

MOMENTUM OF THE CHARGED TRACK

BASED ON THE DECAY $J/\psi \rightarrow \Sigma^0 \bar{\Sigma}^0$

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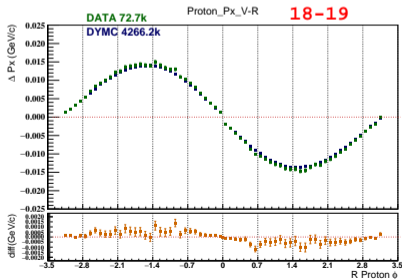
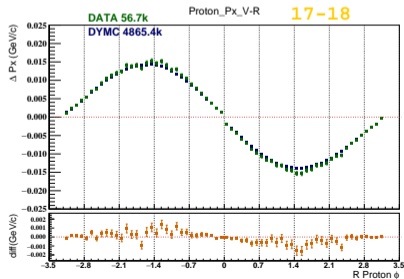
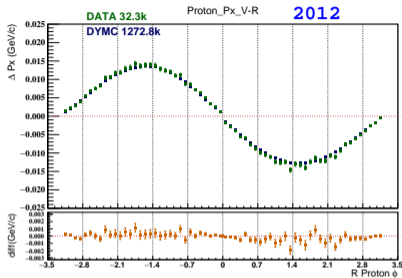
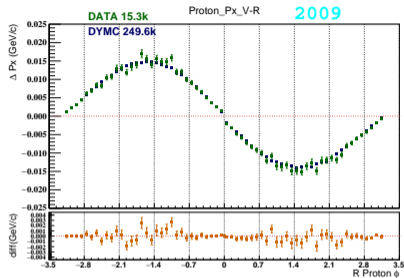
II. ISSUES

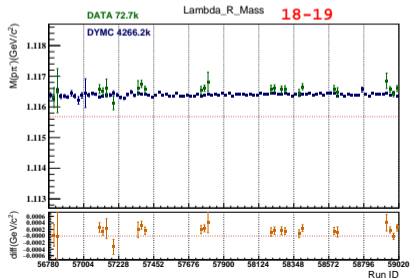
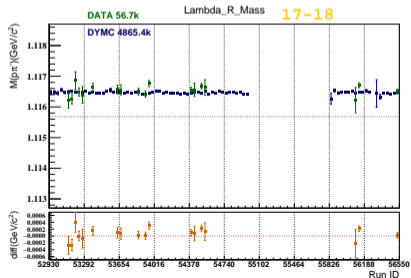
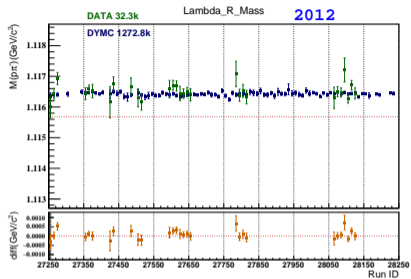
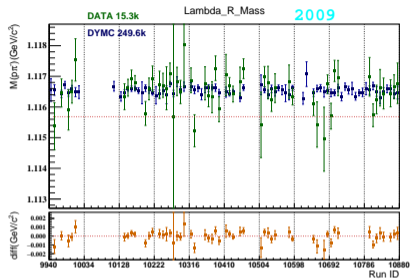
III. APPROACHES

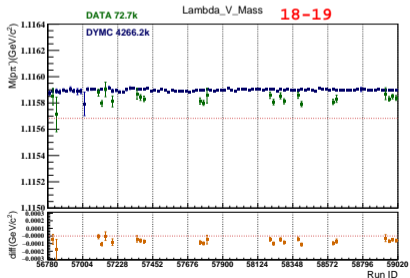
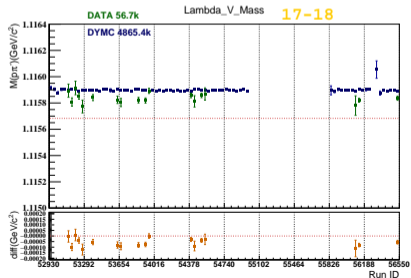
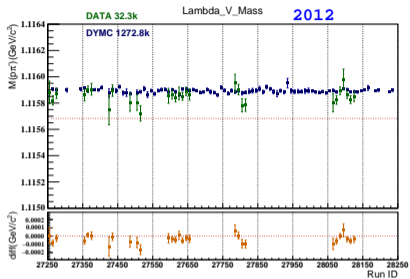
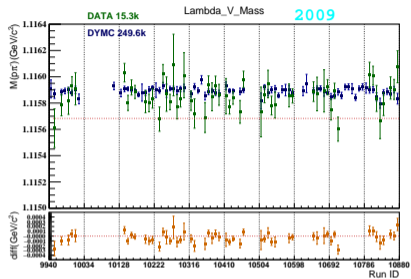
IV. STRATEGY

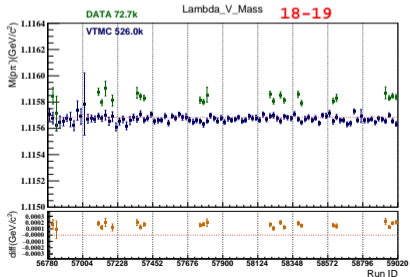
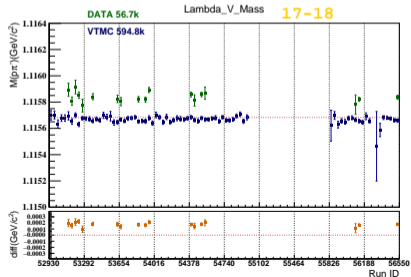
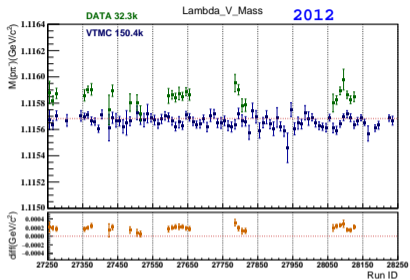
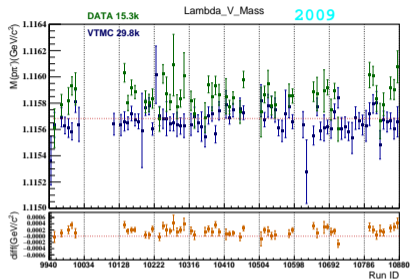
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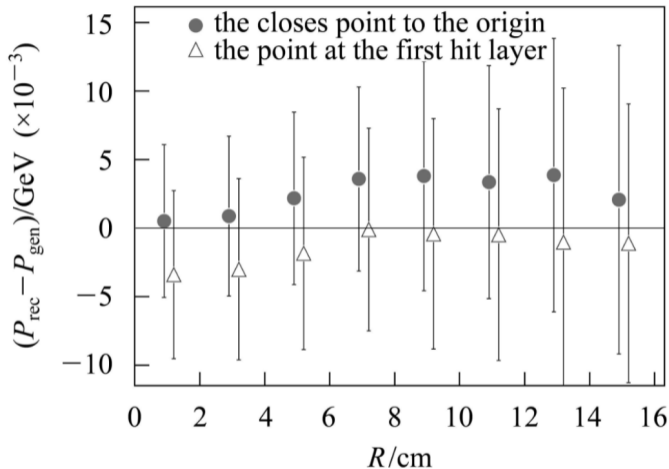
- ✎ In the previous Workshop, I gave a talk about some possible **irregularity** of reconstructed charged tracks.
This needs further clarification and maybe a solution.
- ✎ **Invariant mass peak shift** found by several persons (details in next slides).
This may have influences in the precision measurements, like those of decay asymmetry parameters.
- ✎ **Data-MC difference** has been reported many times, mainly from Patrik(UU).
Bias? need correction; **Systematic uncertainties?** need suppression.














XU Min, HE Kang-Lin, ZHANG Zi-Ping and WANG Yi-Fang. *Decay vertex reconstruction and 3-dimensional lifetime determination at BESIII*[J]. Chinese Physics C, 2009, 33(6): 428-435.

 `mdcTrack()->p4(mass)`


 `mdcKalTrack()->p4(mass)`


 `mdcKalTrack()->helix() \implies VFHelix \implies momentum(0.0, mass)`


 For the VFHelix, there is a **pivot** method to modifying helix parameters according to different initial/production point.

 The different production points are:

- 1 (0, 0, 0)
- 2 run-by-run averaged colliding vertex(IP), read from DataBase
- 3 Vertex fitted production point, for $\Lambda \rightarrow p\pi$, there are 2.

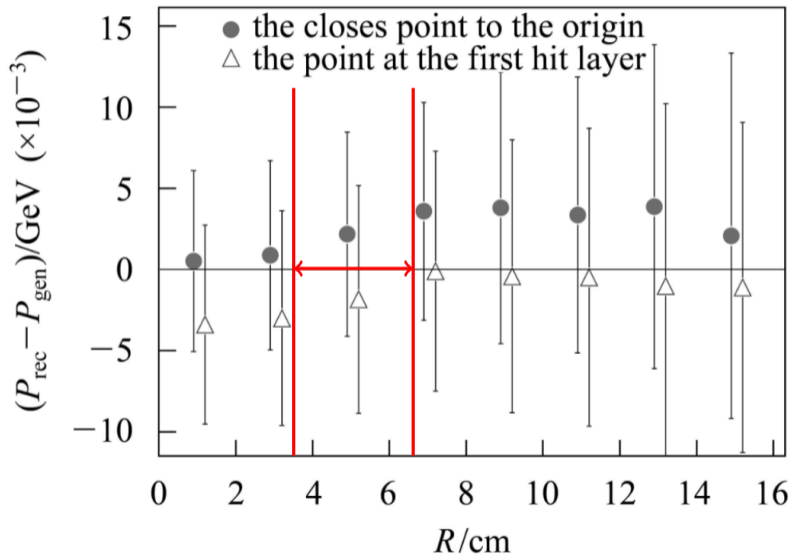
 Also there are 4C, 5C, 6C, etc. based on different decay channels

 And how on perform the kinematic fitting

 And the possible combinations of all above

It is noted that this may be important for precision measurements.

- Based on high statistics MC, about 100 times Data for $J/\psi \rightarrow \Sigma^0 \bar{\Sigma}^0$
- Compared with MC Truth momentum to determine the best way
- Iteration of VertexFit to choose proper helix (ZHelix FHelix LHelix)



 aaa

 bbb

BACKUP

aaa