

Weekly Meeting

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Object definition

	p^T	Eta	ID	Isolation
Photons	$p^T/m_{\gamma\gamma} \geq 0.35(\text{leading})$ $p^T/m_{\gamma\gamma} \geq 0.25(\text{subleading})$	$1.52 \leq \eta \leq 2.47$ or $ \eta \leq 1.37$	Tight	FixedCutLoose
Jets	$\geq 25\text{GeV}$	$ \eta \leq 4.5$	AntiKt4EMTopoJets	-
Muon	$\geq 4\text{GeV}$	$ \eta \leq 2.5$	Medium	GradienLoose
Electron	$\geq 7\text{GeV}$	$1.52 \leq \eta \leq 2.47$ or $ \eta \leq 1.37$	Tight	GradienLoose

- Missing ET:
 - TST
 - $\geq 10\text{GeV}$
- Overlap removal:
 - $\Delta R(e, \gamma) < 0.4, \Delta R(e, \text{jet}) < 0.4$
 - $\Delta R(\text{jet}, e) < 0.2, \Delta R(\text{jet}, \gamma) < 0.4$
 - $\Delta R(\mu, \gamma) < 0.4, \Delta R(\mu, \text{jet}) < 0.4$

Event Selection

Category	N of Photons	N of Jets	Bveto	N of Leptons(mu or electron)	$m_{\gamma\gamma}$ Mass Window(GeV)
$\gamma\gamma jjjj$	≥ 2	≥ 4	YES	≥ 0	105-160
$\gamma\gamma lujj$	≥ 2	≥ 2	YES	≥ 1	105-160
ϵ		SM Higgs Pair - $\gamma\gamma lujj$		SM Higgs Pair - $\gamma\gamma jjjj$	
Generated		100%(425185)		100%(440548)	
Jet Multiplicity		39.2%(166823)		28.3%(120182)	
Bveto		28.7%(122048)		18.0%(79234)	
Lepton		9.6%(40778)		-	
$105 < m_{\gamma\gamma} < 160$		9.6%(40670)		18.0%(79215)	

Sensitivity- $WW\gamma\gamma$

- Signal Region: $\text{abs}(m_{\gamma\gamma}-125.09)<3.4\text{GeV}$

1) $jjjj\gamma\gamma$

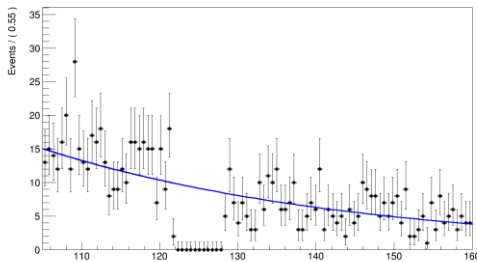
- BKG: Sideband
- $\epsilon_{\gamma\gamma}^B = 0.138242$
- $S=s/\text{sqrt}(b) = 0.016$

2) $jjlv\gamma\gamma$

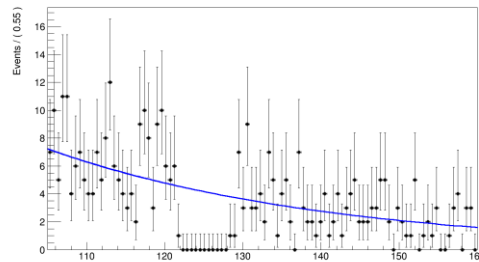
- $S = s/\text{sqrt}(b) = 0.027$

Uncertainties- $m_{\gamma\gamma}$ cut

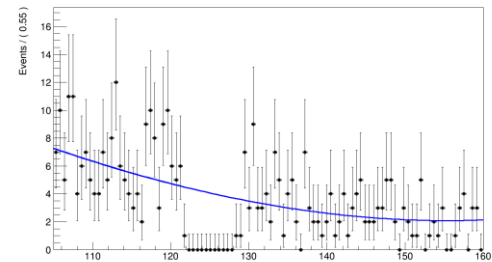
Model	3-jets exclusive sideband	4-jets inclusive sideband	Uncertainty
e^{ax}	13.78%	13.82%	0.29%
$a + bx + cx^2$	-	13.50%	2.3%



The efficiency $\epsilon_{\gamma\gamma}^B$ with e^{ax} for continuous background extracted with 3-jets exclusive events



The efficiency $\epsilon_{\gamma\gamma}^B$ with e^{ax} for continuous background extracted with 4-jets inclusive events



The efficiency $\epsilon_{\gamma\gamma}^B$ with $a + bx + cx^2$ for continuous background extracted with 4-jets exclusive events