

Weekly report

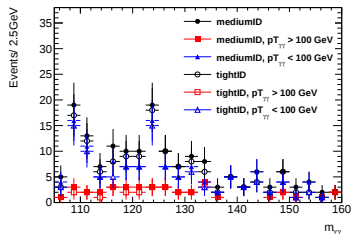
Yu Zhang

IHEP

March 20, 2017

- Tight lepton ID? All the plots in this talk use medium ID.
- $pT_{\gamma\gamma}$ cut?

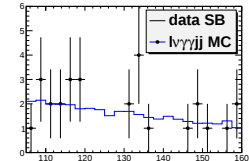
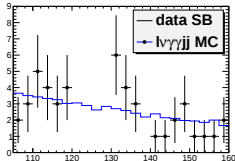
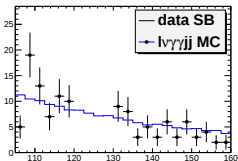
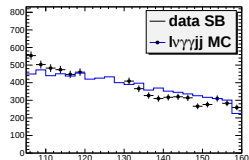
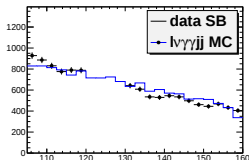
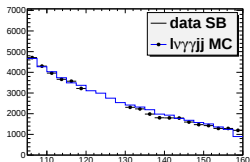
Tight lepton ID



selection	SR	CR	total
inclusive medium	33	132	165
highPTGG medium	7	32	39
lowPTGG medium	26	100	126
inclusive tight	32	110	142
highPTGG tight	7	23	30
lowPTGG tight	25	87	112

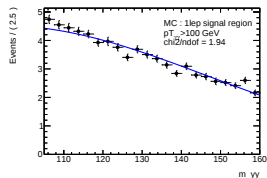
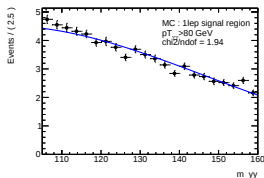
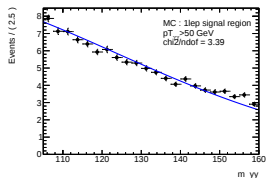
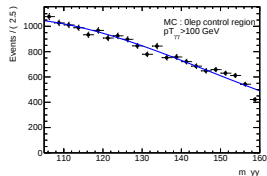
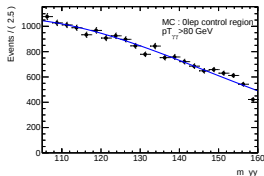
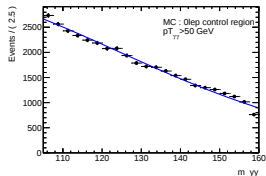
Data/MC comparison with different $pT_{\gamma\gamma}$ cut

- Normalize to data SB for each cut value.
- Top is CR and bottom is SR. $pT_{\gamma\gamma}$ is 0, 80, 100 GeV from left to right.

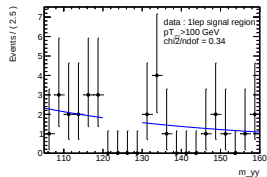
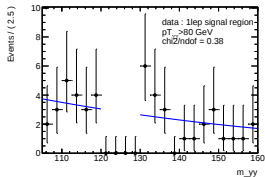
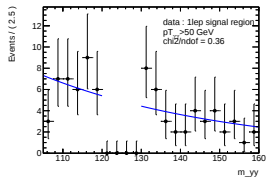
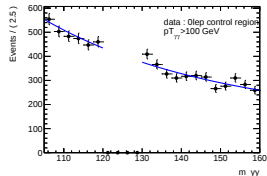
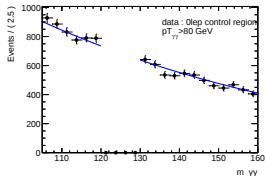
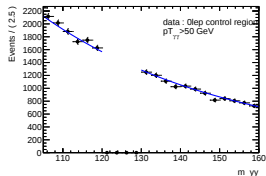


MC : check the fit with different $pT_{\gamma\gamma}$ cut

- Extract the shape from CR and calculate the chi2 in SR.
- Test 50, 80, 100 GeV cut.
- Top is CR and bottom is SR.

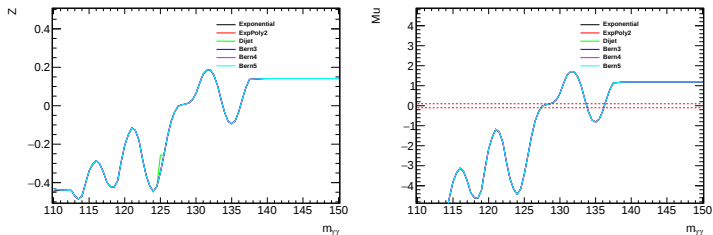


Data : check the fit with different $pT_{\gamma\gamma}$ cut



Spurious signal test

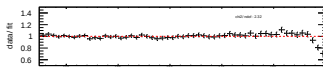
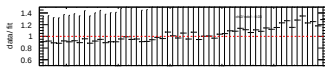
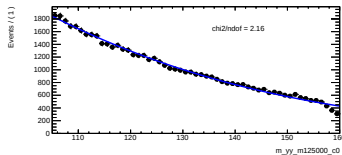
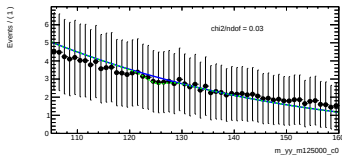
- Medium ID and no $pT_{\gamma\gamma}$ is used.
- The result of $m_H = 260\text{GeV}$ is shown here.



Function	Max(S)	Max(S/DeltaS)	Max(S/RefS)	Result
Exponential	-2.28849	-0.446397	-4.42596	fail
ExpPoly2	-2.28869	-0.446343	-4.42635	fail
Dijet	-2.2887	-0.446411	-4.42637	fail
Bern3	-2.2887	-0.446403	-4.42637	fail
Bern4	-2.2887	-0.446068	-4.42637	fail
Bern5	-2.2887	-0.446338	-4.42637	fail

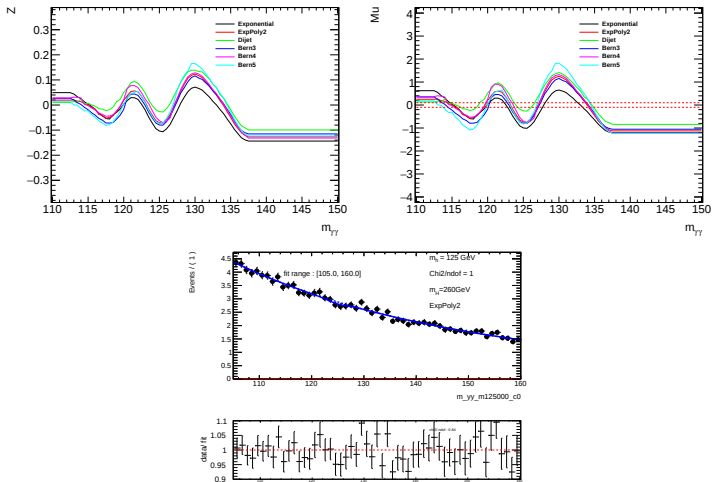
Fit result of S+B fit with simultaneous fit

- Fit with ExpPoly2.
- Negative spurious signal at 125 GeV.
- Stat error is large, so chi2 is very small.



Fit result of S+B fit with direct fit to SR

- All functions pass the criteria and the fit goodness is good.



Summary

- Tight ID will not affect the shape much (seen in last week).
- From data, it is hard to say whether the current background modeling can describe the shape due to low stat in SR. However, the MC is somehow not consistent with data SB. Even we want to use number counting with $pT_{\gamma\gamma}$ cut, we suffer from the statistic and can hardly obtain a correct efficiency of tight mass window.
- The results of spurious signal test show the simultaneous fit is not a good choice, but the reducible background is not considered, so it is not 100% reliable. It is still very hard to obtain a shape of reducible background.
- To do : estimate the uncertainty of each background modeling strategy (spurious signal from my side) and re-produce the limit (Qi can help this ?) need to answer : statistic dominant or systematic dominant?
- note status?