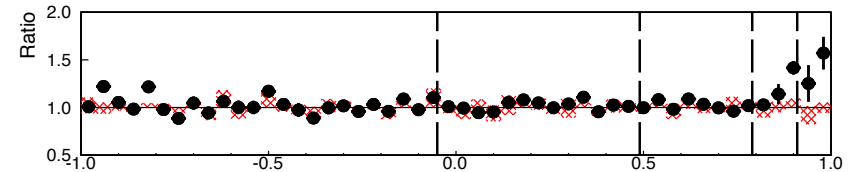
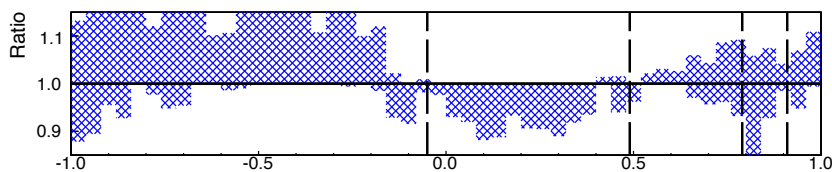
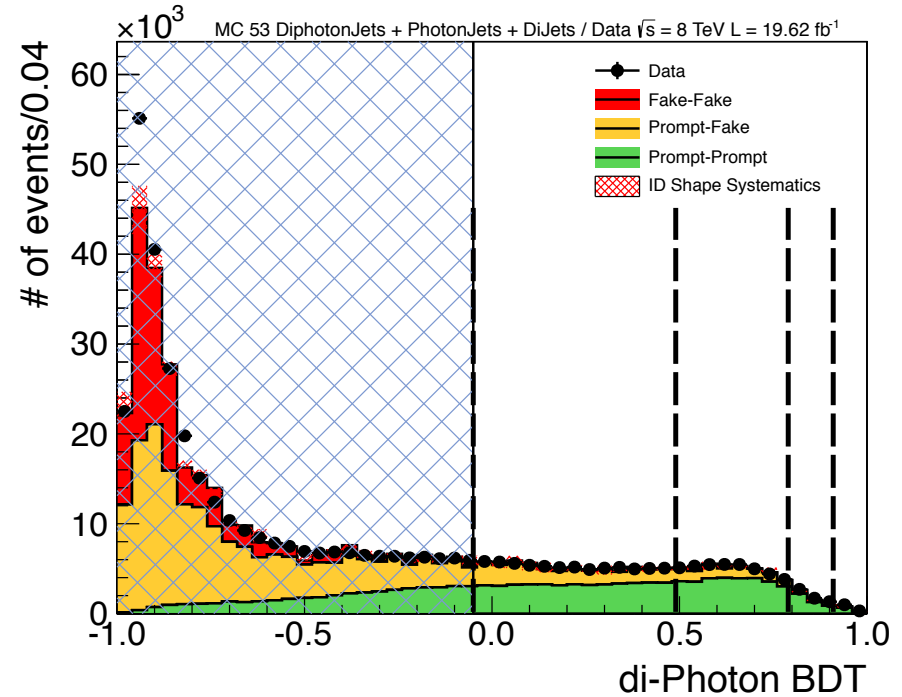
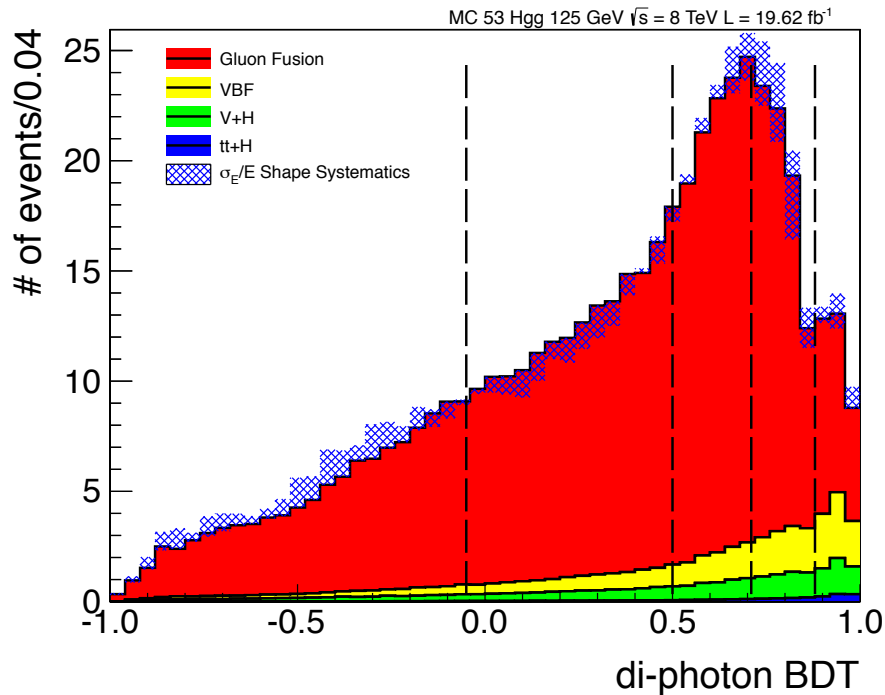


Collider Cross Talk
CMS Higgs to gamma gamma

Matthew Kenzie
Imperial College London

Diphoton BDT distribution



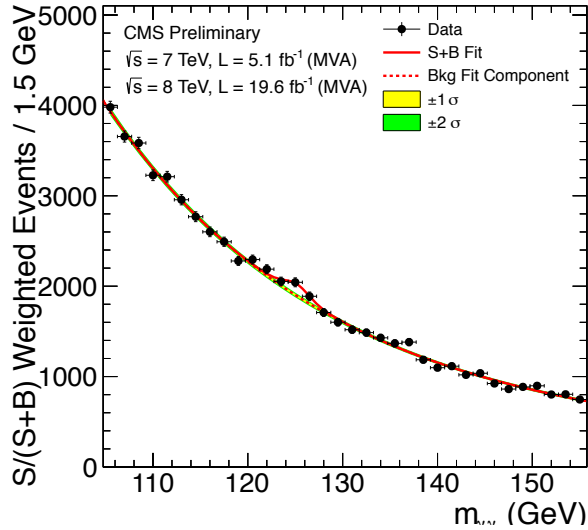
Expected signal breakdown

Expected signal and estimated background

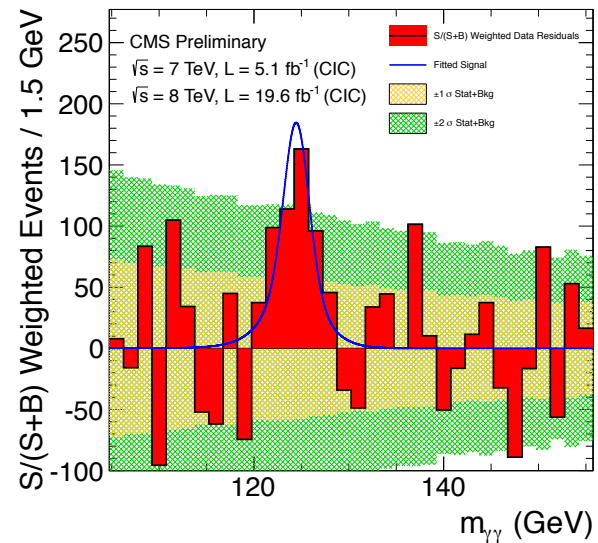
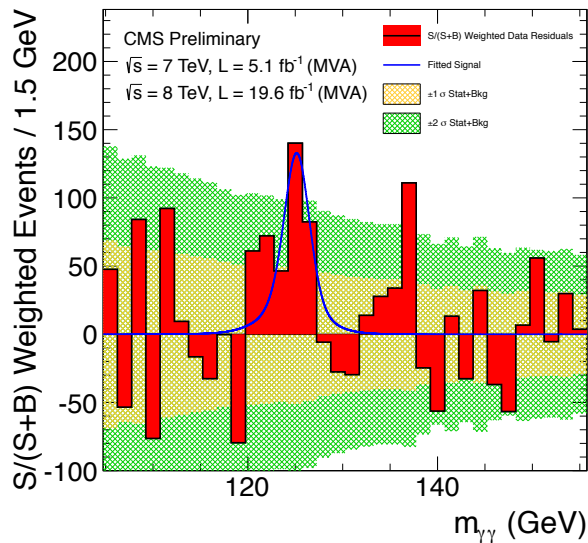
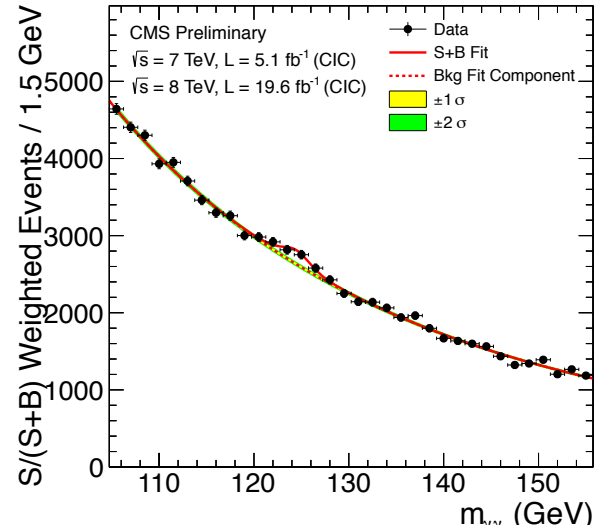
Event classes		SM Higgs boson expected signal ($m_H=125$ GeV)						Background	
		Total	ggH	VBF	VH	ttH	σ_{eff} (GeV)	FWHM/2.35 (GeV)	$m_{\gamma\gamma} = 125$ GeV (ev./GeV)
7 TeV 5.1 fb^{-1}	Untagged 0	3.2	61.4%	16.8%	18.7%	3.1%	1.21	1.14	3.3 \pm 0.4
	Untagged 1	16.3	87.6%	6.2%	5.6%	0.5%	1.26	1.08	37.5 \pm 1.3
	Untagged 2	21.5	91.3%	4.4%	3.9%	0.3%	1.59	1.32	74.8 \pm 1.9
	Untagged 3	32.8	91.3%	4.4%	4.1%	0.2%	2.47	2.07	193.6 \pm 3.0
	Dijet tag	2.9	26.8%	72.5%	0.6%	–	1.73	1.37	1.7 \pm 0.2
8 TeV 19.6 fb^{-1}	Untagged 0	17.0	72.9%	11.6%	12.9%	2.6%	1.36	1.27	22.1 \pm 0.5
	Untagged 1	37.8	83.5%	8.4%	7.1%	1.0%	1.50	1.39	94.3 \pm 1.0
	Untagged 2	150.2	91.6%	4.5%	3.6%	0.4%	1.77	1.54	570.5 \pm 2.6
	Untagged 3	159.9	92.5%	3.9%	3.3%	0.3%	2.61	2.14	1060.9 \pm 3.5
	Dijet tight	9.2	20.7%	78.9%	0.3%	0.1%	1.79	1.50	3.4 \pm 0.2
	Dijet loose	11.5	47.0%	50.9%	1.7%	0.5%	1.87	1.60	12.4 \pm 0.4
	Muon tag	1.4	0.0%	0.2%	79.0%	20.8%	1.85	1.52	0.7 \pm 0.1
	Electron tag	0.9	1.1%	0.4%	78.7%	19.8%	1.88	1.54	0.7 \pm 0.1
E_T^{miss} tag	1.7	22.0%	2.6%	63.7%	11.7%	1.79	1.64	1.8 \pm 0.1	

Results

MVA based



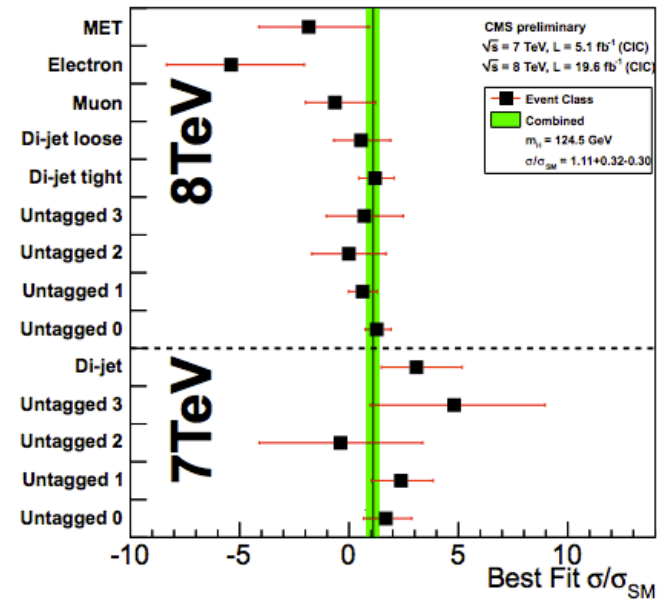
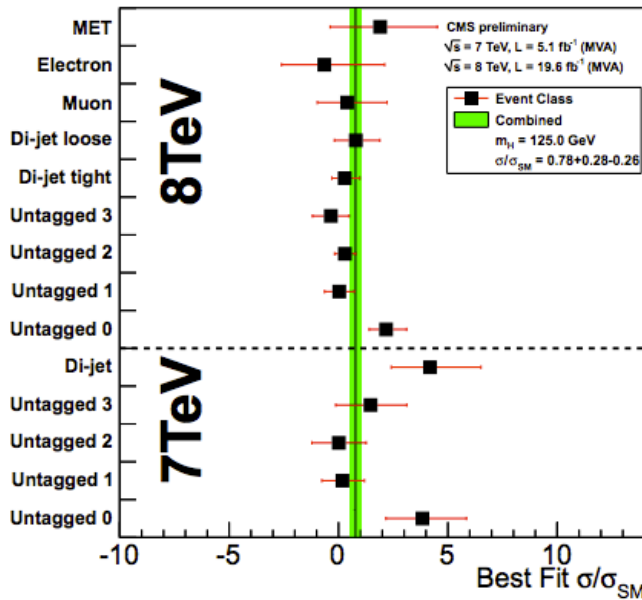
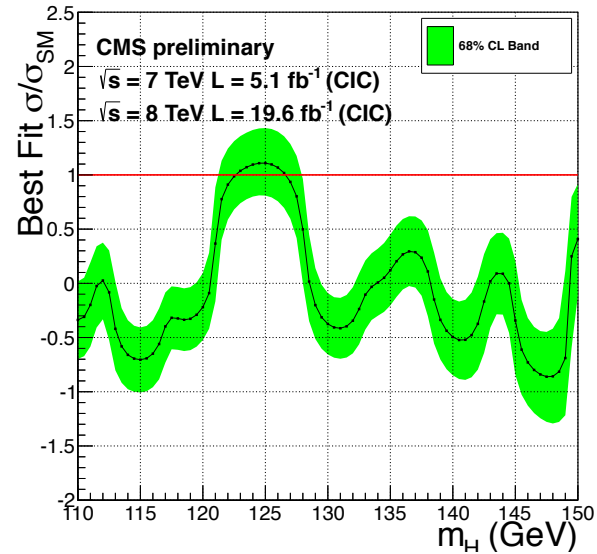
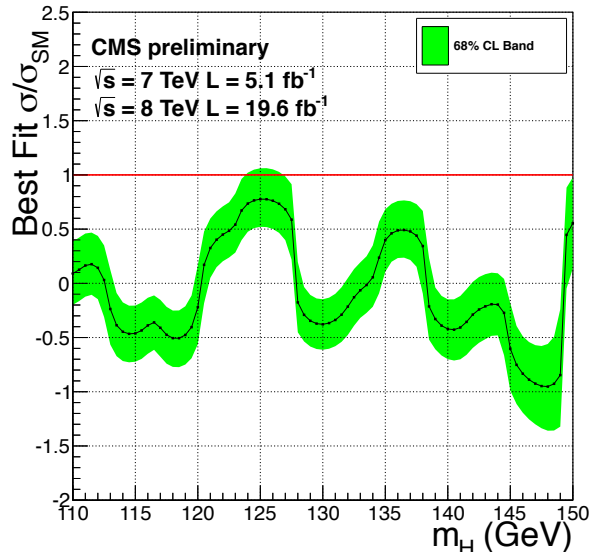
Cut based



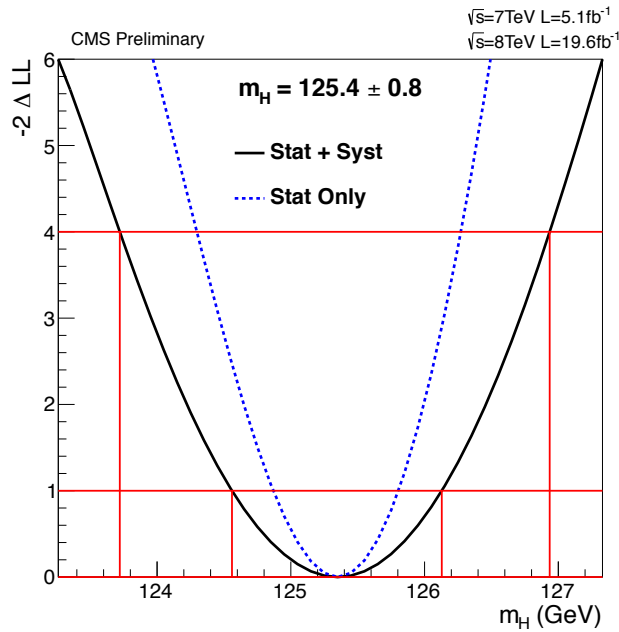
Results

MVA based

Cut based



Results



All MVA based

