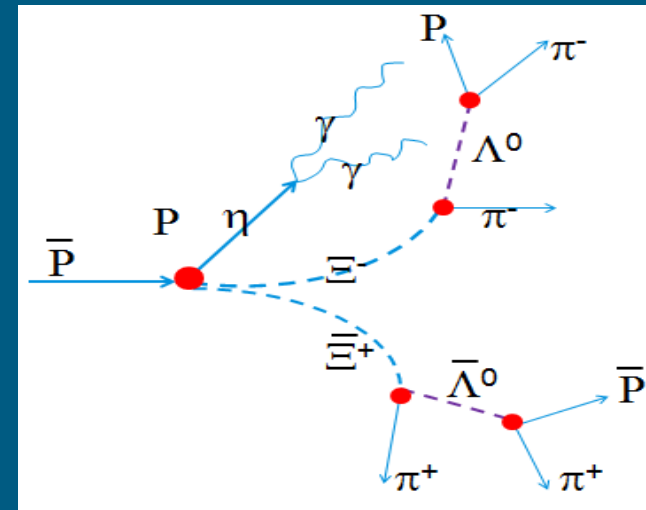


Test on fitters with $p\bar{p} \rightarrow \Xi^- \bar{\Xi}^+ \eta$



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1: IKP-1, Forschungszentrum Juelich, Helmholtz Association of Germany
 Research Centers

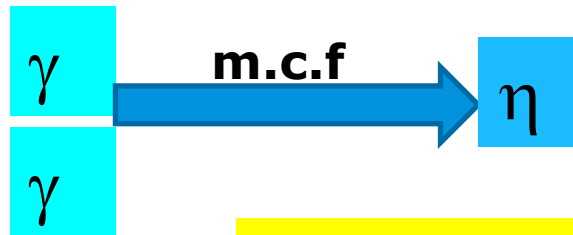
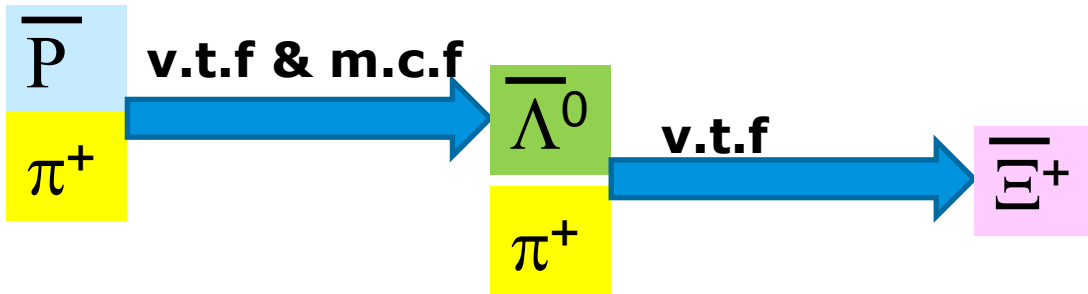
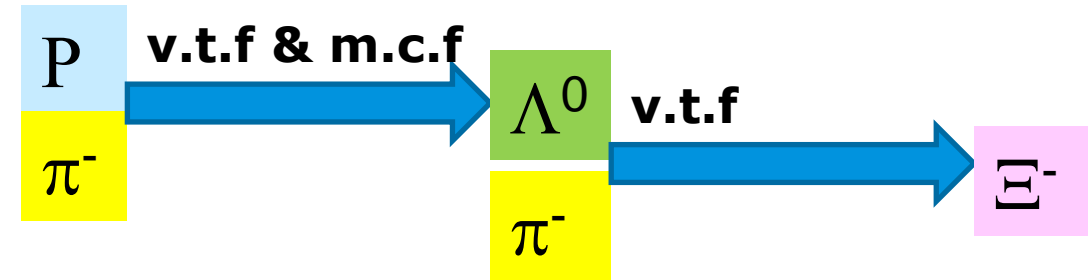
2: Institute of High Energy Physics, Chinese Academy of Science

2017/3/7

Test on fitters with $p\bar{p}$ to $\Xi^- \bar{\Xi}^+ \eta$

The Reconstruction of Λ , Ξ , η (tentative)

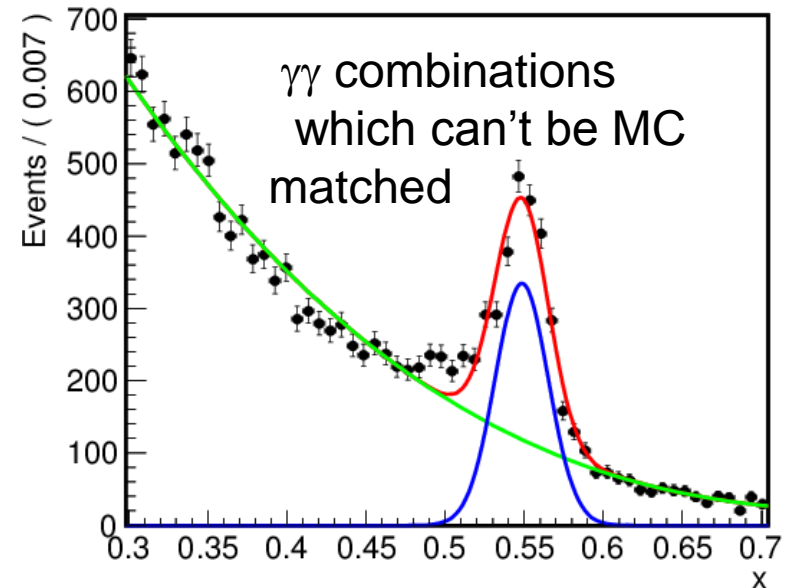
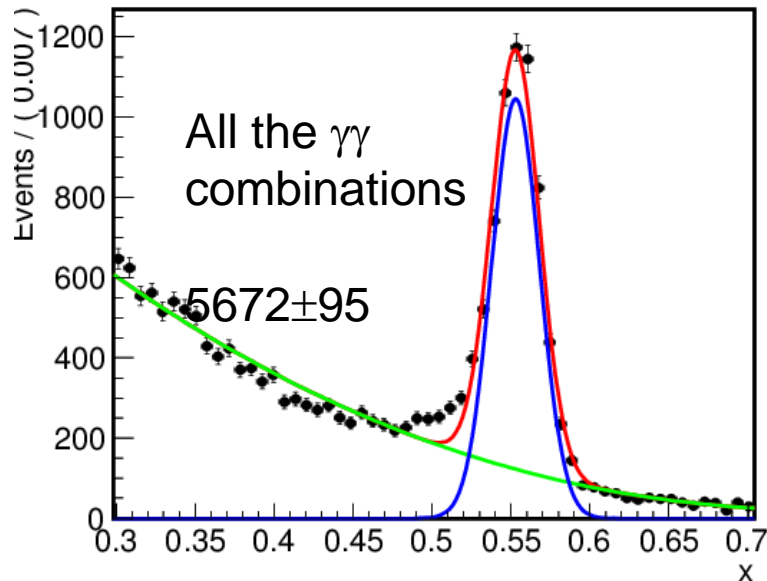
Particle	Rec. eff(%) MC Matched
η	40.31 ± 0.49
p	79.44 ± 0.40
Anti-p	72.91 ± 0.44
π^- from Λ^0	84.10 ± 0.36
π^- from Ξ^-	82.03 ± 0.38
π^+ from $\bar{\Lambda}^0$	84.64 ± 0.36
π^+ from $\bar{\Xi}^+$	81.97 ± 0.38
$\Lambda^0 / \bar{\Lambda}^0$	43.65 ± 0.50 $/40.44 \pm 0.49$
$\Xi^- / \bar{\Xi}^+$	30.05 ± 0.45 $/27.62 \pm 0.45$



Trunk 29675

□ m.c.f: mass constraint fit
□ v.t.f: vertex fit

Reconstruction of η (10k events)

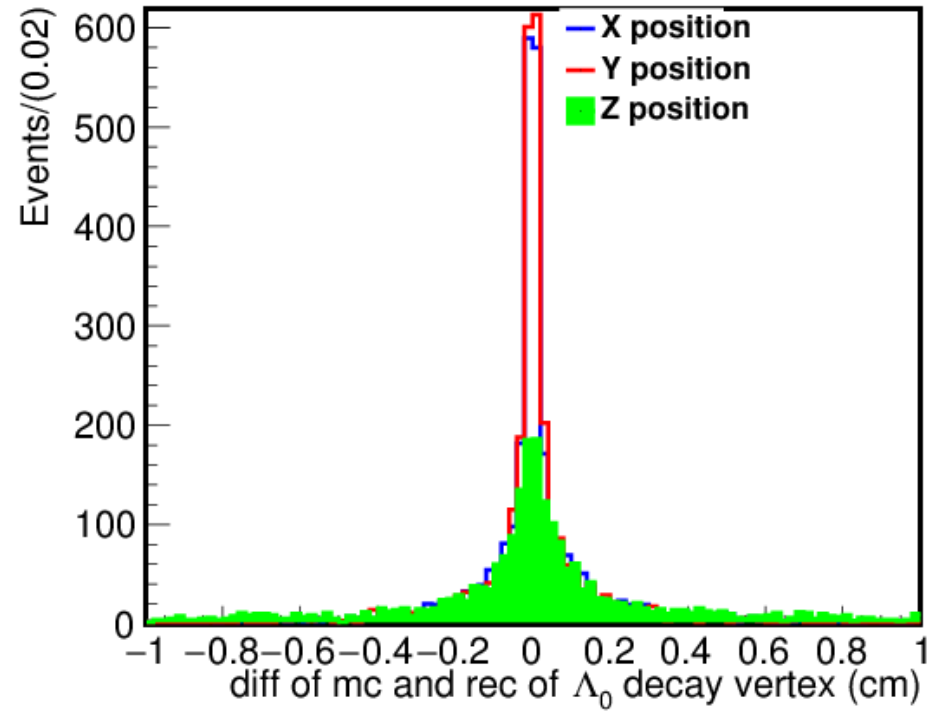
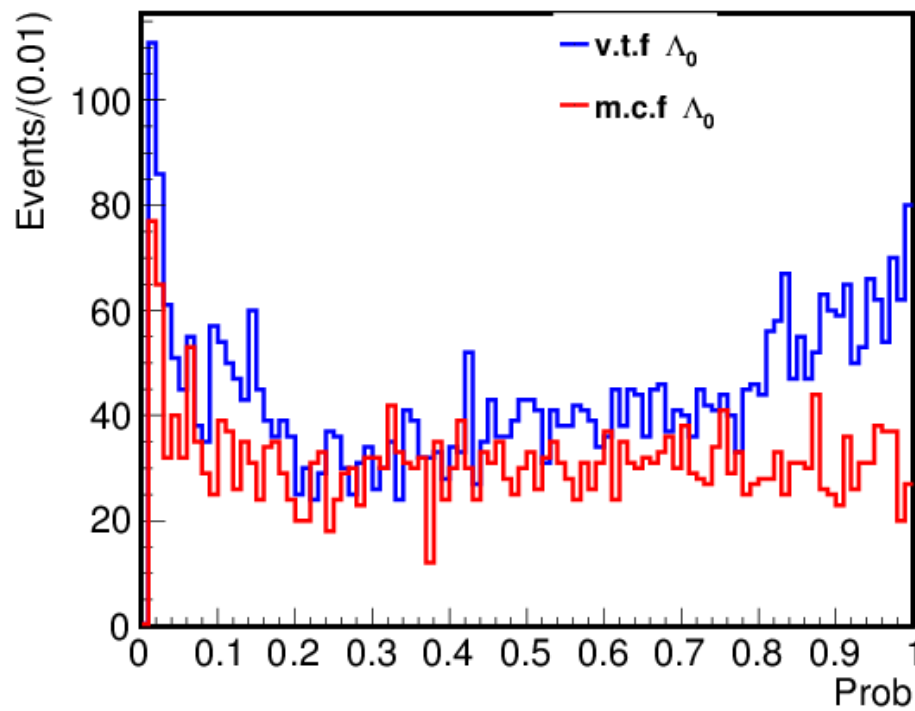


In 10k events:

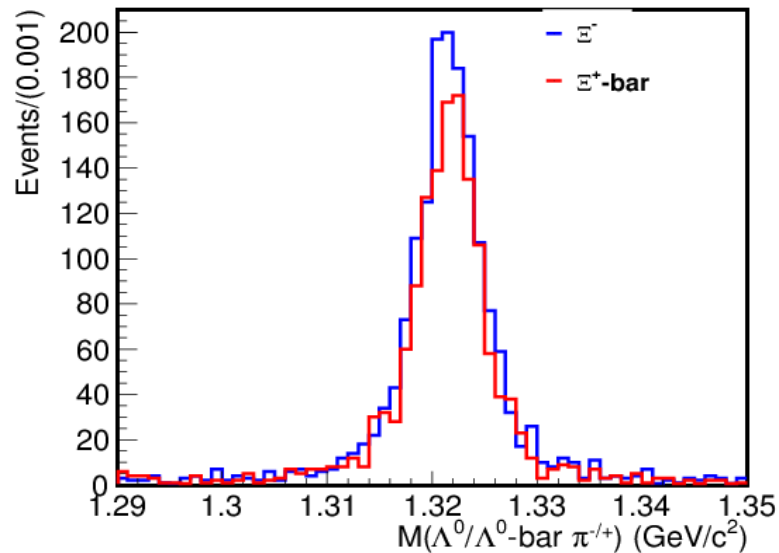
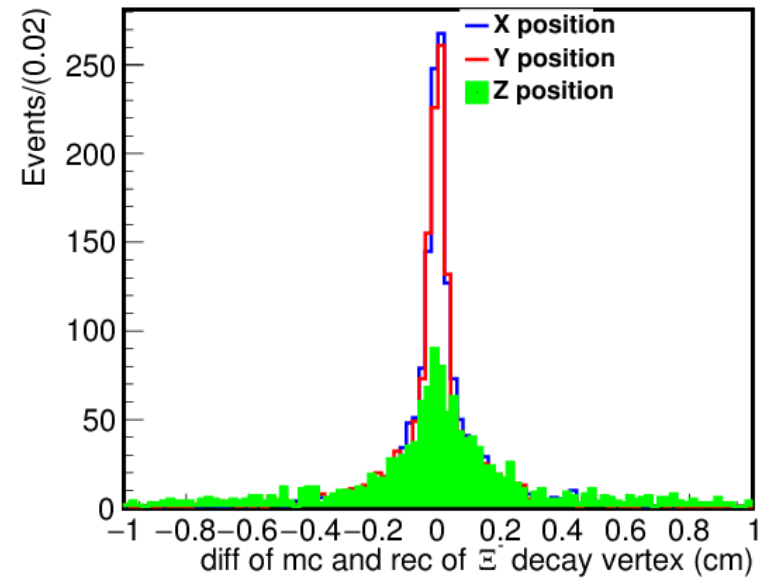
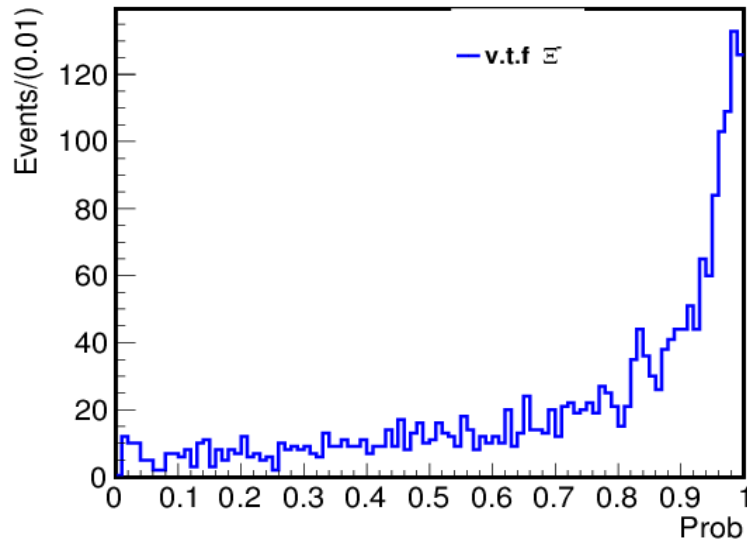
▣ Reconstructed : 4031 η (MC matched) ~ 1600 η (γe conversion on 1 γ)

▣ m.c.f : 5993 η (**retained**) 3409 η (MC matched)

Reconstruction of Λ_0 from p and π^-



The Reconstruction of Ξ^- from Λ_0 and π^-



Two tests on the reconstructed Ξ^- , Ξ^+ , η

Suggested by Ralf

Test1 :

□ v.t.f on Ξ^- , Ξ^+ , η with

FitAll()

■ PndKinVtxFitter

■ PndKalmanVertexFitter

□ Use the fittedcand

(lock the Ξ^- , Ξ^+)

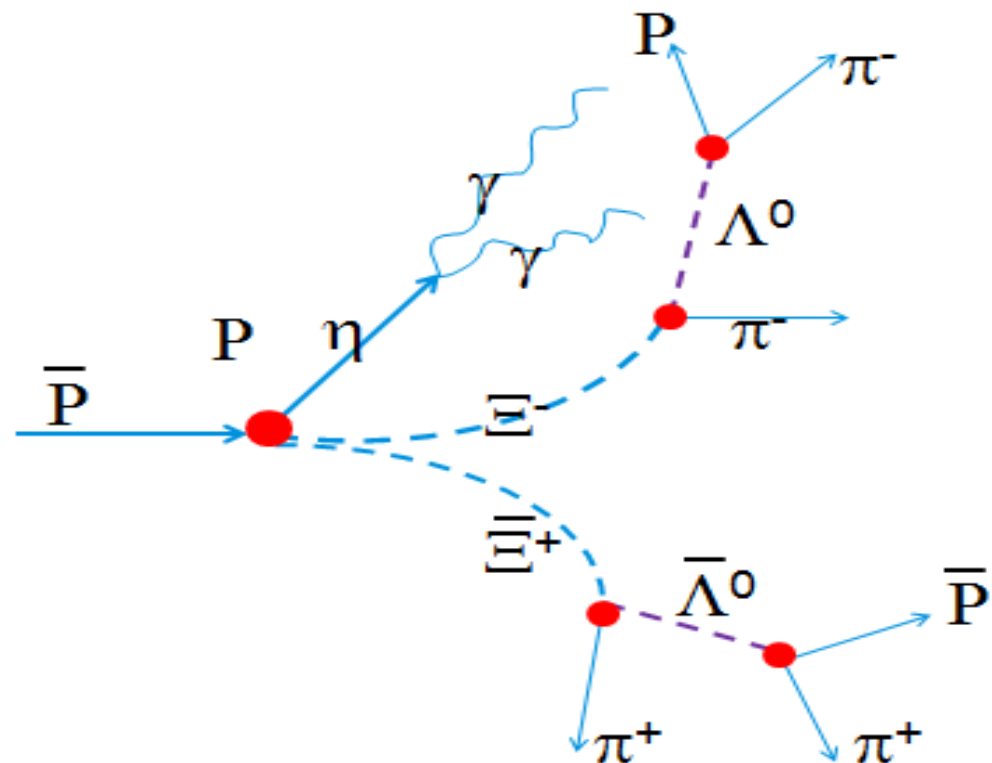
□ 4C fit

■ PndKinFitter

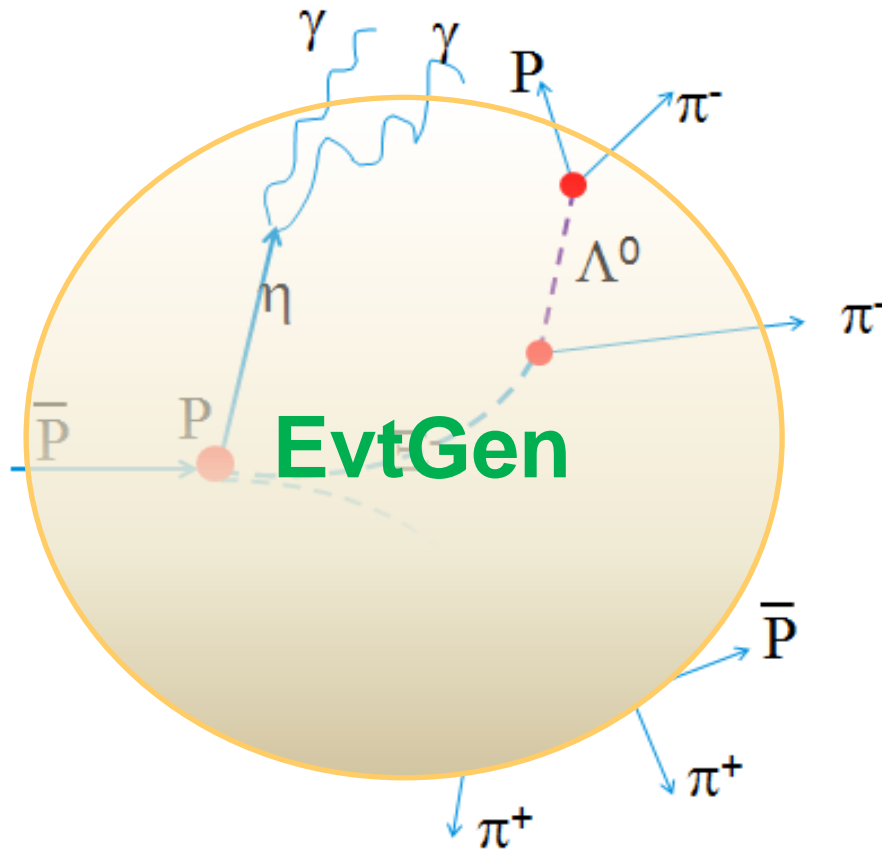
■ Pnd4Cfitter

Test2:

□ DecayTreeFitter (d.t.f in short)



A problem in this case...



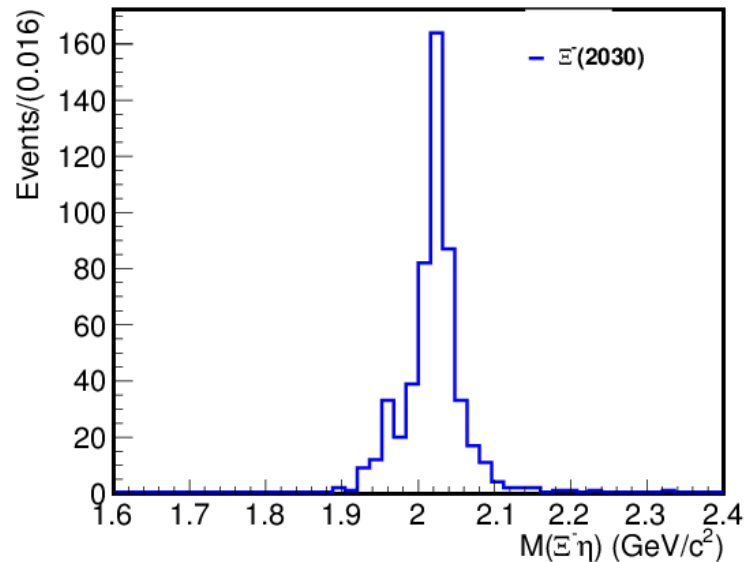
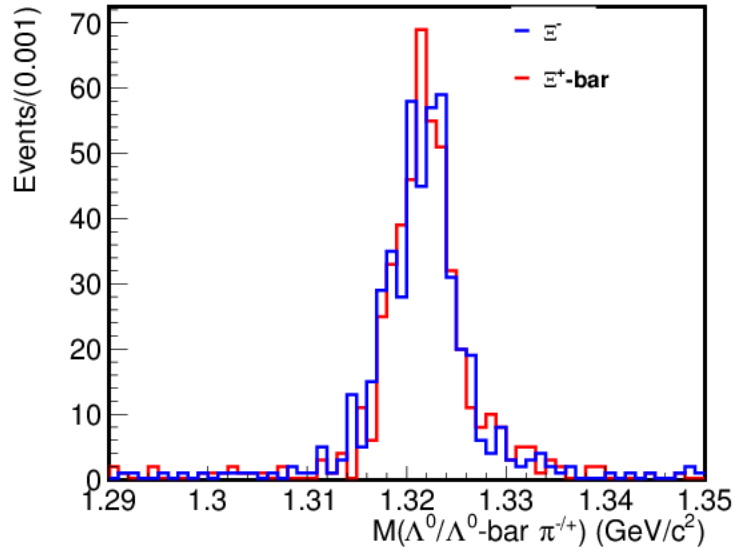
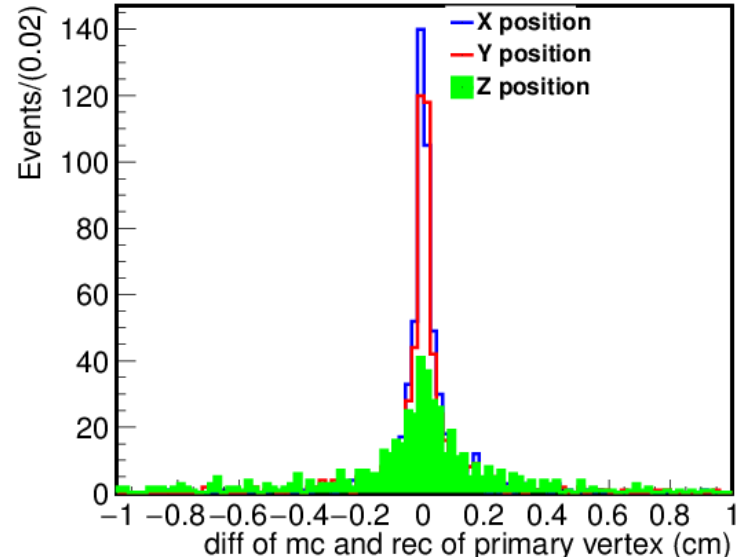
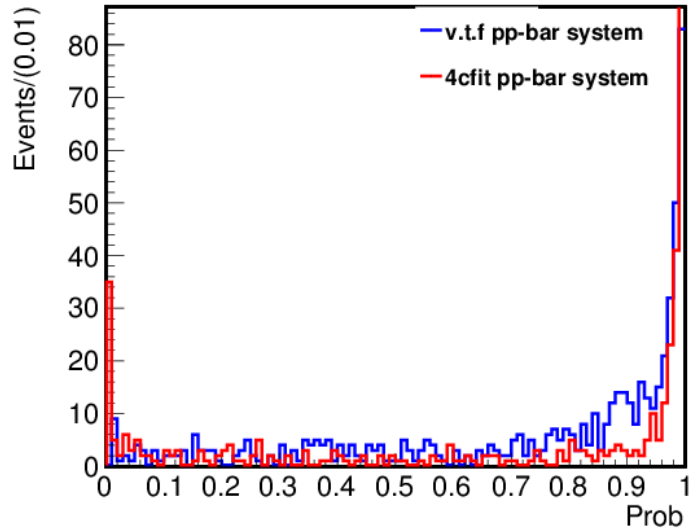
□ **GEANT**: Only particles of final state ($P, \bar{P}, \gamma, \gamma, \pi^+, \pi^-$) has interaction with detector.

□ Tracks of $\Xi^- / \bar{\Xi}^+$ are not helixes!

□ the performance of the fitter on v.t.f or 4C fit may not reflect the real case...

Test1 with FitAll()

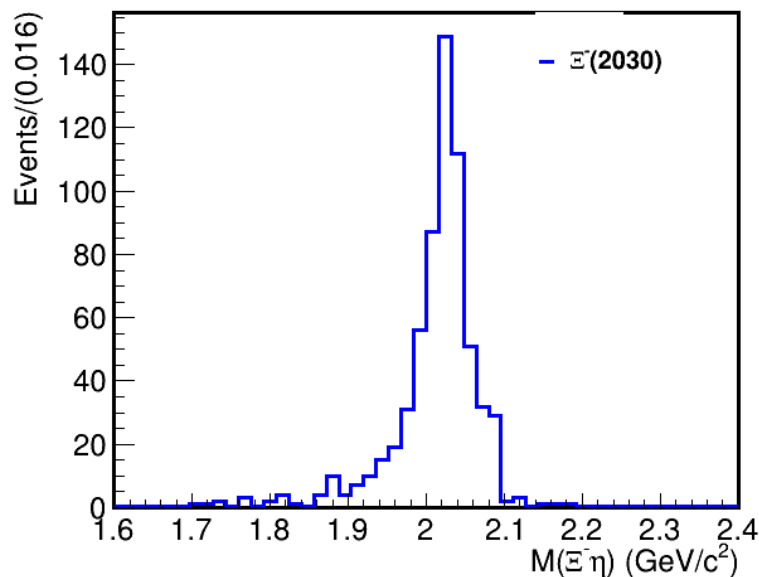
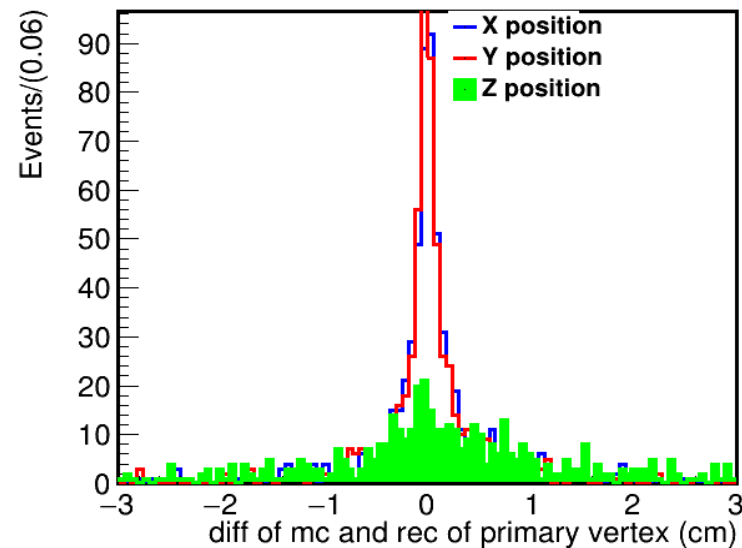
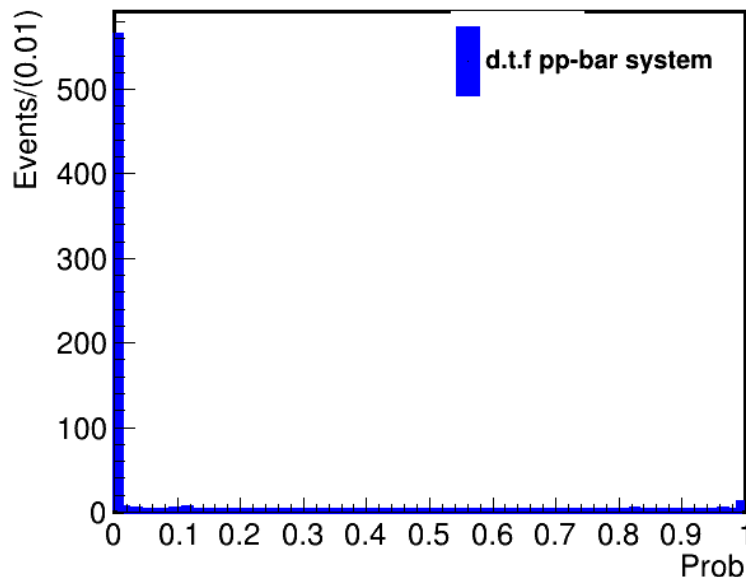
PndKinVtxFitter & PndKinFitter



Test1 with FitAll()

- ❑ PndKalmanVtxFitter: Most of the vertex fit gives $\text{Chi}2() < 0$, so few event survived.
- ❑ PndKinVtxFitter & Pnd4CFitter: give same distribution with PndKinVtxFitter & PndKinFitter

Test2: DecayTreeFitter()



□ Secondary vertex fit done before (neutral and charged tracks, refitted tracks)

□ Mass constrains on η, Ξ in d.t.f

Summary & next to do

- Impact from magnetic field on simulation on Ξ^- and Ξ^+
 - Modify the momentum and position after EvtGen
 - Or any other solutions? ...
- Fitters:
 - vtf:
 - *neutral & charged* → Jennifer Puetz (FZJ)
 - *Two charged with secondary vertex(e.g. $\Xi^- \Xi^+$)*
 - 4Cfit(PndKinFitter, PndDecayTreeFitter)
 - *test with PndDecayTreeFitter step by step(suggested by Ralf)*
 - *Two charged with secondary vertex(e.g. $\Xi^- \Xi^+$)*

BACKUP

