Vertex Resolution studies on Generated Level

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Procedure

- Considering $H \rightarrow \tau\tau$ process, find the tau pair which orginated from Higgs. Such that **generated vertex** will be Higgs production vertex.

- Each tau leg undergoes decay, generated decay products match with the reconstructed particle by using $\Delta R > 0.4$

- The indices of generated particle which are matched are used to find the correct **refitted vertex**.

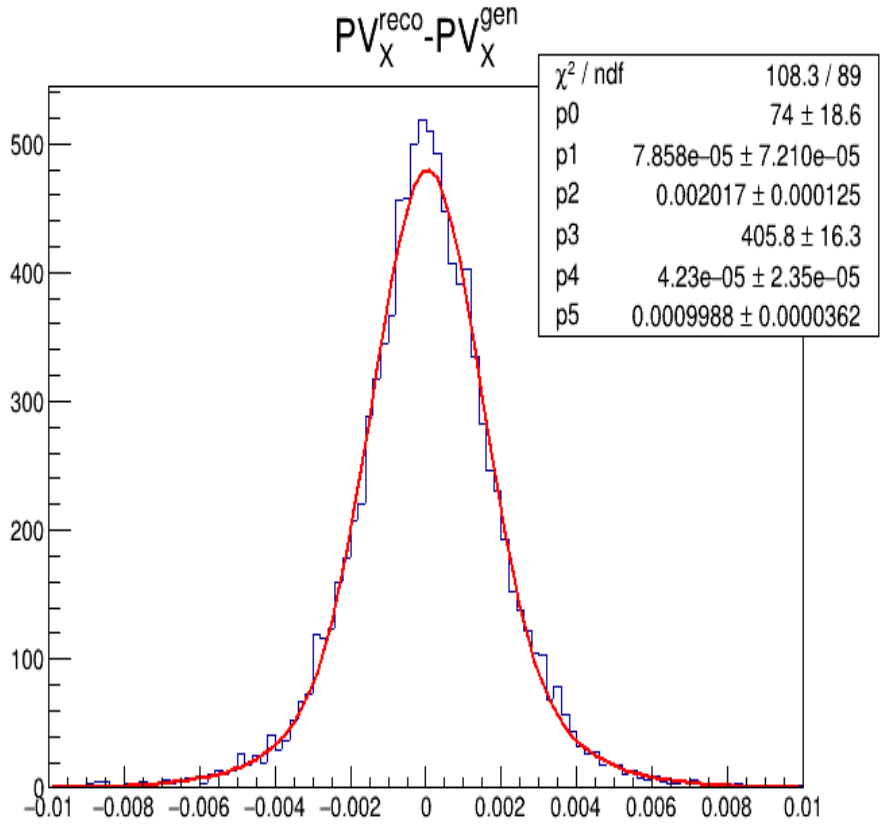
Vertex calculation using SyncNtuple

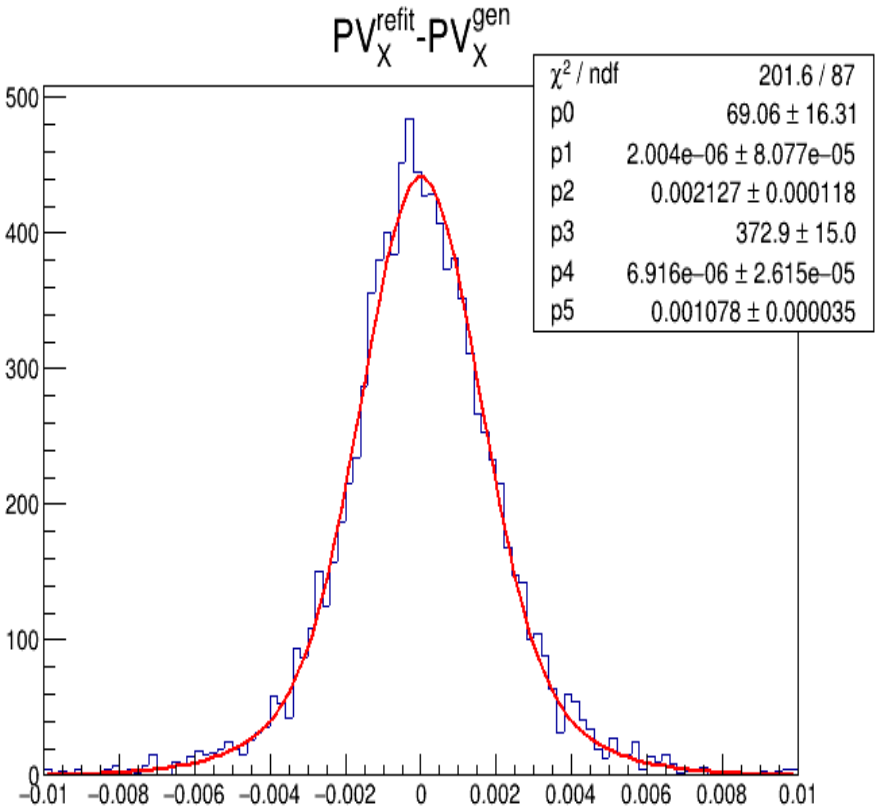
- In SyncNtuple the generated Higgs Vertex is already stored.

- We considering the process $H \rightarrow \mu(\tau)\tau$. the selection of muon and tau are already implied in SyncNtuple.

- We used the muon indices and tau indices for calculating correct refitted vertex.

Resolution Plots for VBF sample in Generated level





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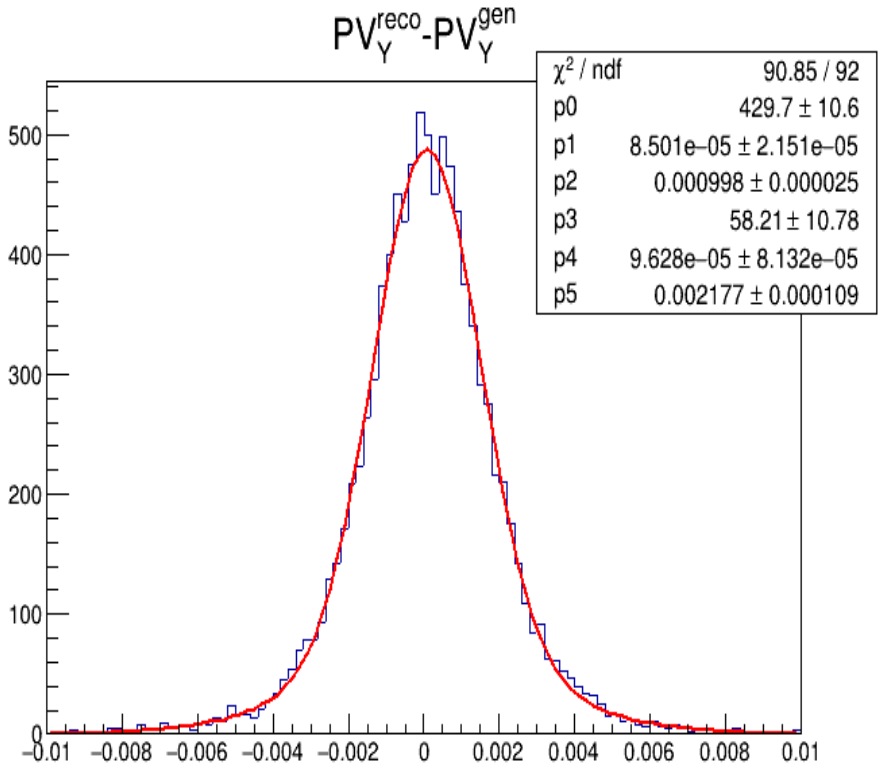

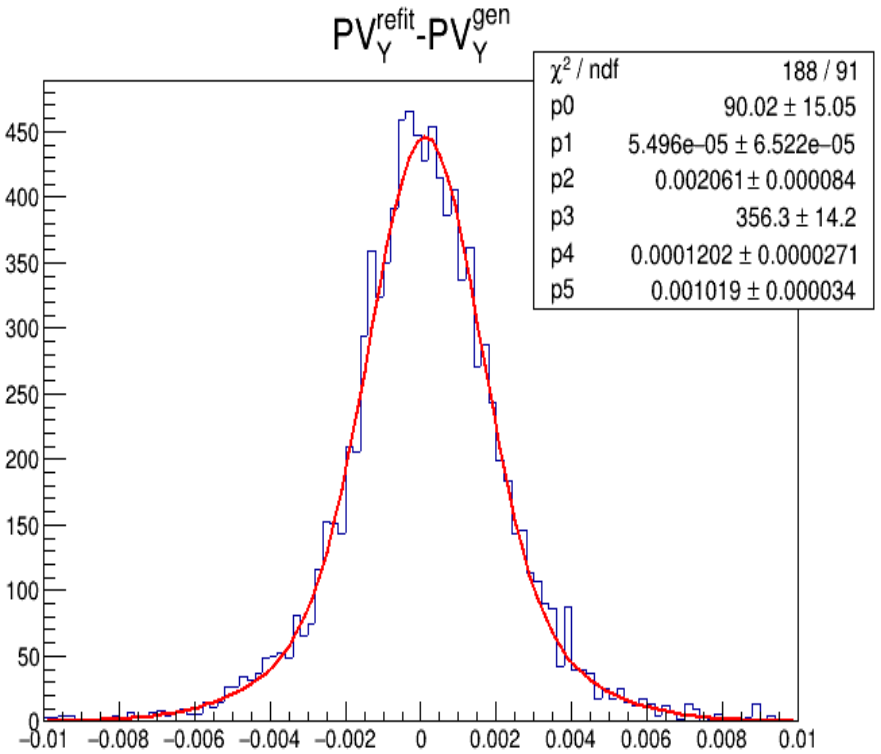

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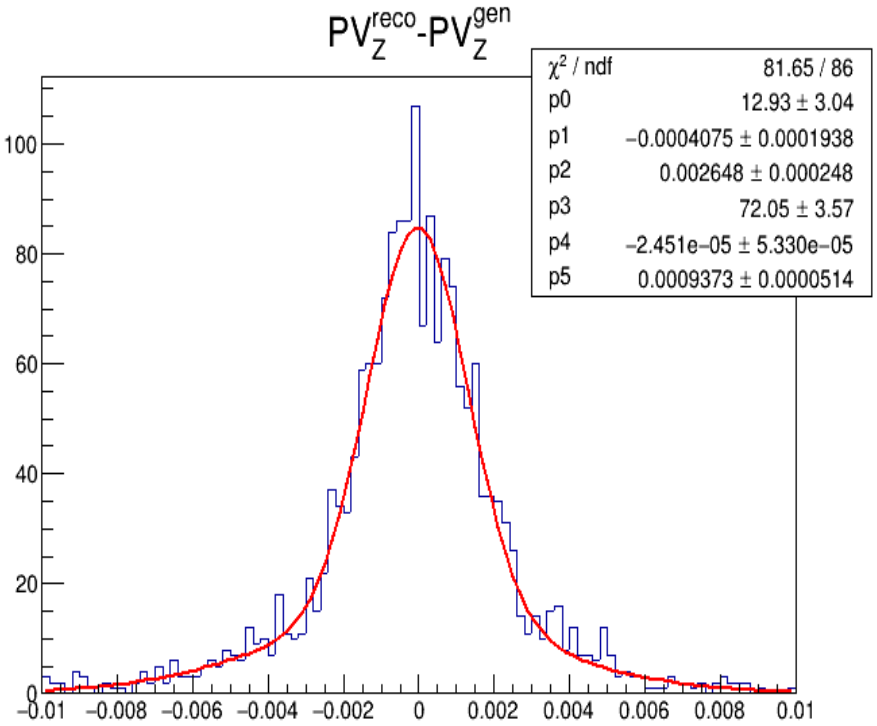
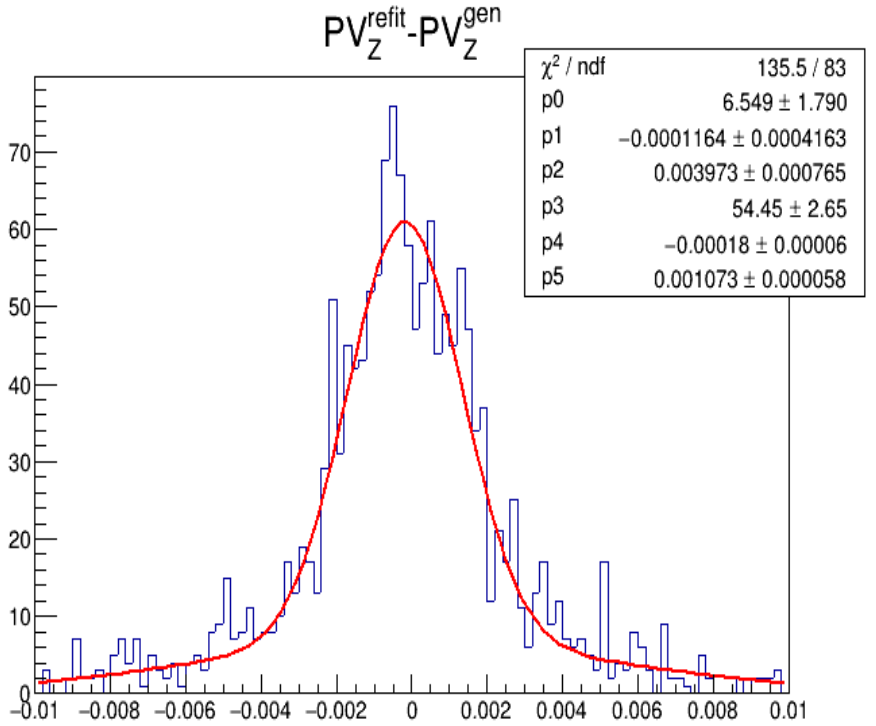
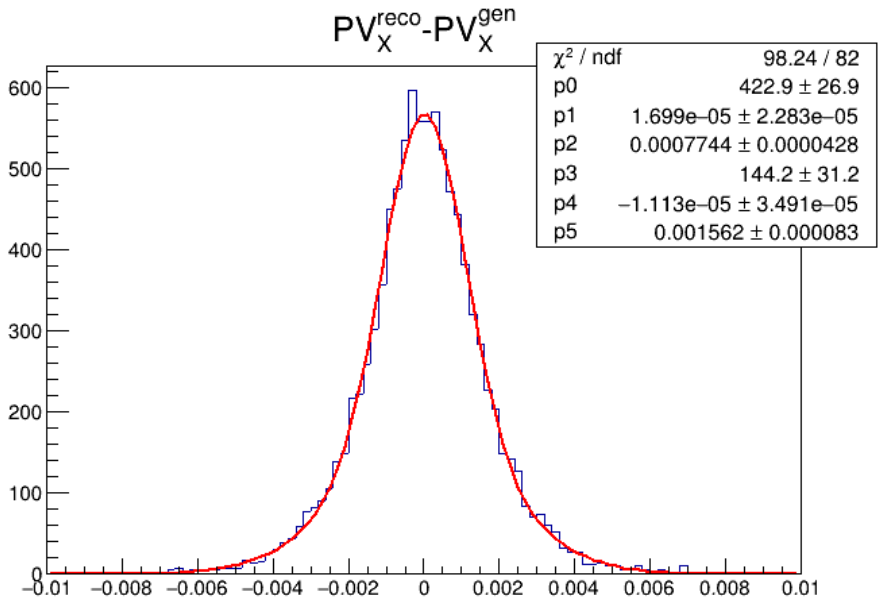
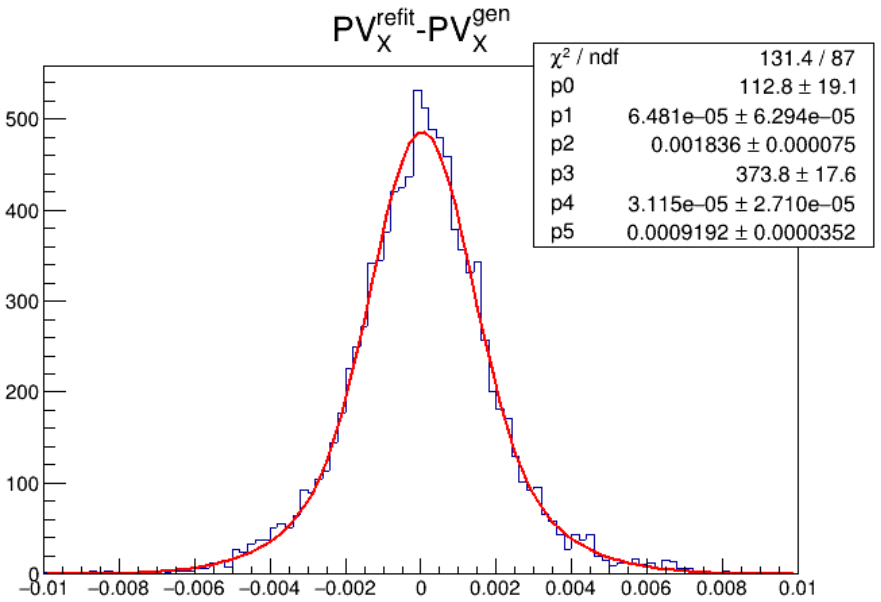




Resolution Plots for ggH sample in Generated level





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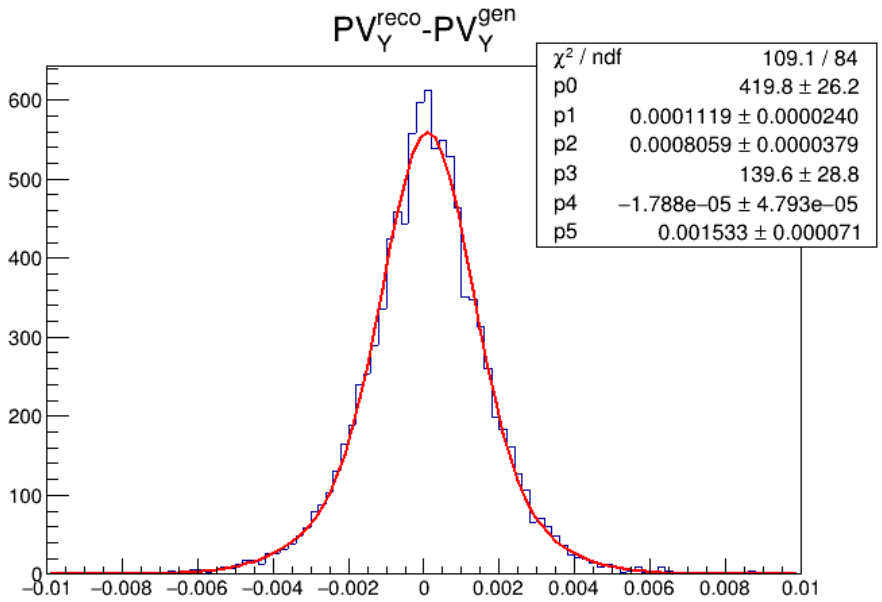

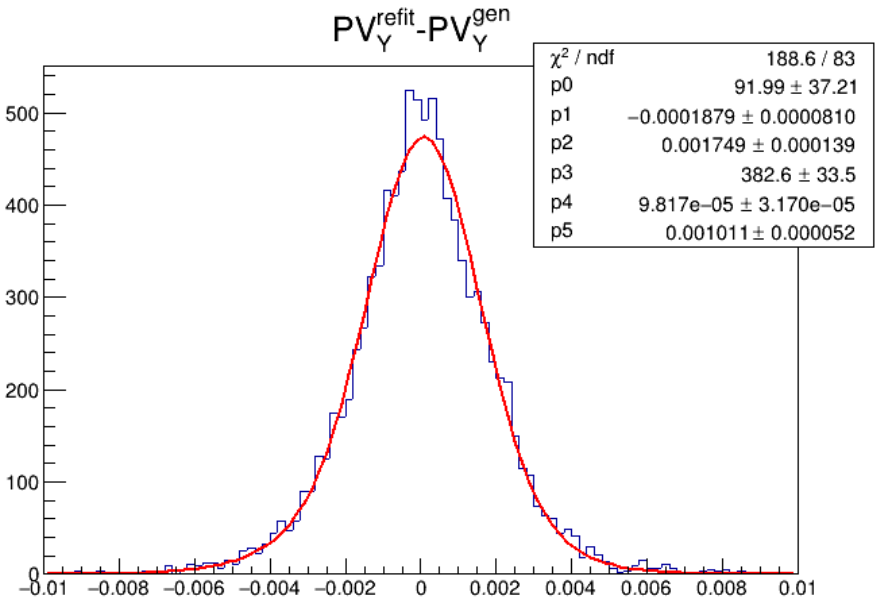

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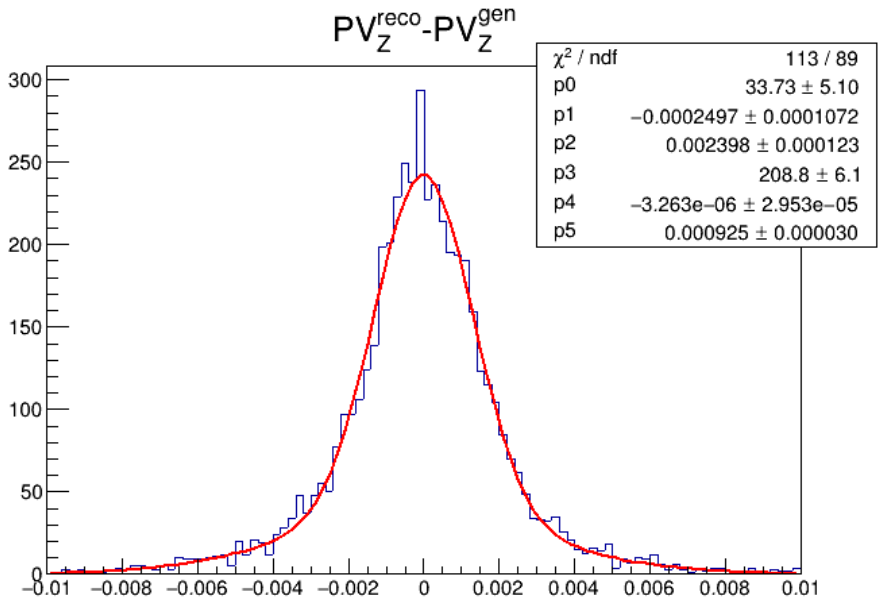
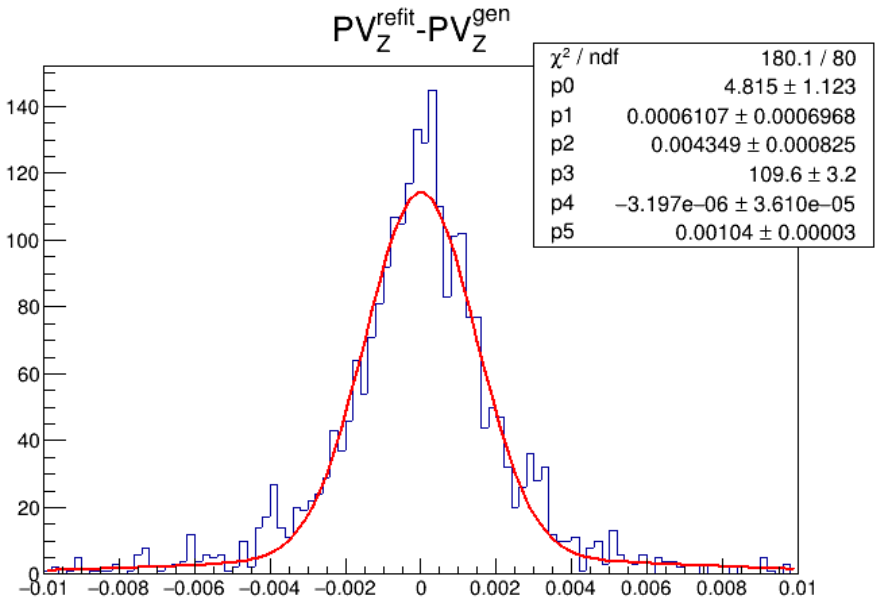
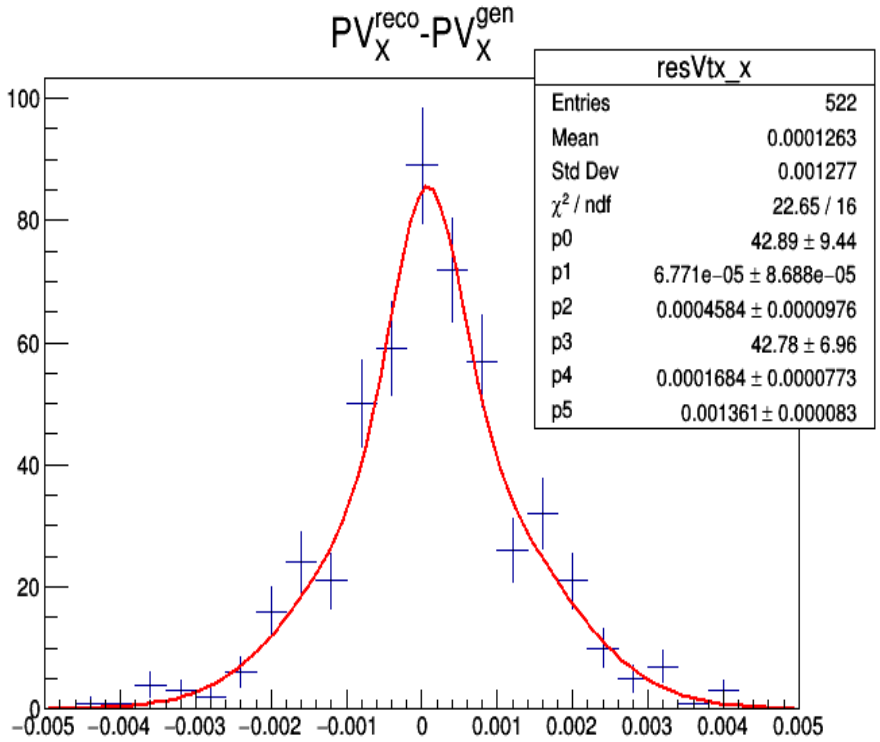
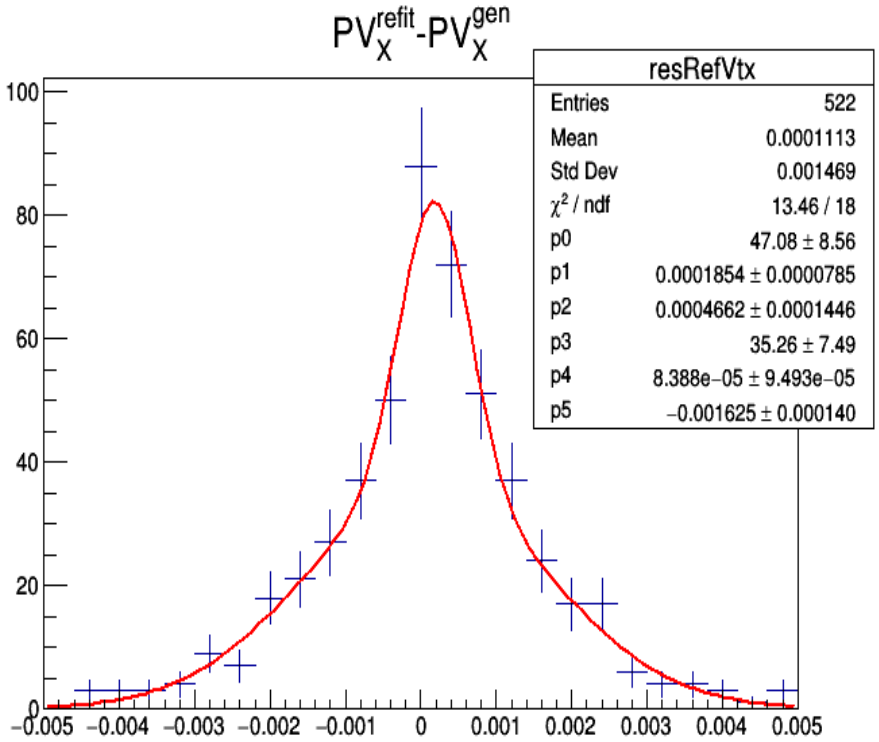




Studies Using SyncNtuple

Resolution Plots for VBF sample in Generated level using SyncNtuple





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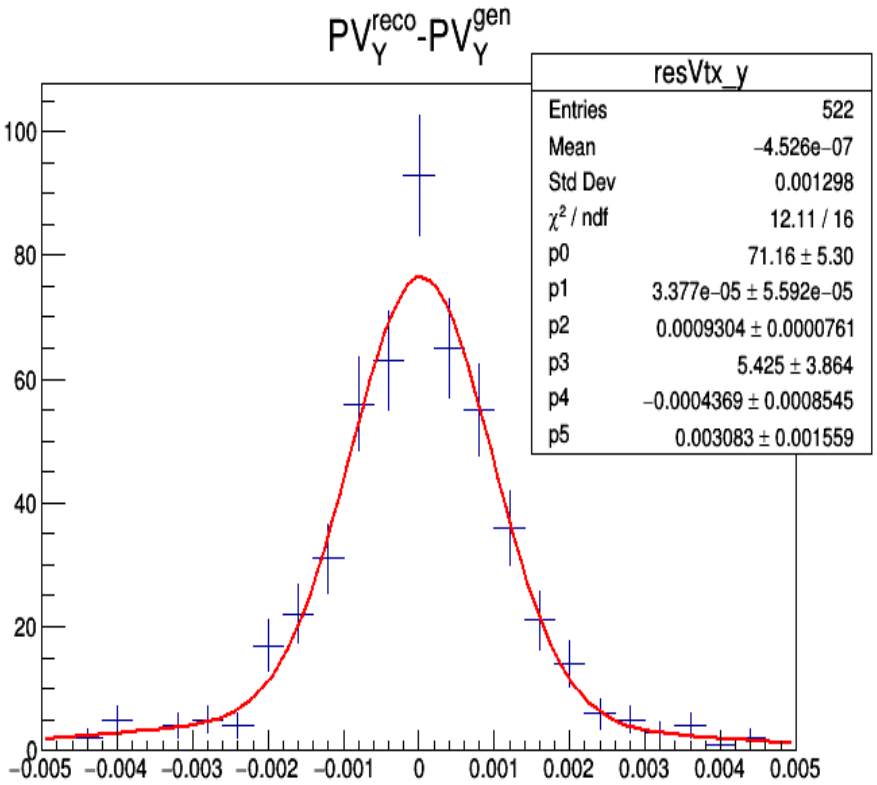

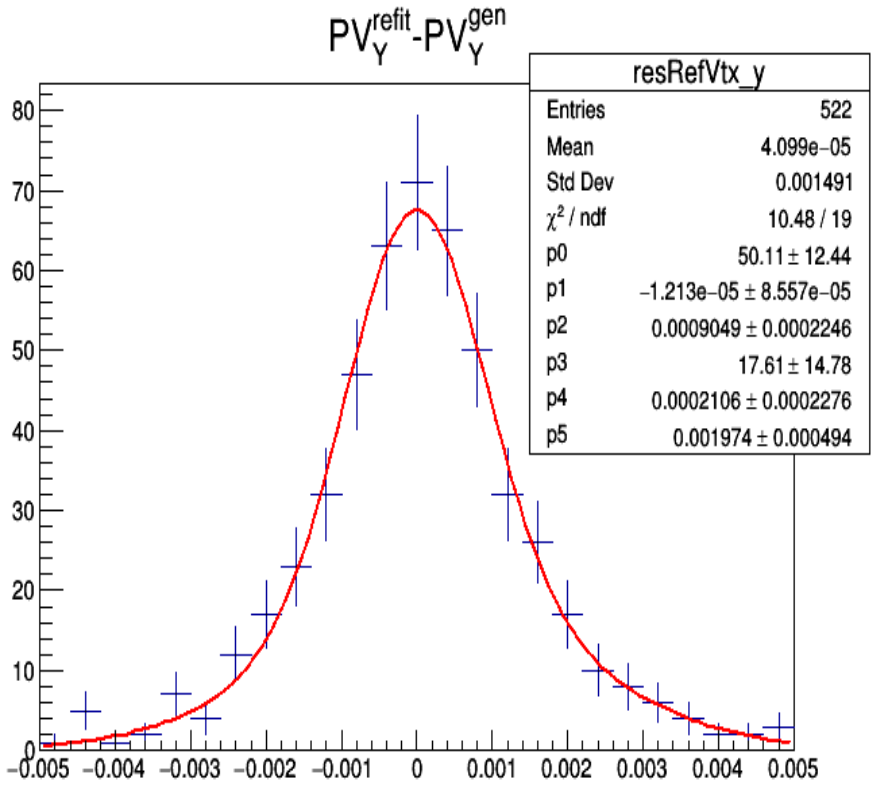

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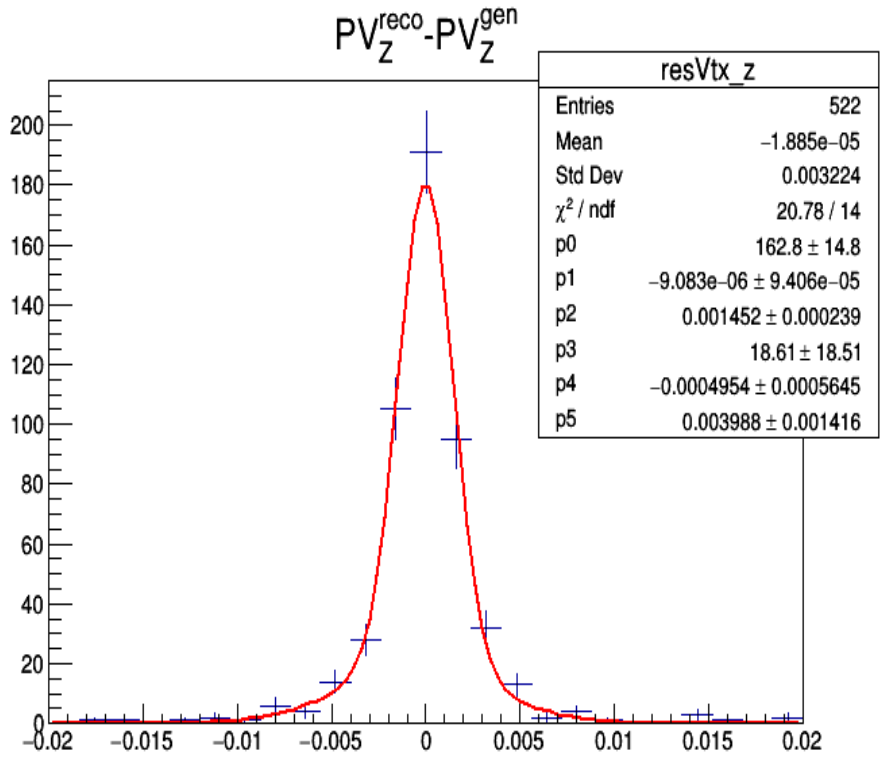

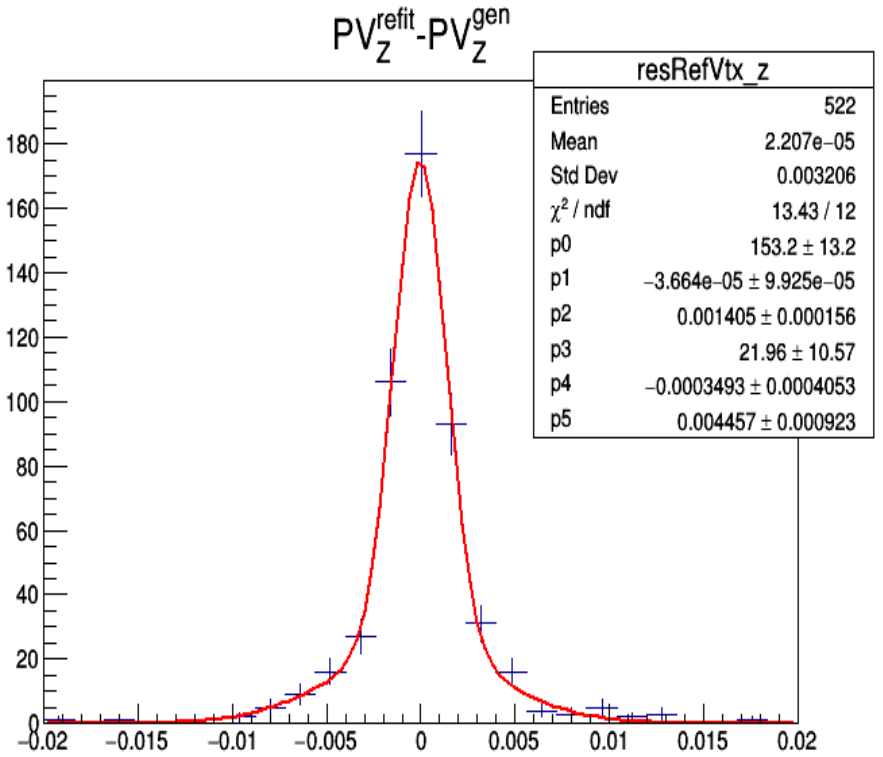

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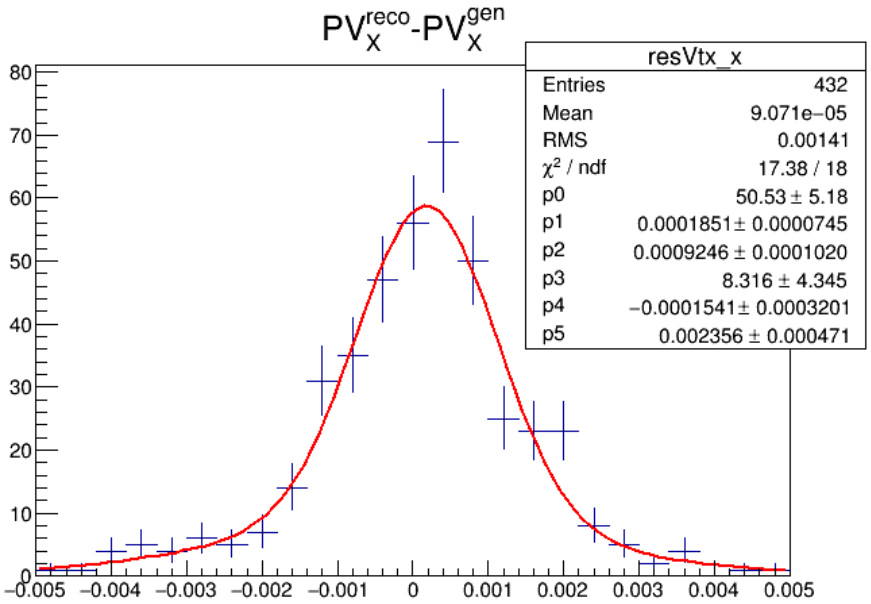

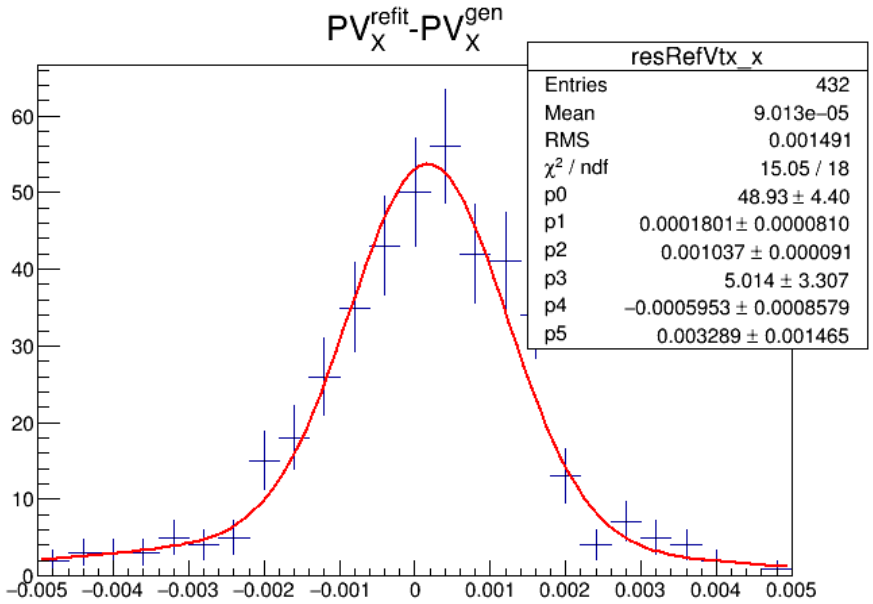

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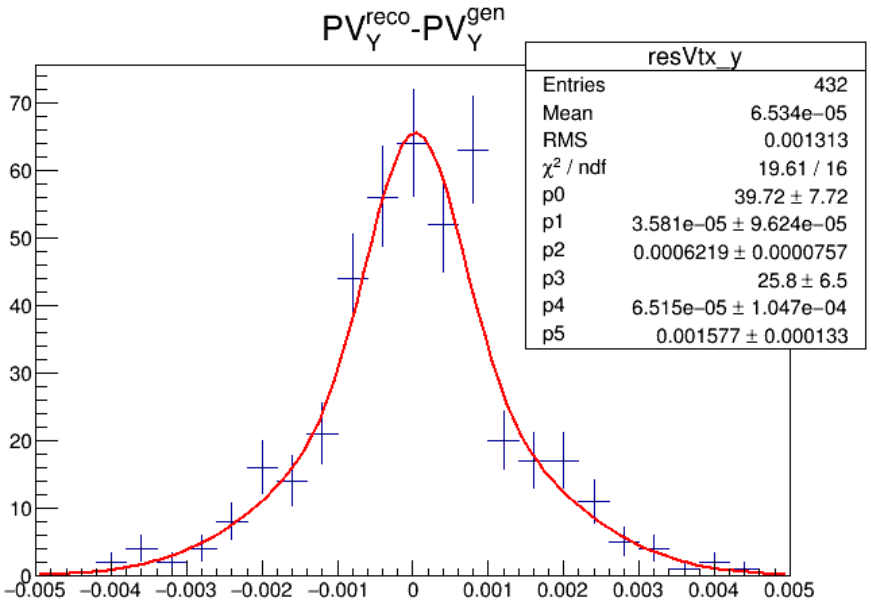

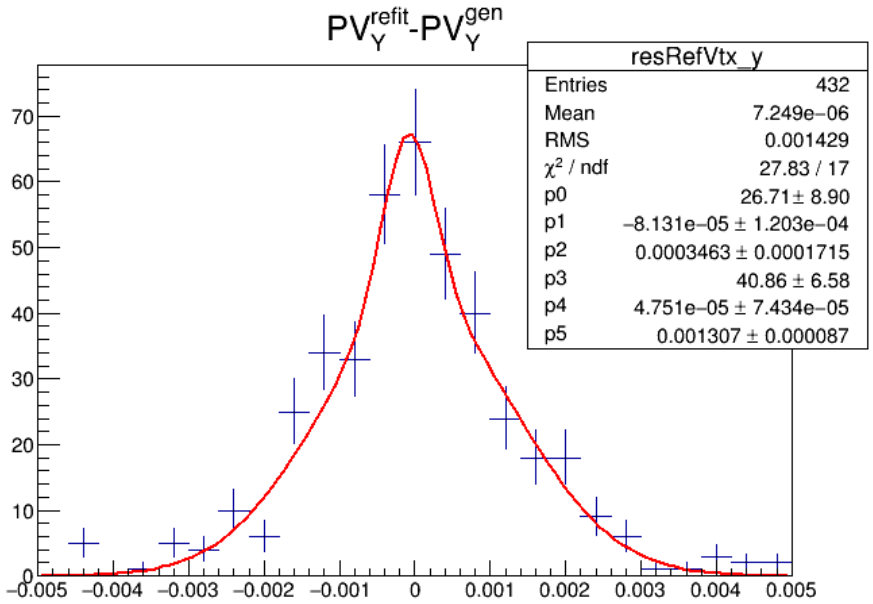

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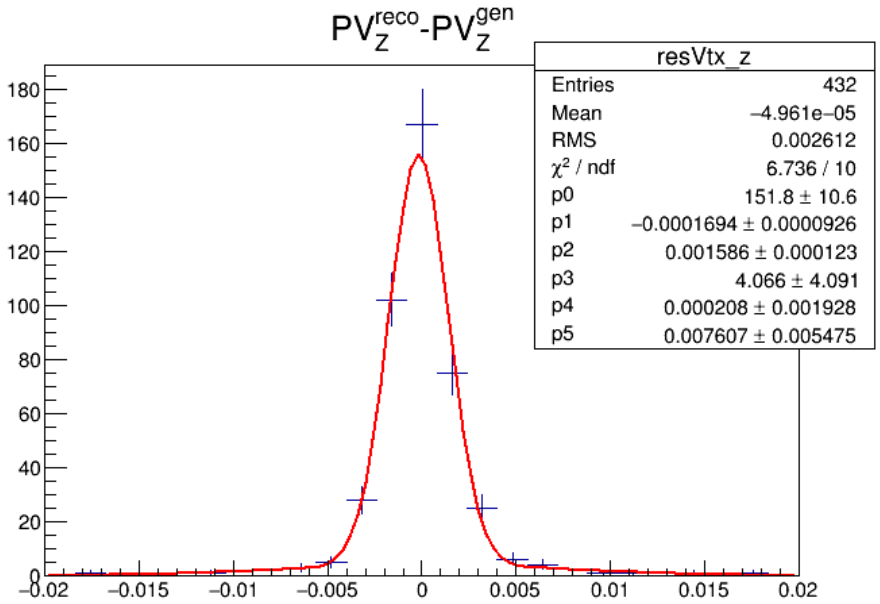

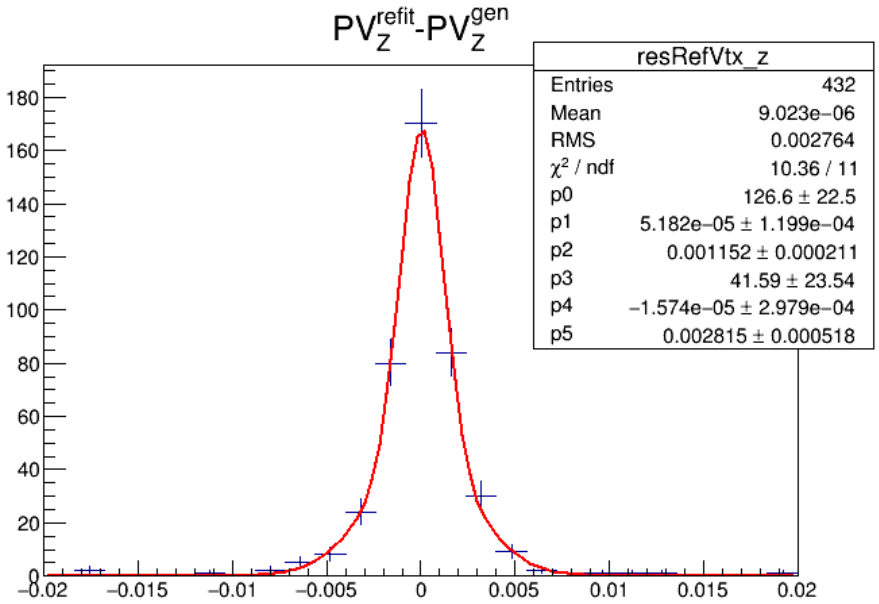

Summary

- In VBF sample around 30% of events are not refitted. In ggH sample it becomes 40%.
- But by using SynchNtuple, only 7 out of 500 number of events are not refitted.
- The refitting is not helpful in VBF sample. But in ggH sample resolution in refitted vertex are slightly good.

Future works

- The huge number of events are not refitted on generated level. We are trying to investigate on it.
- The Kinematics plots of Higgs decay product is asked, I am trying to producing it.
- Diwakar is working to add the impact parameter on Ntuple.