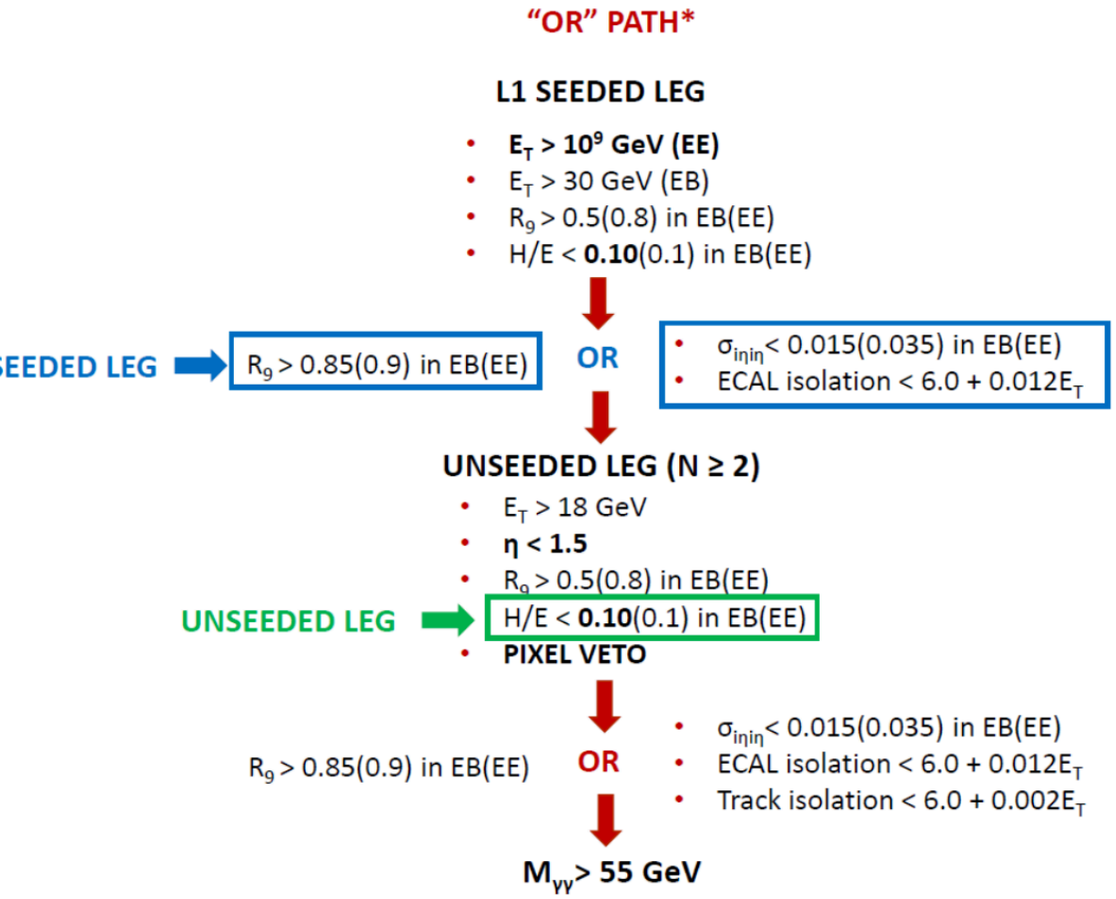
- $m_{\gamma\gamma}$ > 55 GeV, P_T lead γ> 30 GeV, P_T sub-lead γ> 18 GeV, Pixel Veto applied

NEW

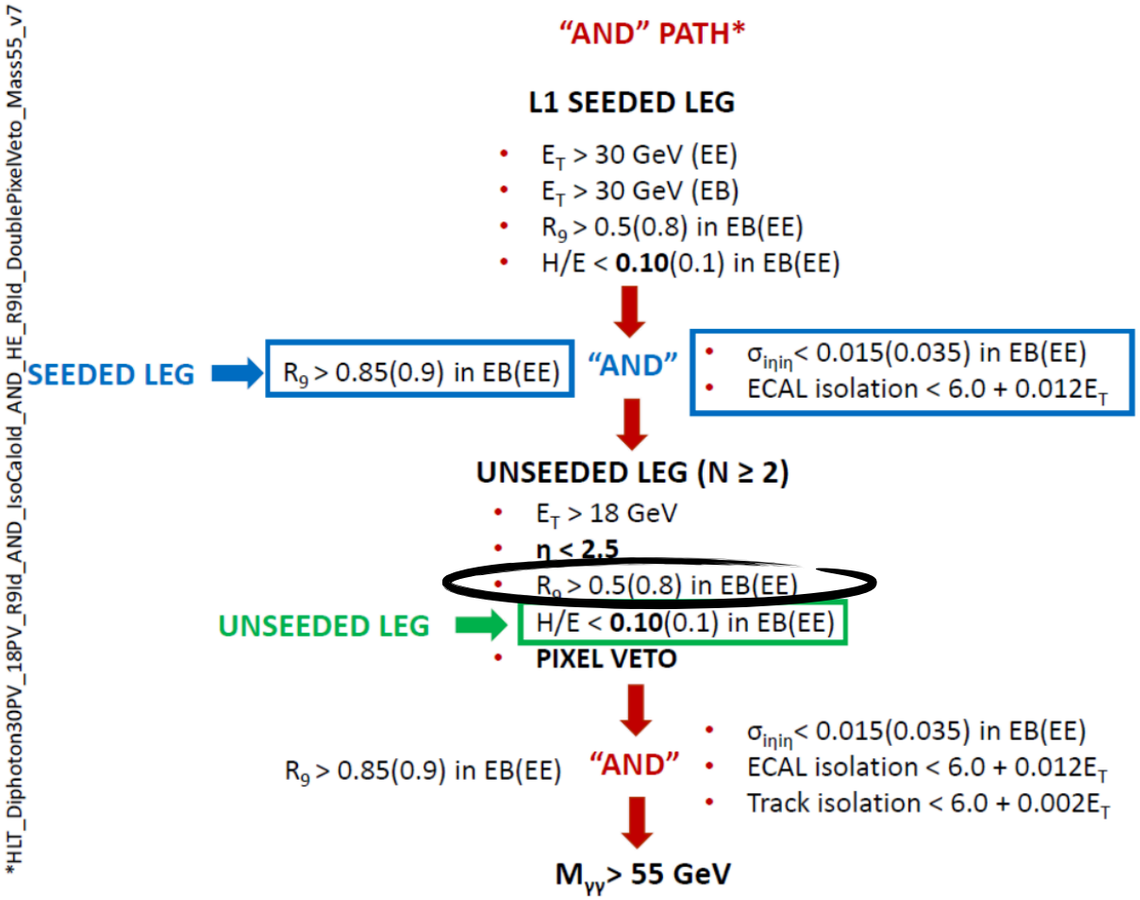
Offline Trigger like requirements-1

Category		R9	H/E	$\sigma_{i\eta i\eta}$	Pho Iso	Trk Iso
Both photons in EB		> 0.85	< 0.08	-	-	-
		> 0.5 && < 0.85	< 0.08	< 0.015	4 GeV	6 GeV
At least one Photon in EE	Second photon in EB	> 0.85	< 0.08	< 0.015	4 GeV	6 GeV
	Second Photon in EE	> 0.9	< 0.08	< 0.035	4 GeV	6 GeV

he Low-Mass HLT DiPhoton Trigger

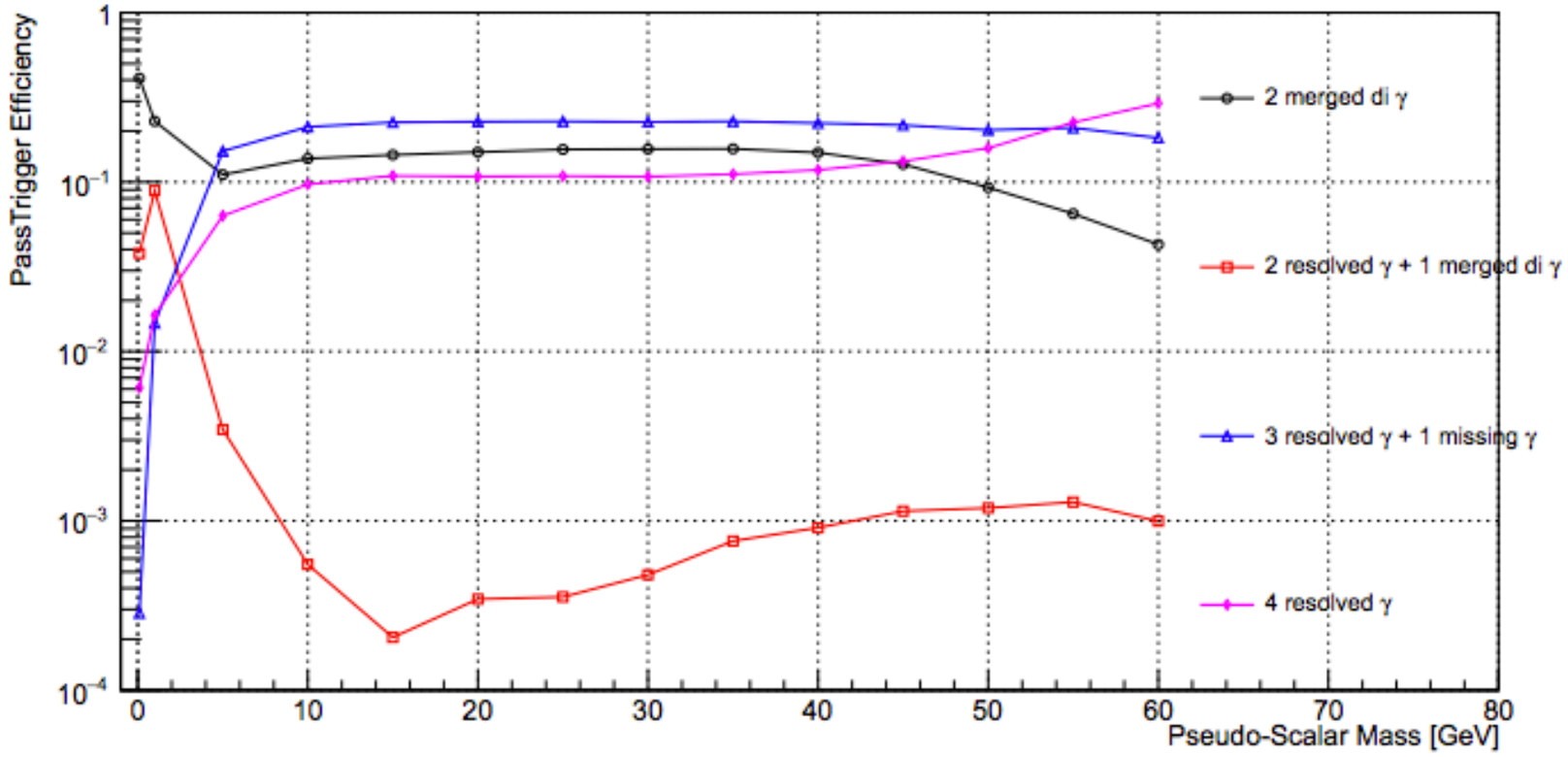


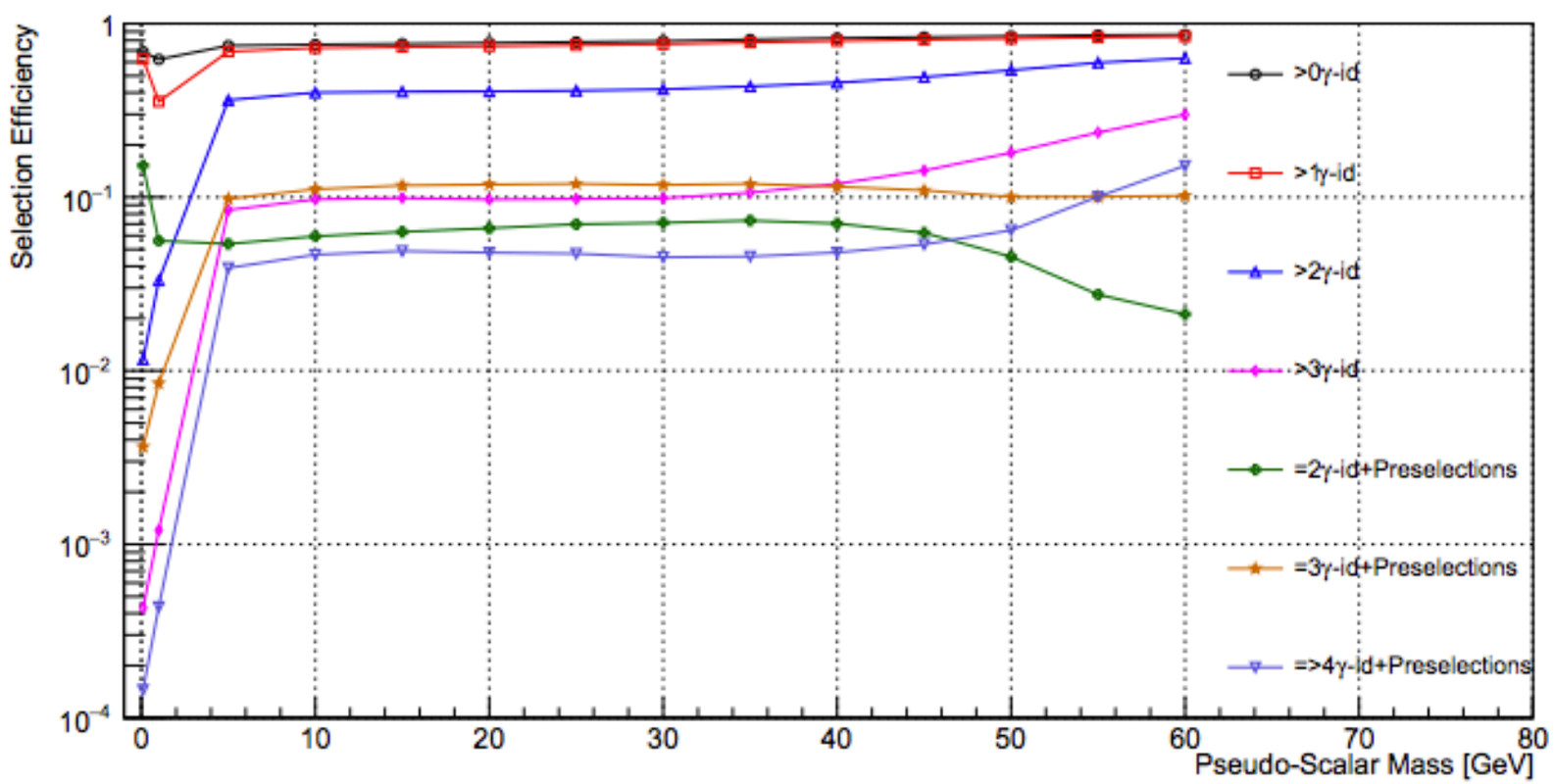
The Low-Mass HLT DiPhoton Trigger



*HLT_Diphoton30PV_18PV_R9Id_DoublePixelVeto_Mass55_v7
*HLT_Diphoton30PV_18PV_R9Id_AND_IsoCaloId_AND_HE_R9Id_DoublePixelVeto_Mass55_v7

45



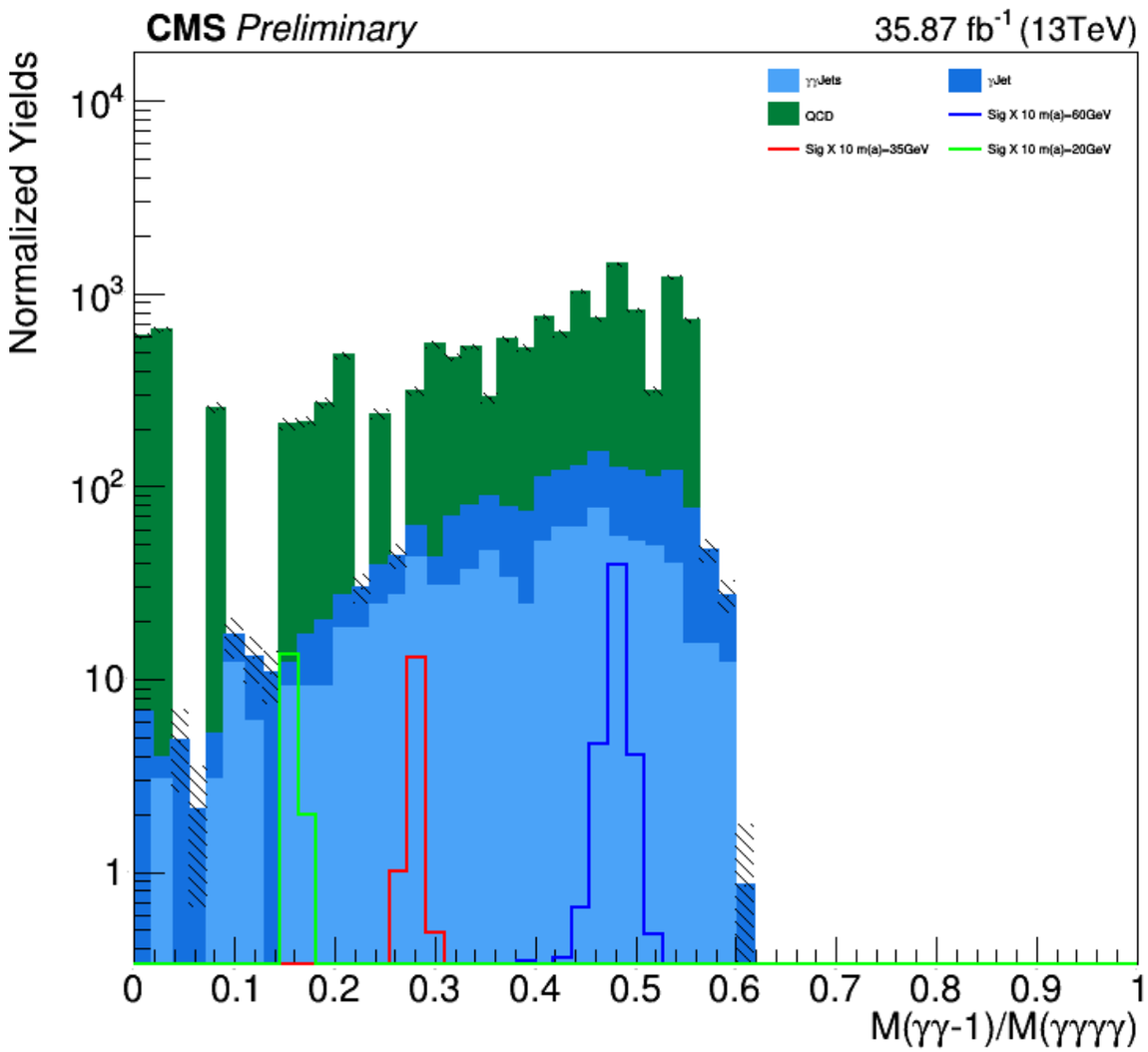


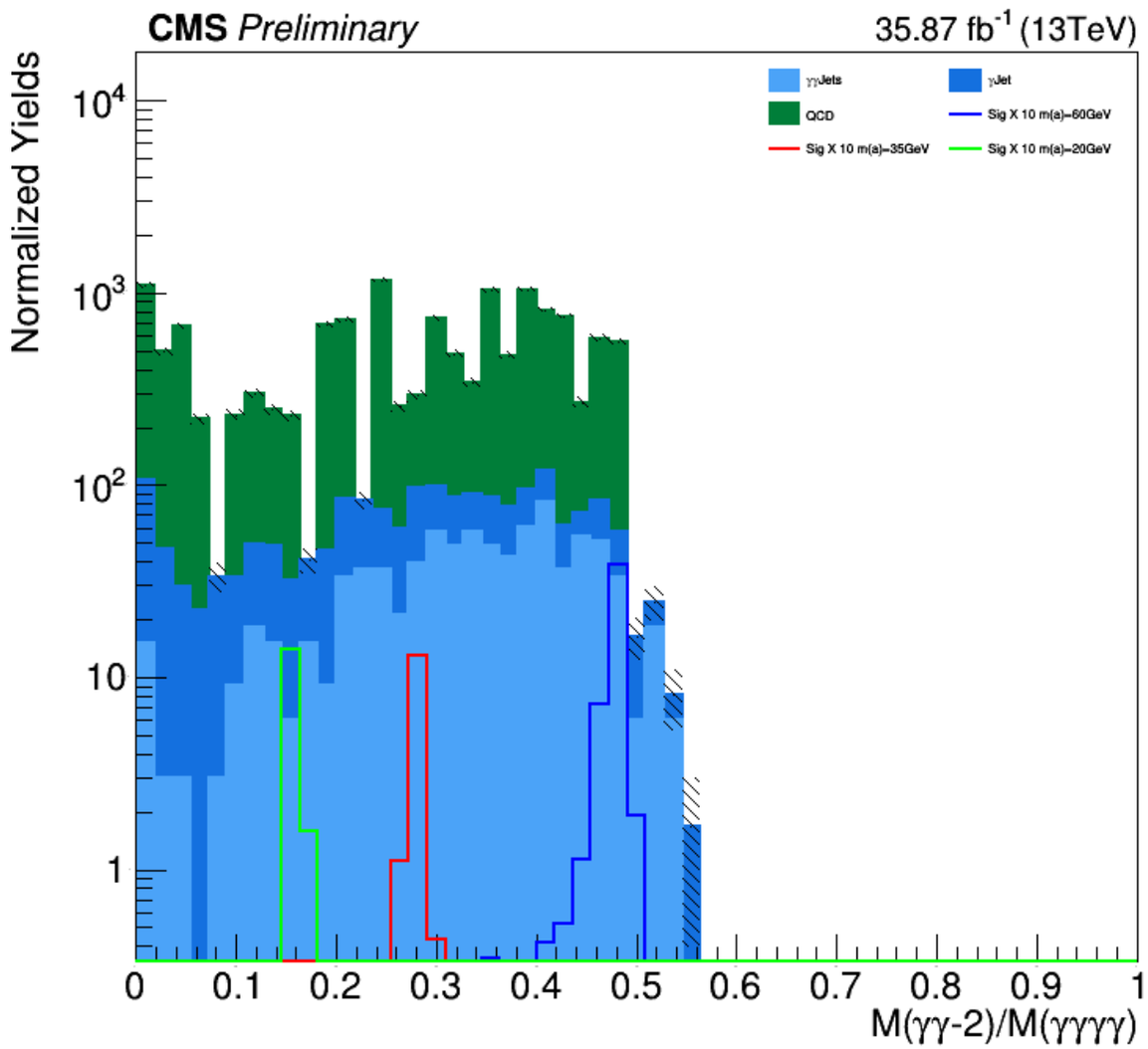
- **Check** - with the new pre-selections, the trend actually matches with the one seen in pass Trigger efficiency

- **Top plot** - effect of trigger on different categories
- **Bottom plot** - effect of acceptance, MVA, pre-selections

Spreadsheet

Ingredients for 4 Gamma



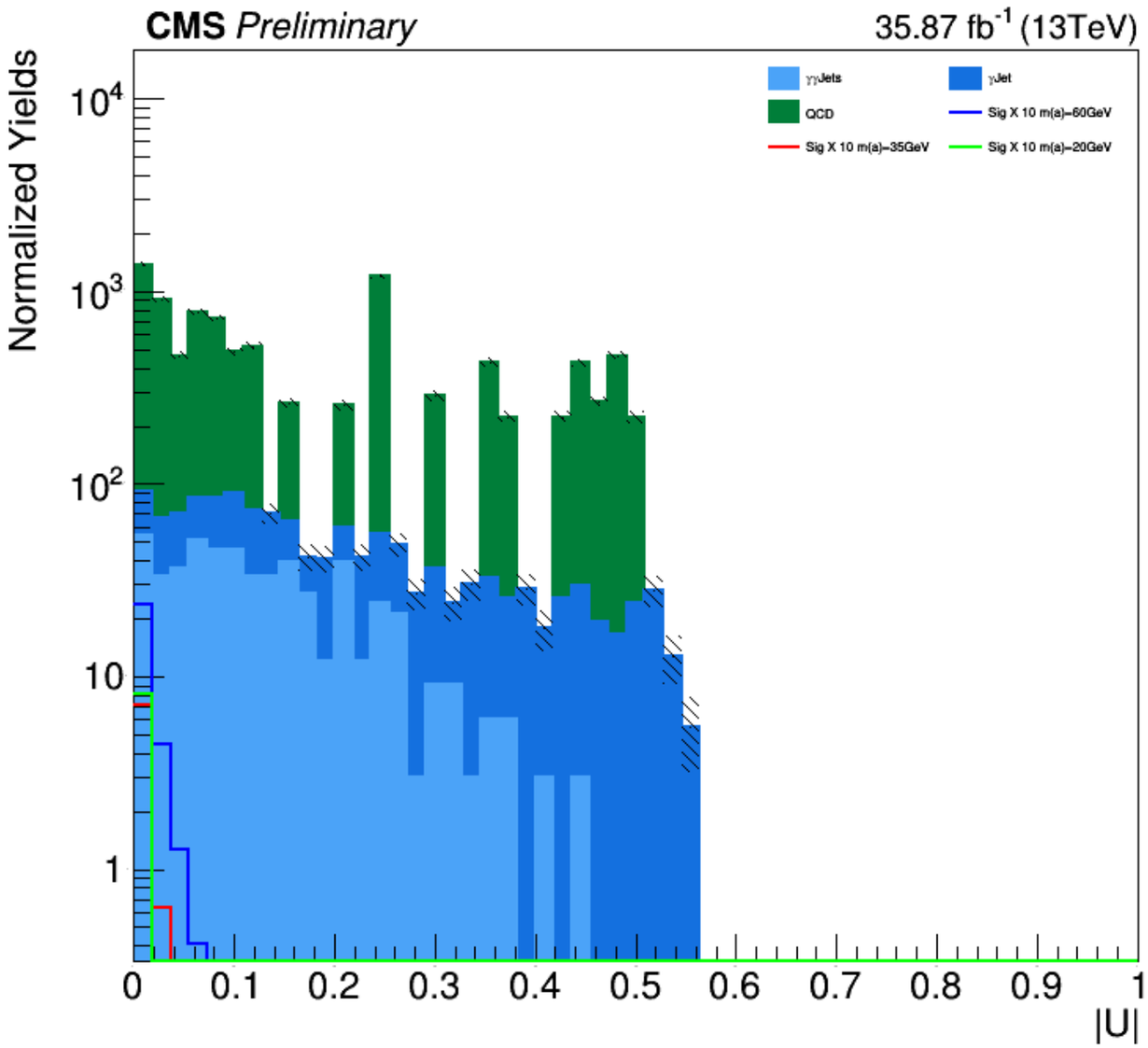


Ratio of Diphoton mass over tetra photon mass

- 0.05 < dp1_mass/tp_mass < 0.55

- 0.05 < dp2_mass/tp_mass < 0.55

Ingredients for 4 Gamma

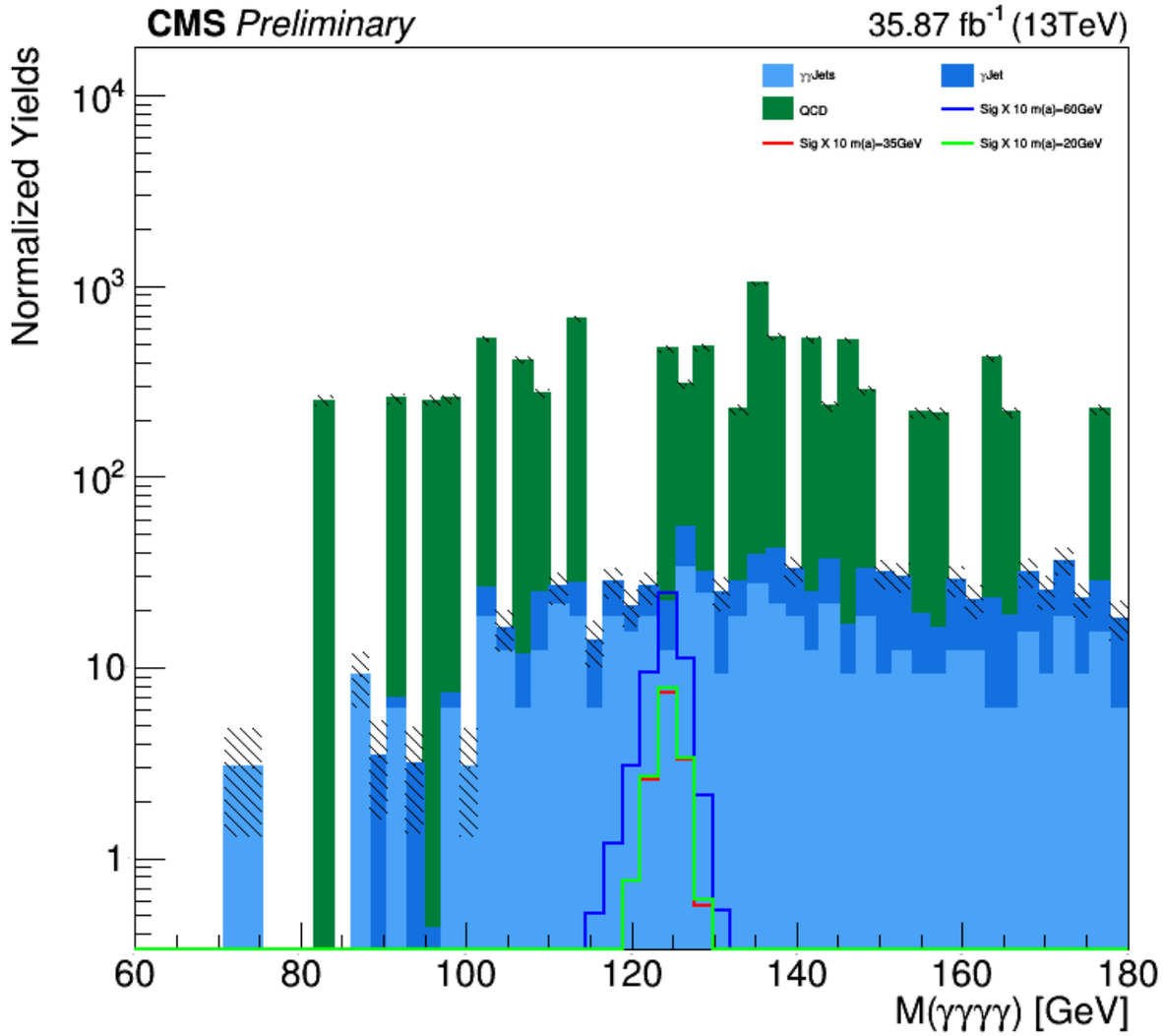


- Mass difference between signal diphotons ~0
- Mass difference between background diphotons > 0

$$|U_M| = \left| \frac{M(\gamma\gamma_1) - M(\gamma\gamma_2)}{M(\gamma\gamma_1) + M(\gamma\gamma_2)} \right|$$

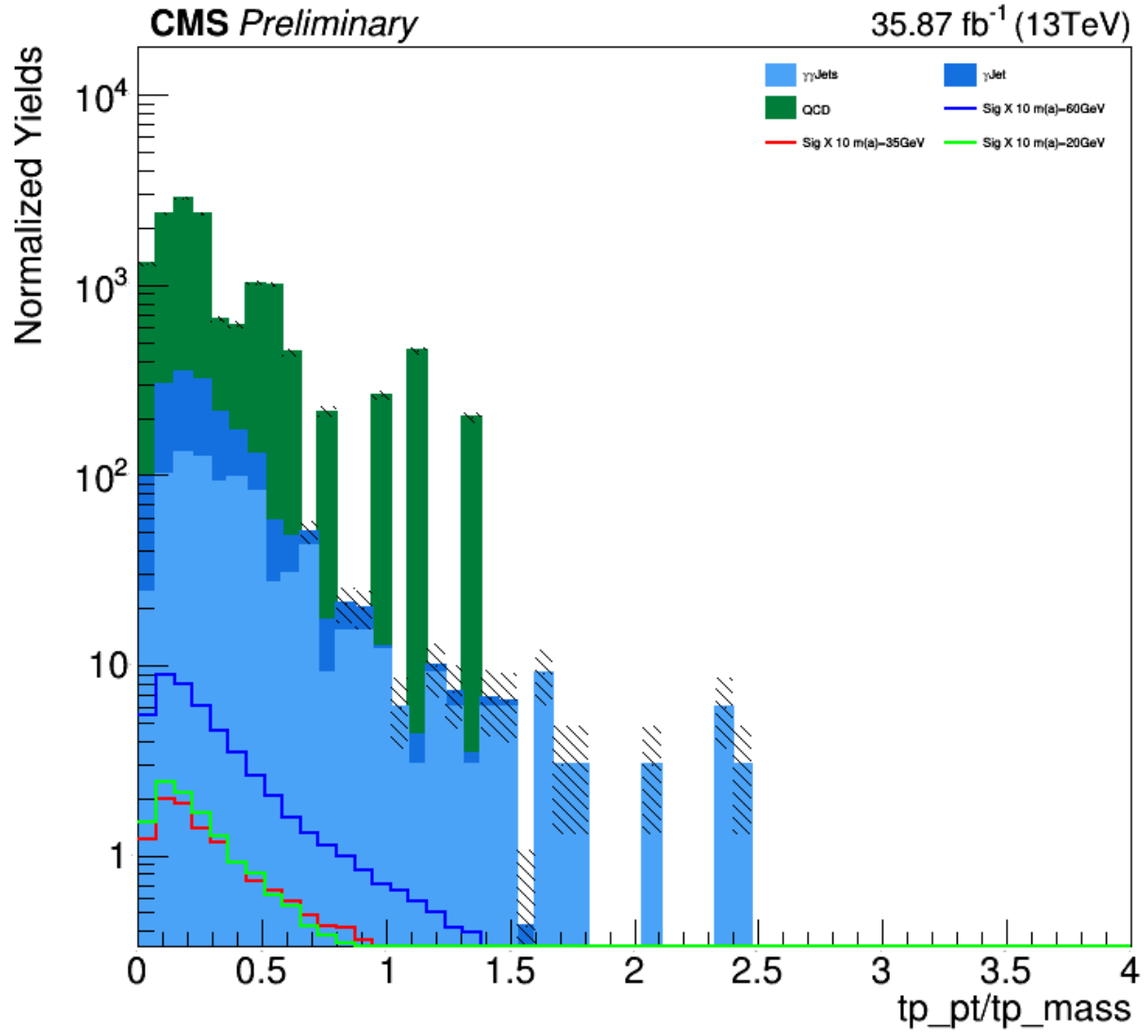
$|U| < 0.25$

Ingredients for 4 Gamma



Tetraphoton Mass

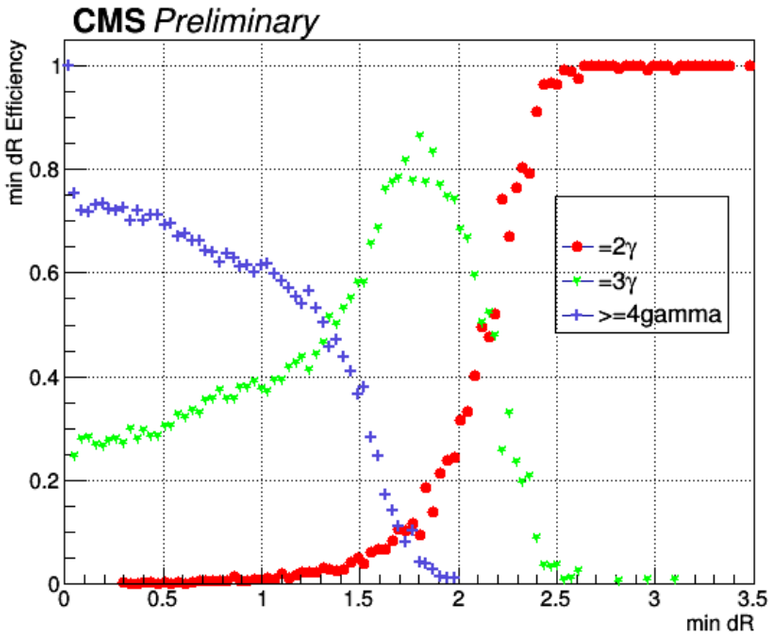
100 < tp_mass < 160

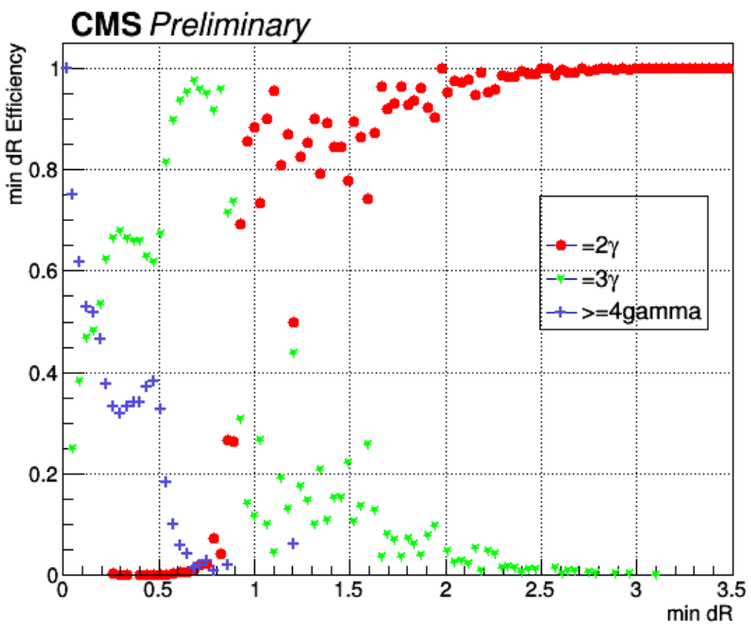


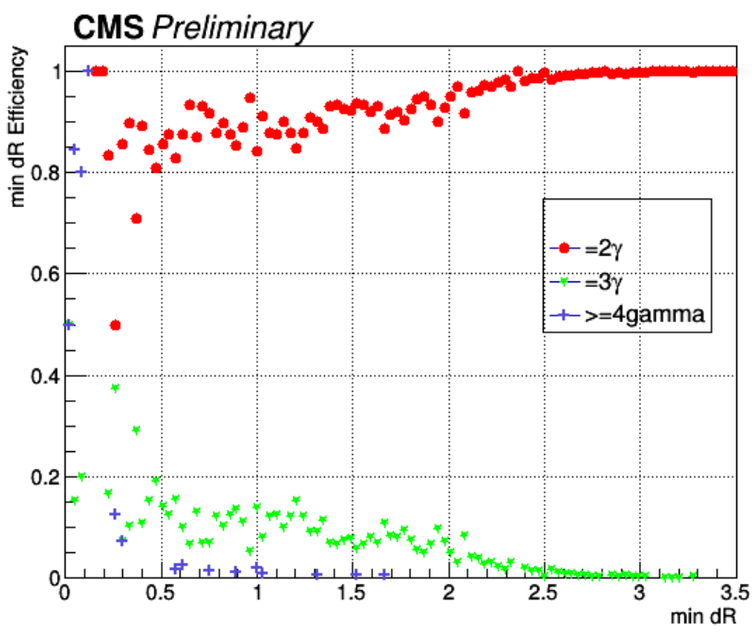
Tetraphoton Pt / Tetraphoton Mass

tp_pt / tp_mass < 1.5
(To get rid of the turn on curve)

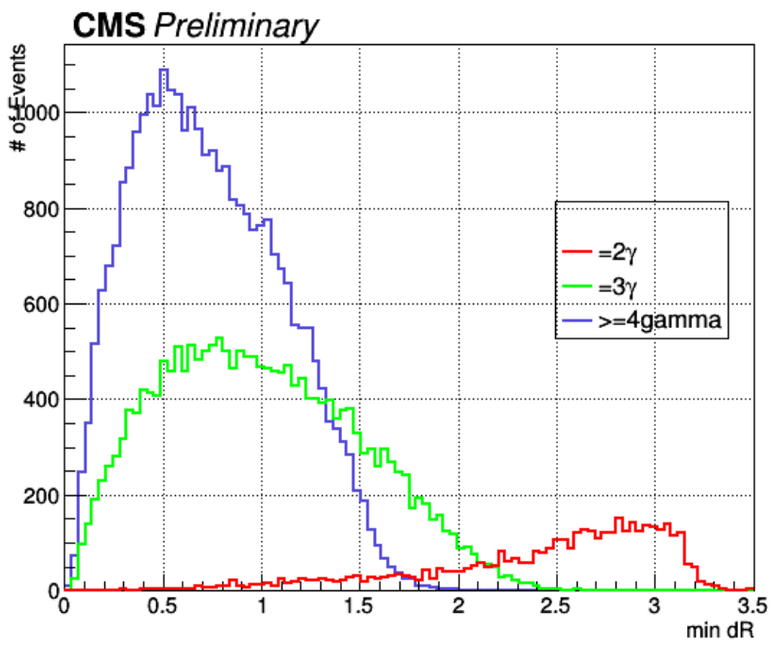
Ingredients for 4 Gamma



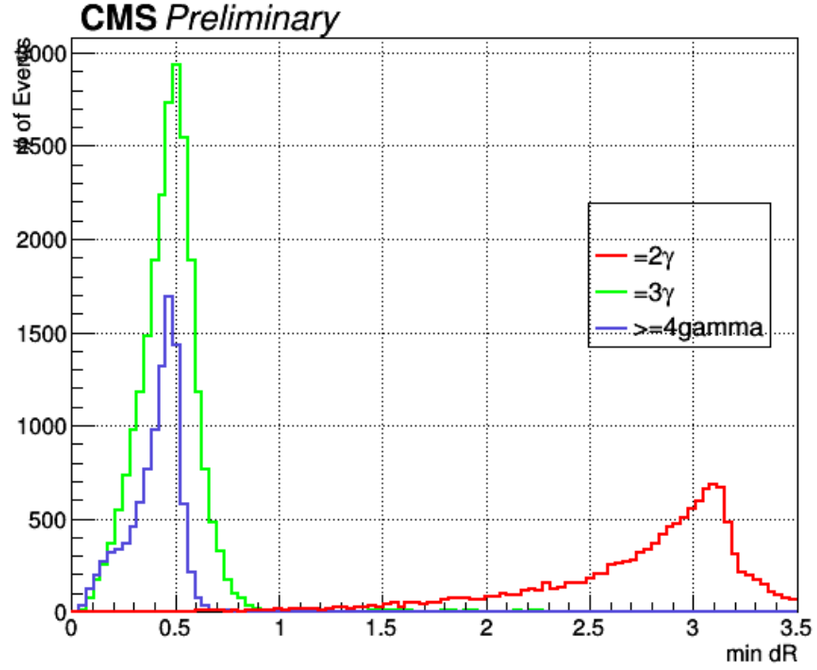




60 GeV



15 GeV



0.1 GeV