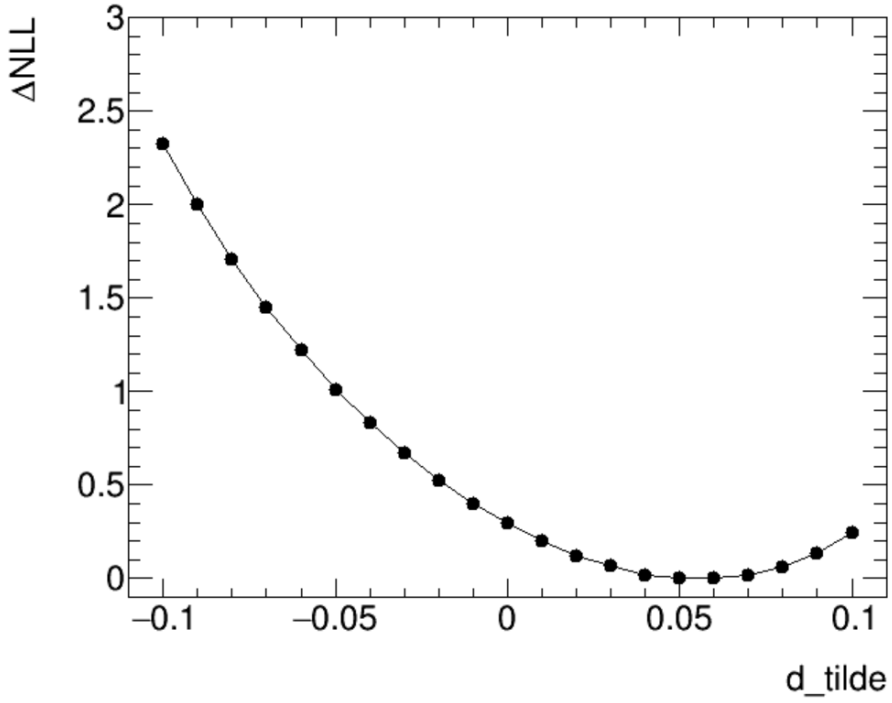
Weekly report

FANGYI GUO

VBF HCP

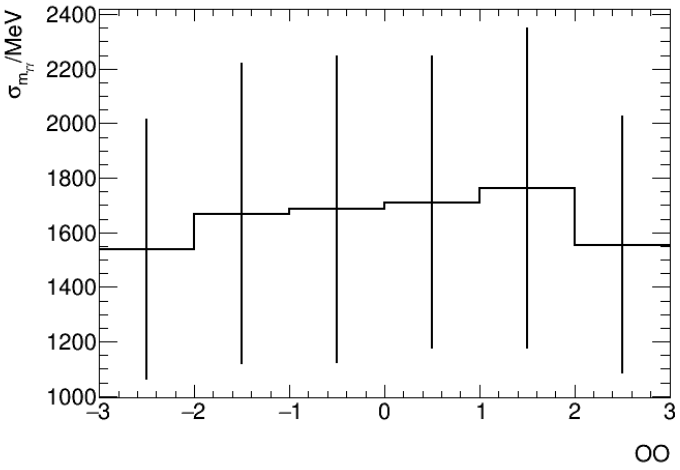
Problem: minimum value shift in 2D fit

Previous attempt: use 2D hist to describe the model.

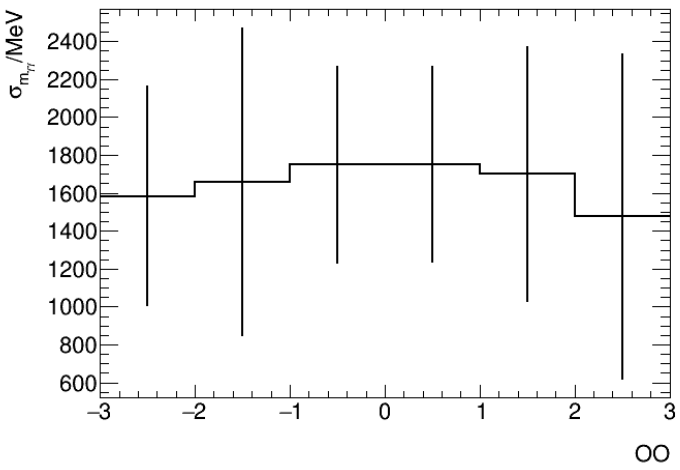


$m_{\gamma\gamma}$ width

$m_{\gamma\gamma}$ width in different OO bins



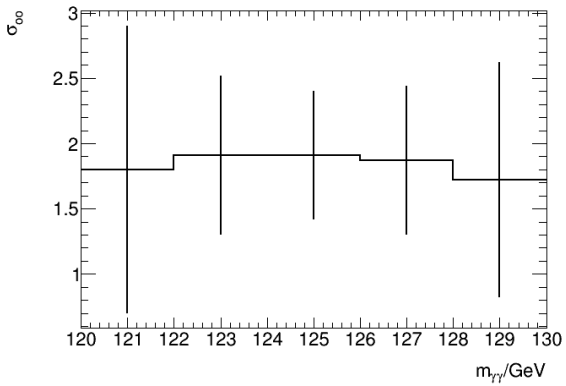
VBF sample



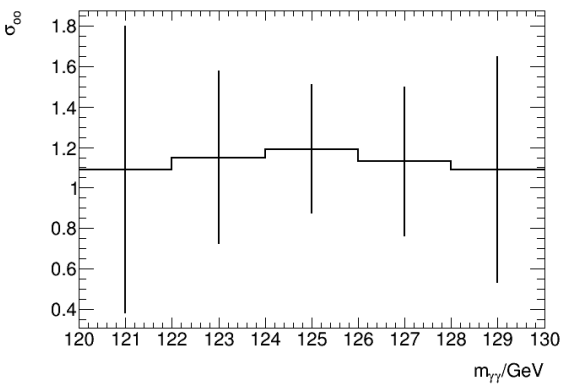
ggH sample

OO width

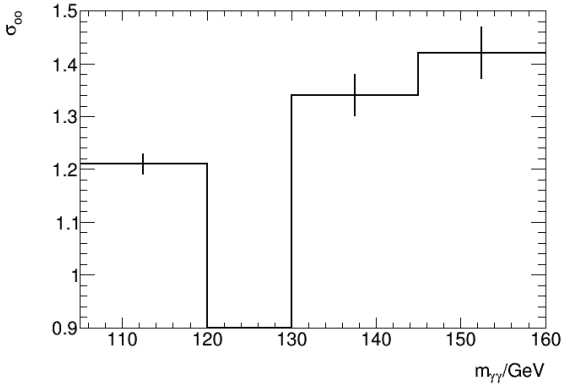
OO width in different $m_{\gamma\gamma}$ bins



VBF sample



ggH sample



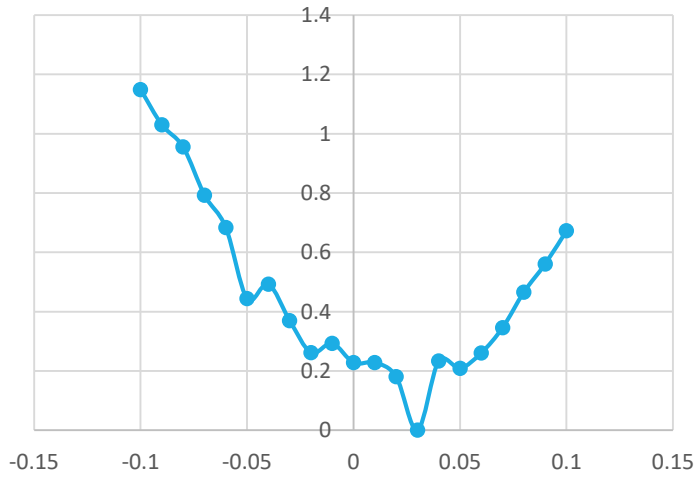
bkg sample

VBF HCP

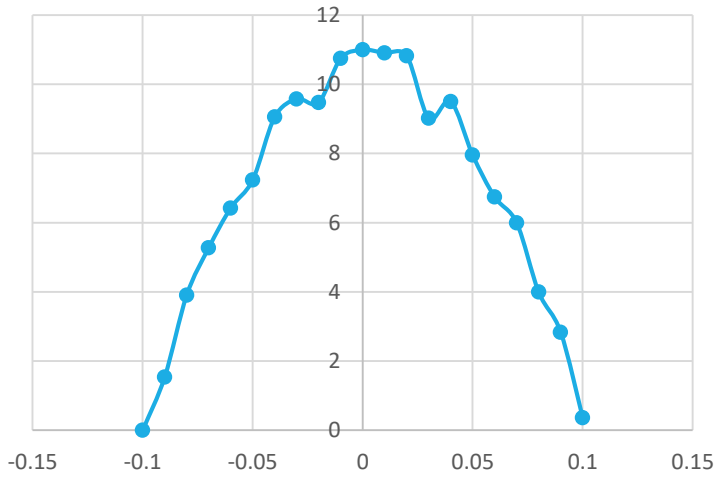
Check1: DoubleSideCB might not describe OO distribution well, so use a RooHistPdf to describe OO and DSCB to describe m_yy.

$$PDF_{total} = \sum N_i \times f_i(m_{\gamma\gamma}) \times h_i(OO).$$

DNLL calculated by hand-write code



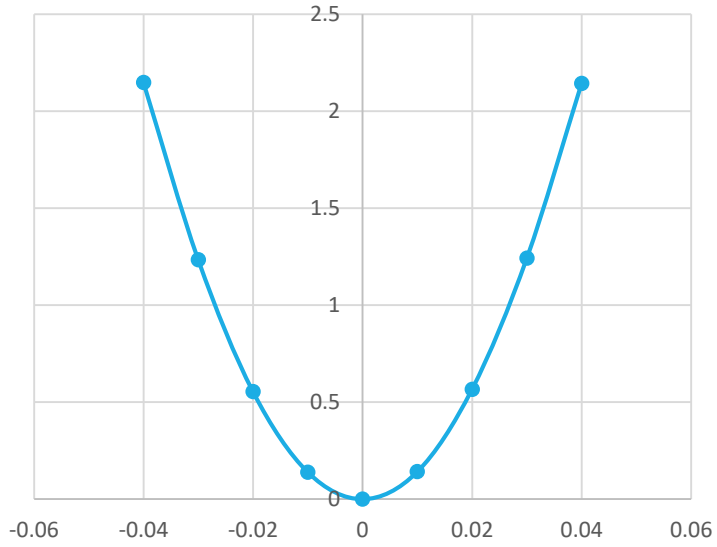
DNLL calculated by RooStat(createNLL)



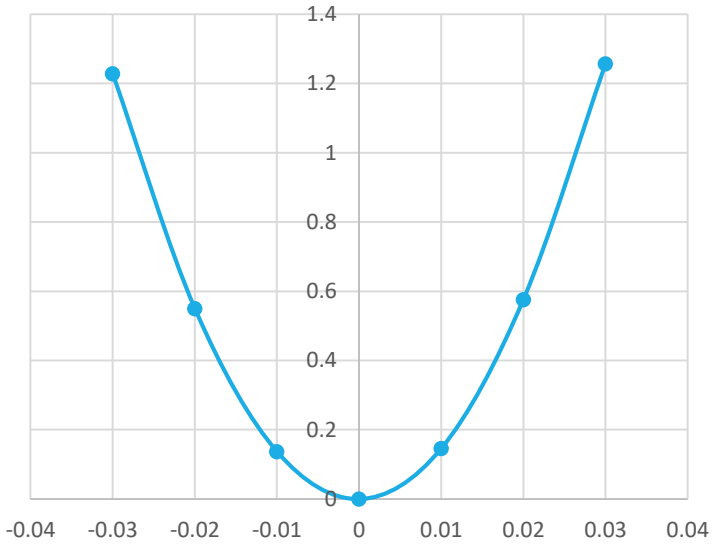
VBF HCP

Check2: Use old 2D model, fit VBF sample only.

$PDF_{total} = N_{VBF} \times f(m_{\gamma\gamma}) \times g(OO)$ Nvbf is not specified.



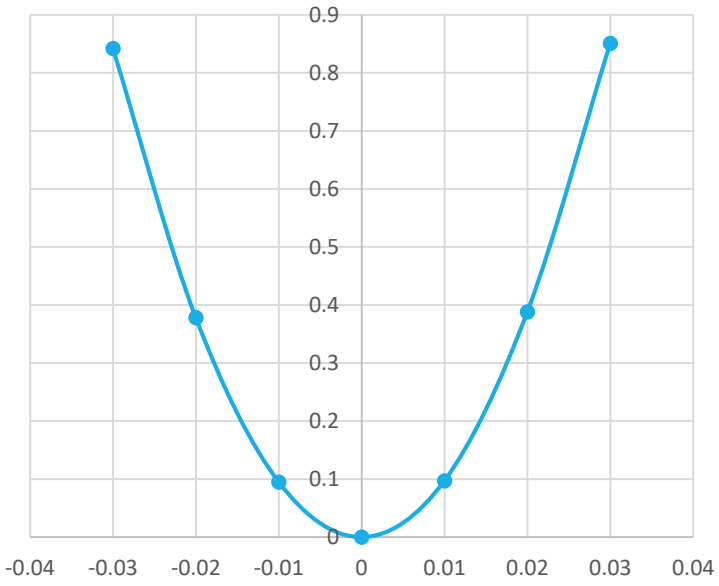
Test with MC



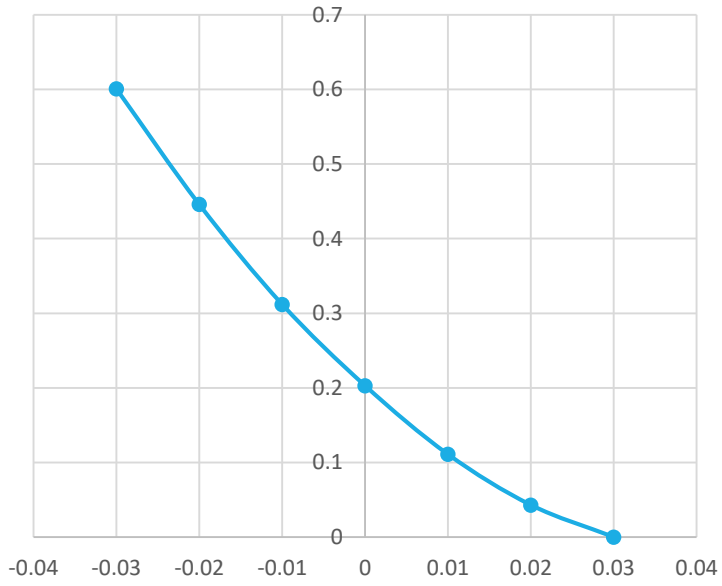
Test with Asimov data

VBF HCP

Check3: Use old 2D model, check VBF+ggH



Test with VBF+ggH MC sample.



Test with VBF+ggH+bkg asimov data

VBF HCP

Brief conclusion:

- Signal shape difference in each OO bins is within stat. error. Actually $m_{\gamma\gamma}$ shape is mainly determined by detector, theoretically they should have no co-relation.
- 2D functional model can describe the distribution, at least for signal sample. Maybe it's not necessary to use 2D HistPdf.

Next step:

- Check bkg model.
- Keep considering DSCB×HistPdf. DSCB ignored the di-peak information in OO distribution.