

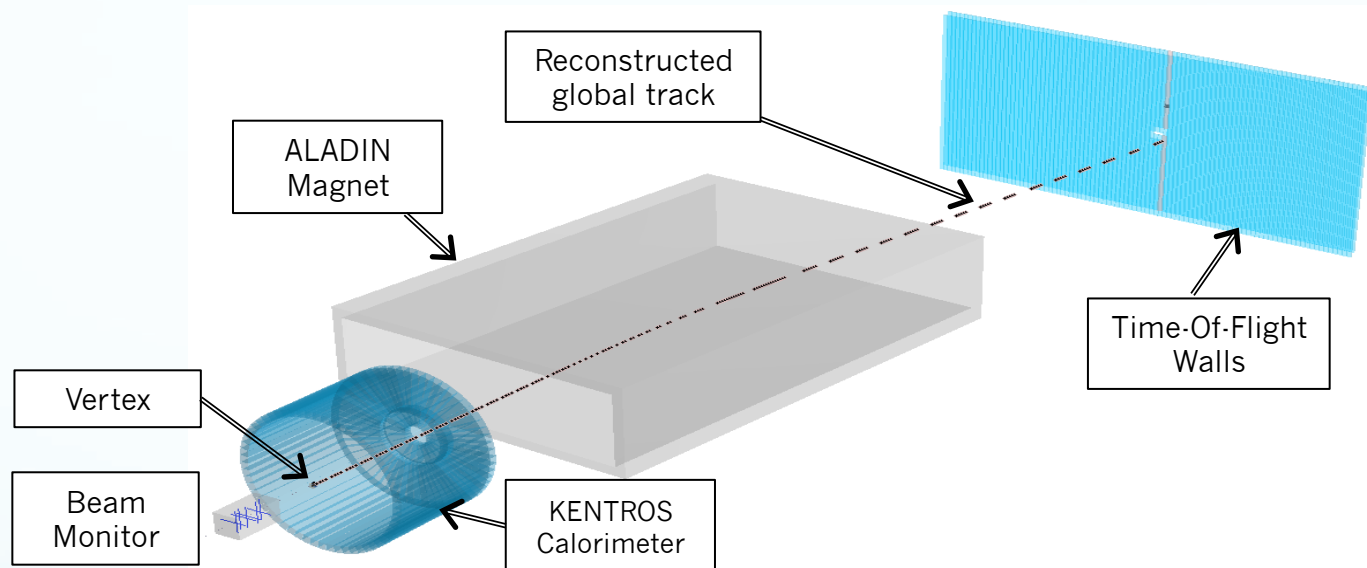
Global Reconstruction- Mass Distributions

D.Juliani Ch.Finck

14/12/12

Introduction

- Goals:
 - ✧ Compare mass distributions between Experiment and MC.



All the global reconstruction in global framework except propagation in ALADIN.

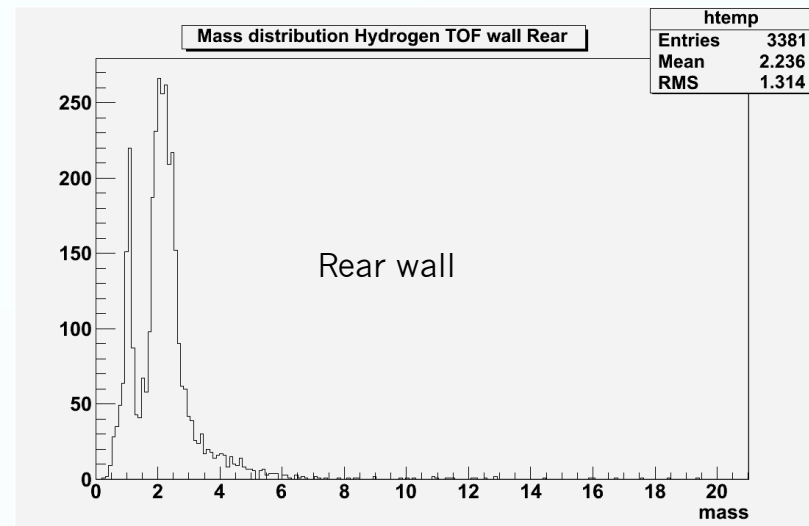
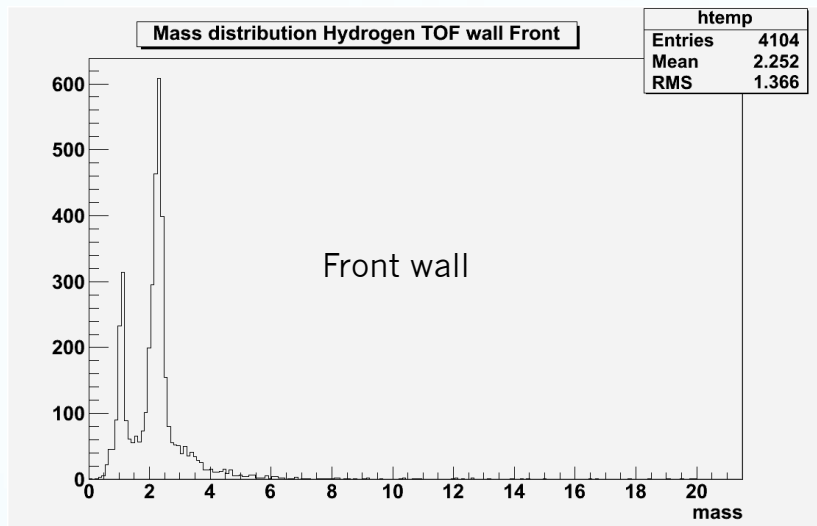
Global reconstruction

- For Monte Carlo: Latest version of the code and MC production v59 used.
- For Data: Latest version of the code and runs 399, 400 and 401 used.

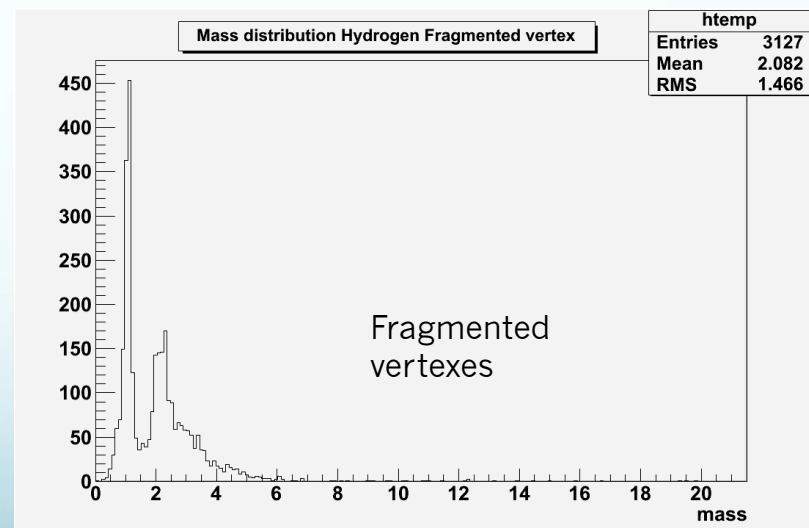
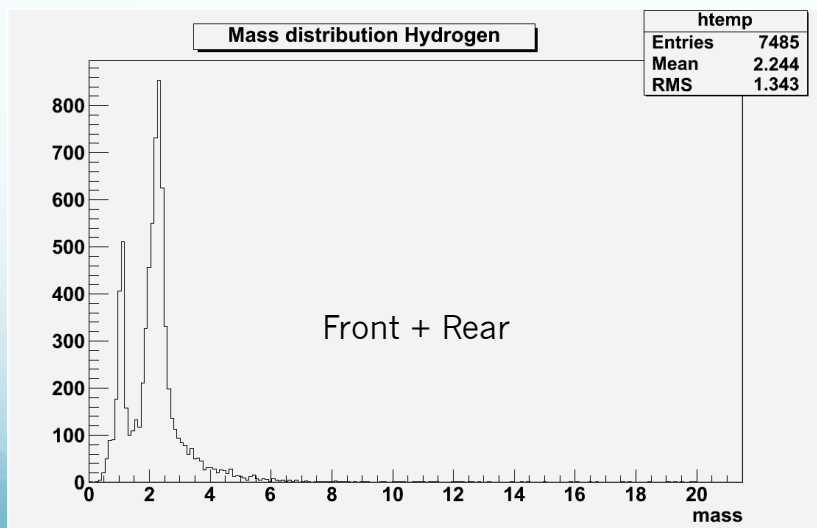
Latest version of the code means:

- Same function concerning charge determination for MC and data.
- Loop on list of tracks from reconstructed vertexes instead of using all tracks reconstructed by the VTX detector.

Mass distribution Hydrogen (DATA)

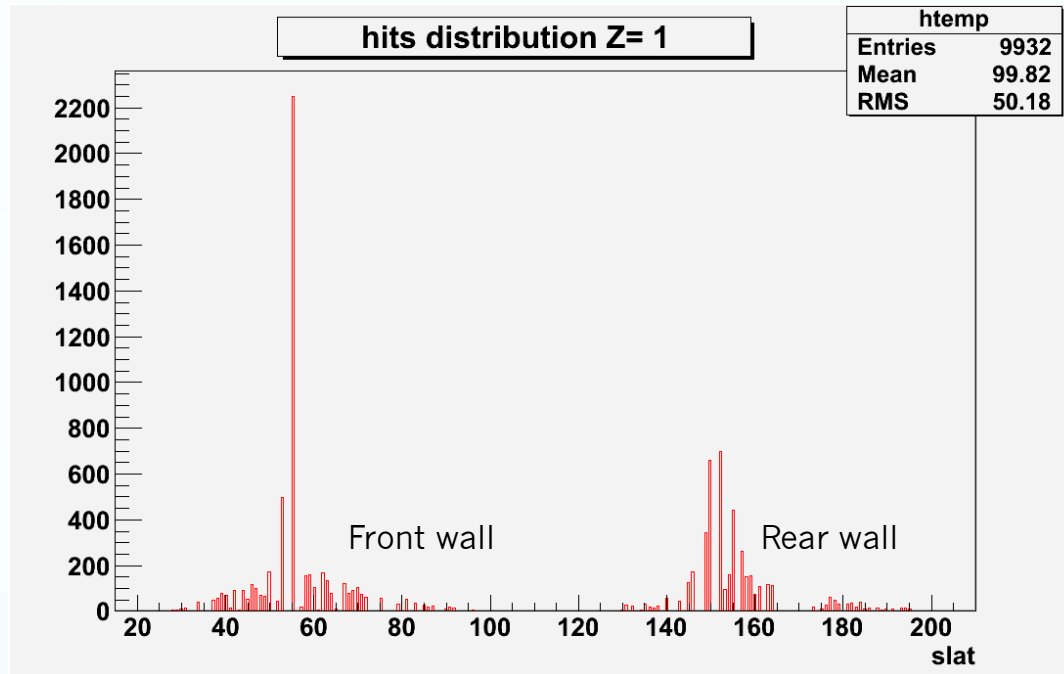


Production run



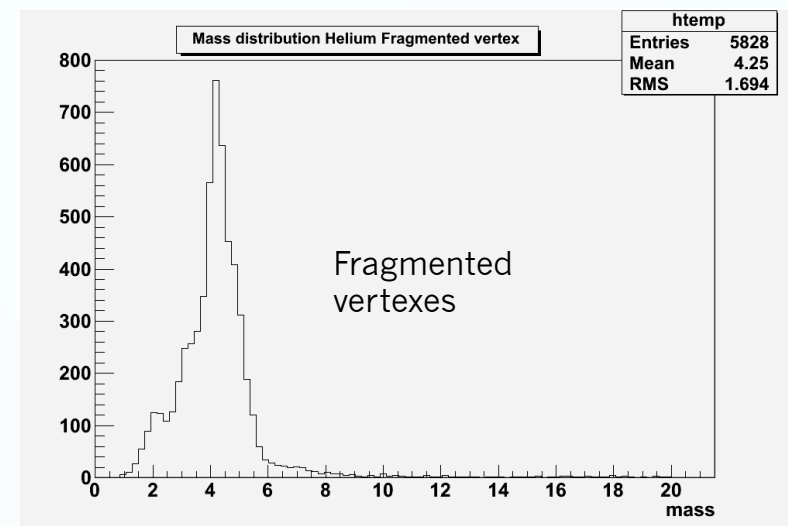
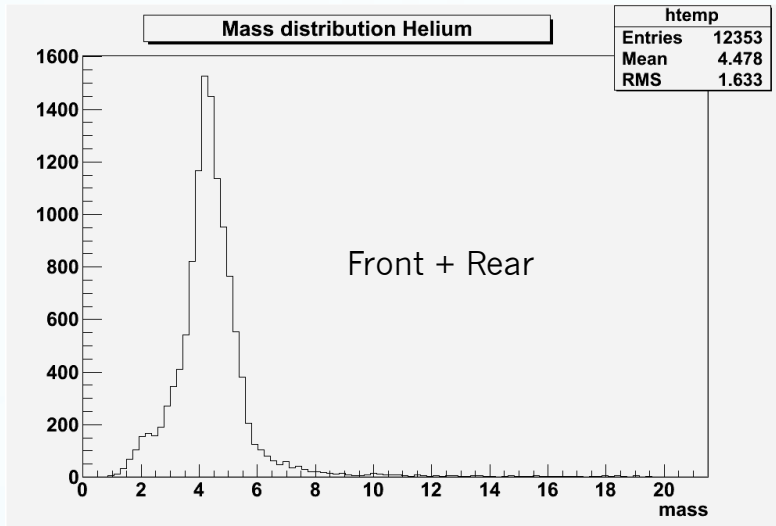
Fragmented vertexes: Reconstructed vertexes where number of tracks > 1.

Hits distribution Hydrogen (DATA)

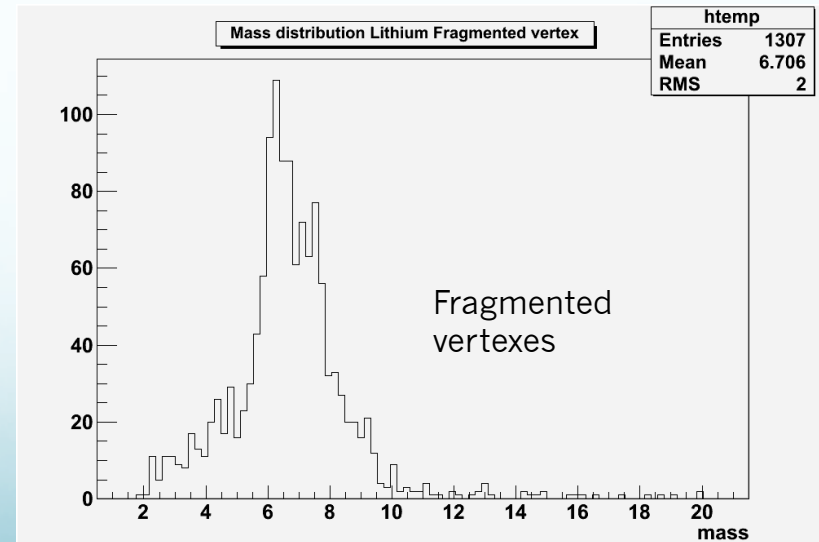
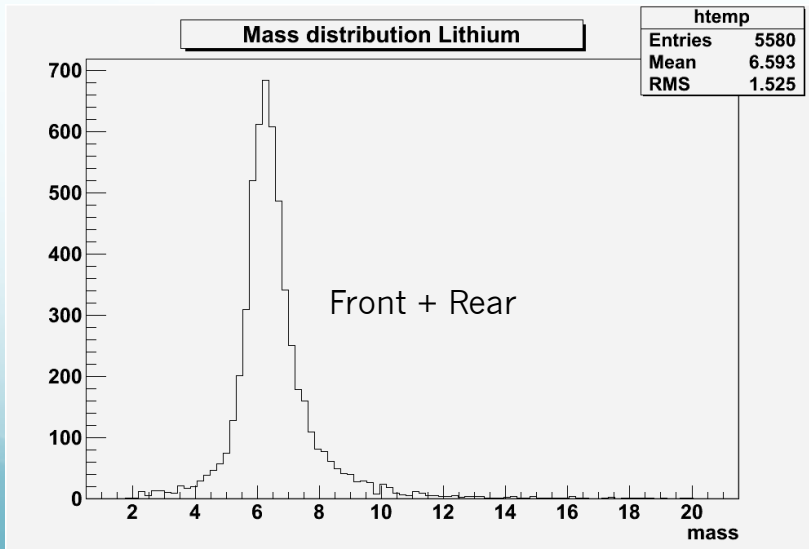


Lots of fake hydrogens (deposited energy in slat $i \pm 1$ when carbon detected in slat i).

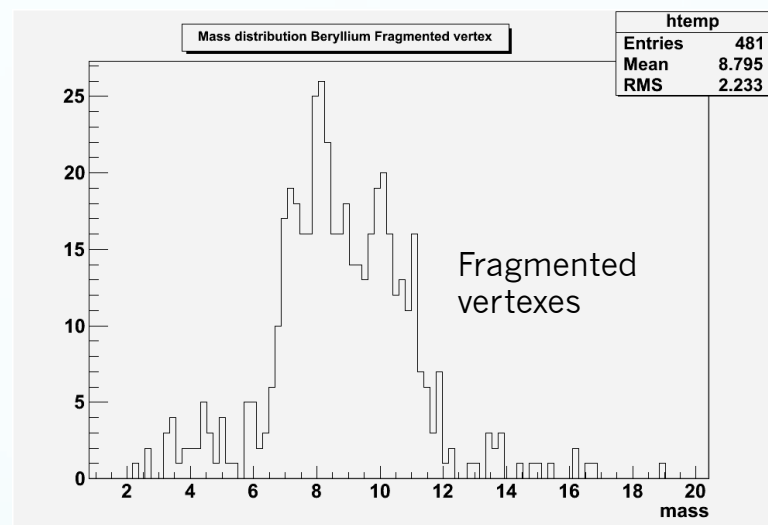
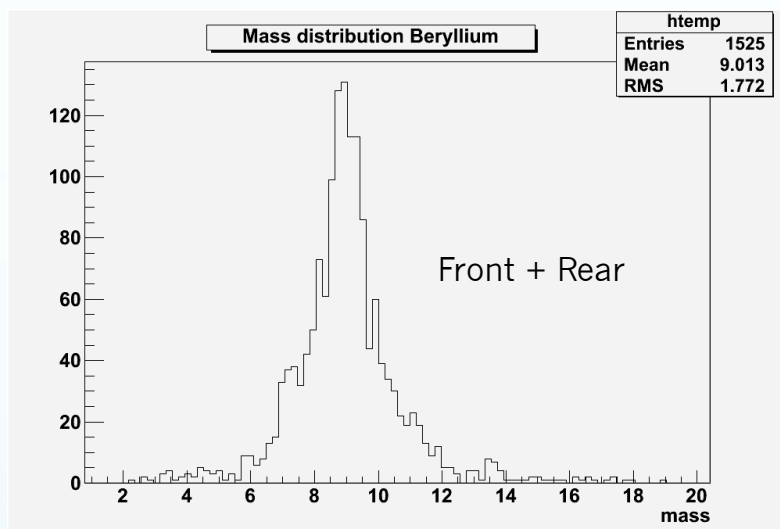
Mass distribution Helium - Lithium (DATA)



Production run

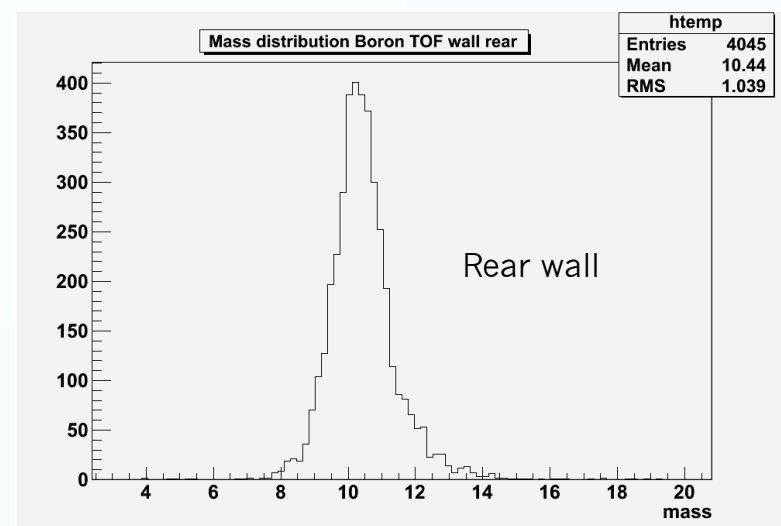
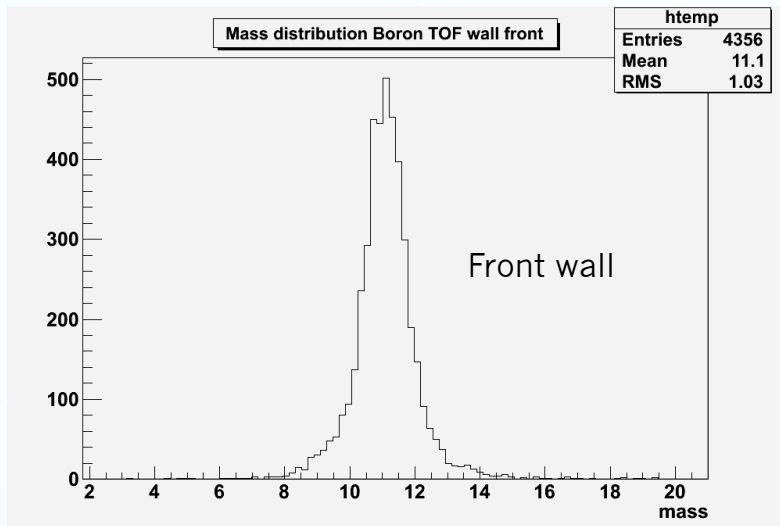


Mass distribution Beryllium (DATA)

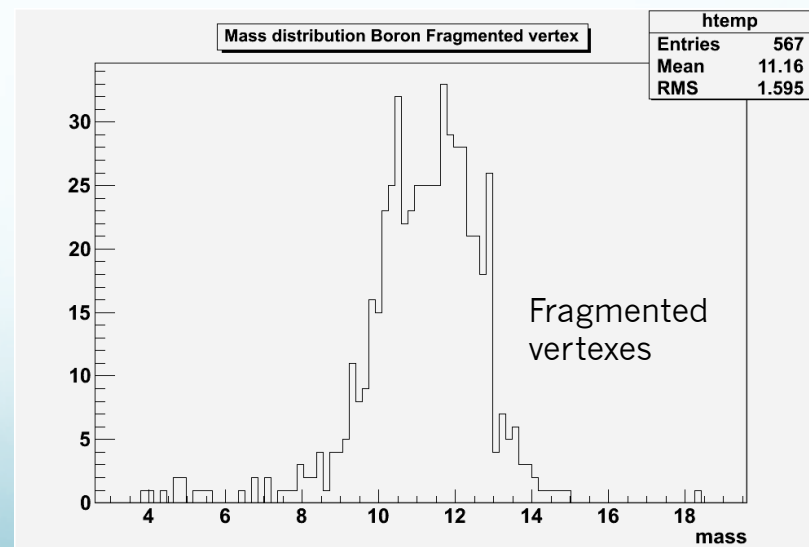
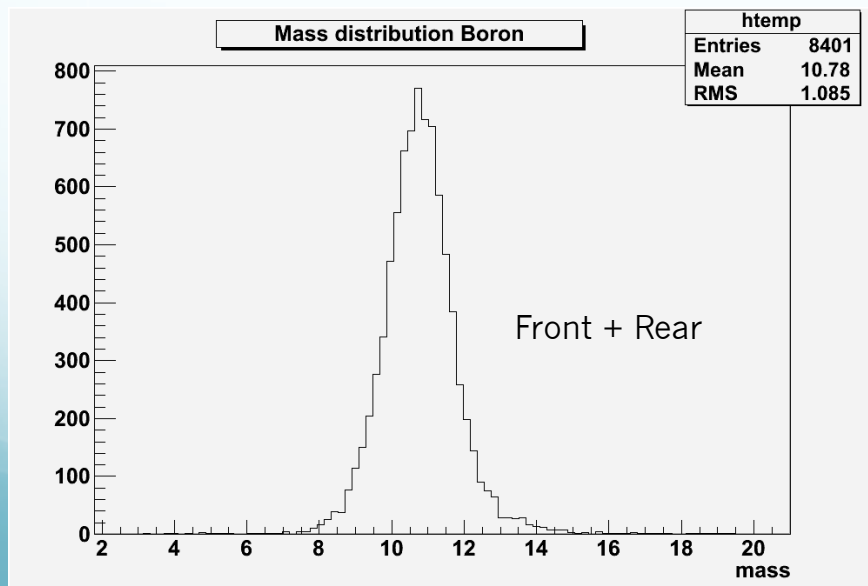


Production run

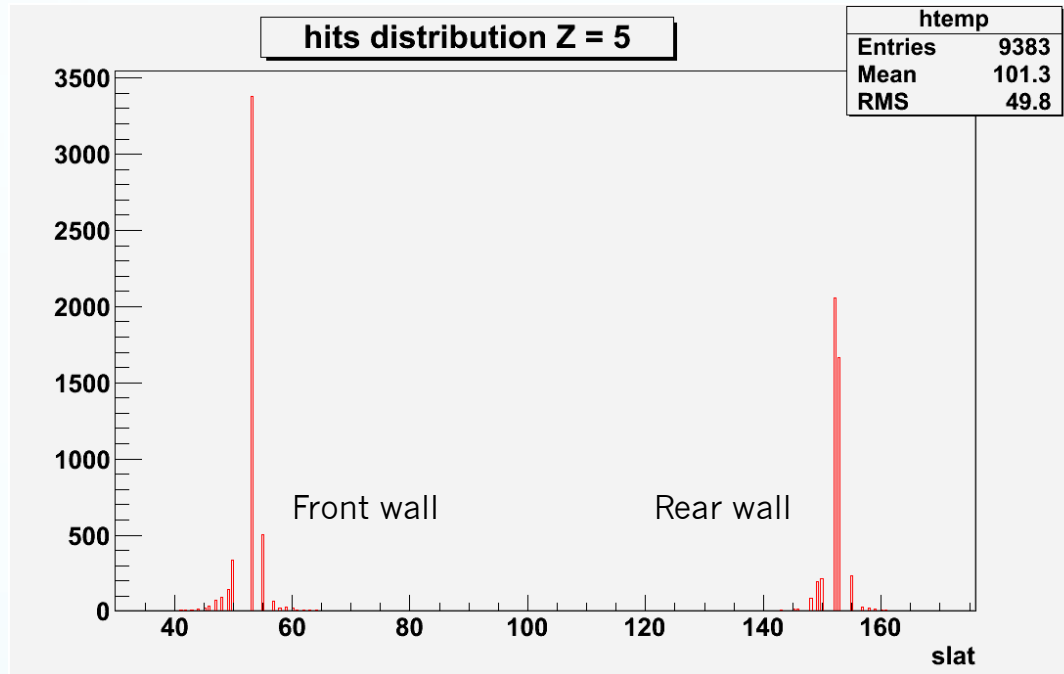
Mass distribution Boron (DATA)



Production run

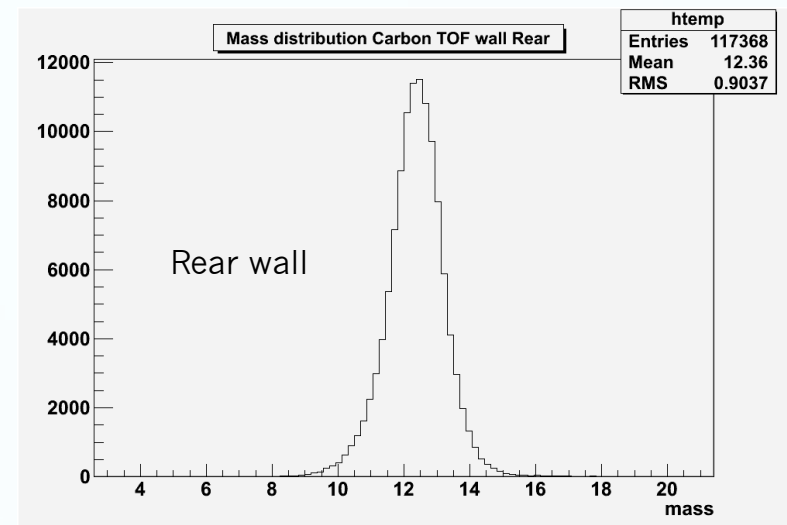
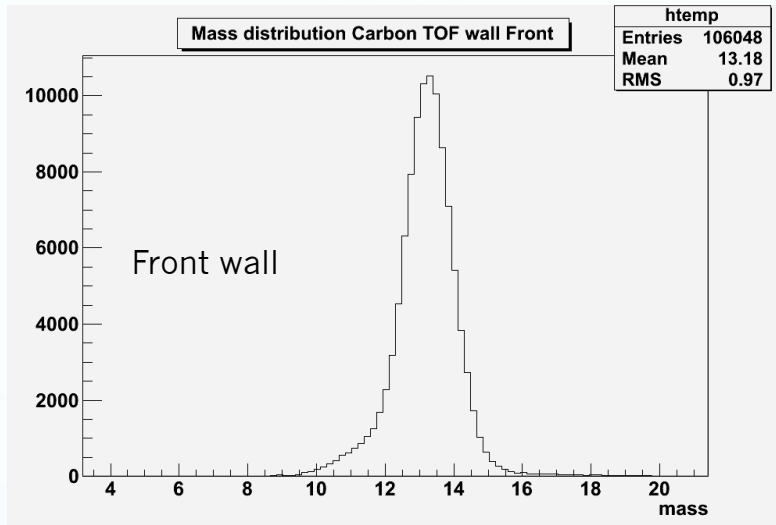


Hits distribution Boron (DATA)

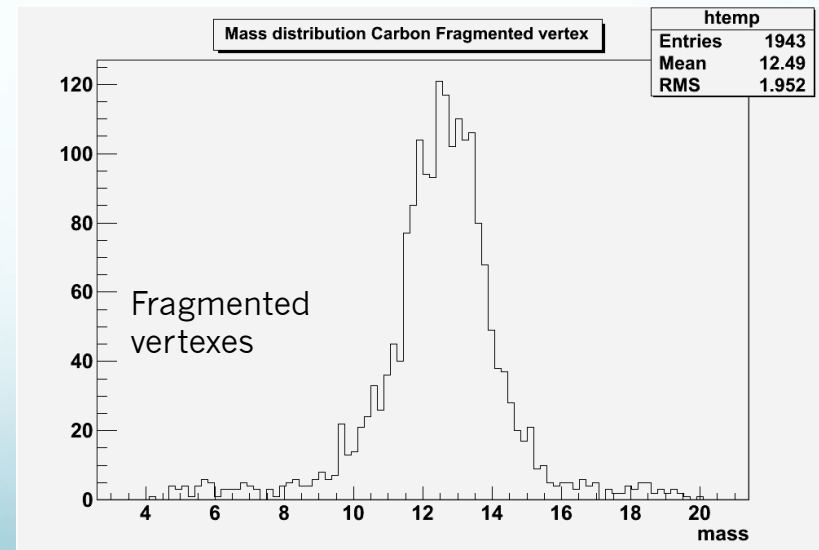
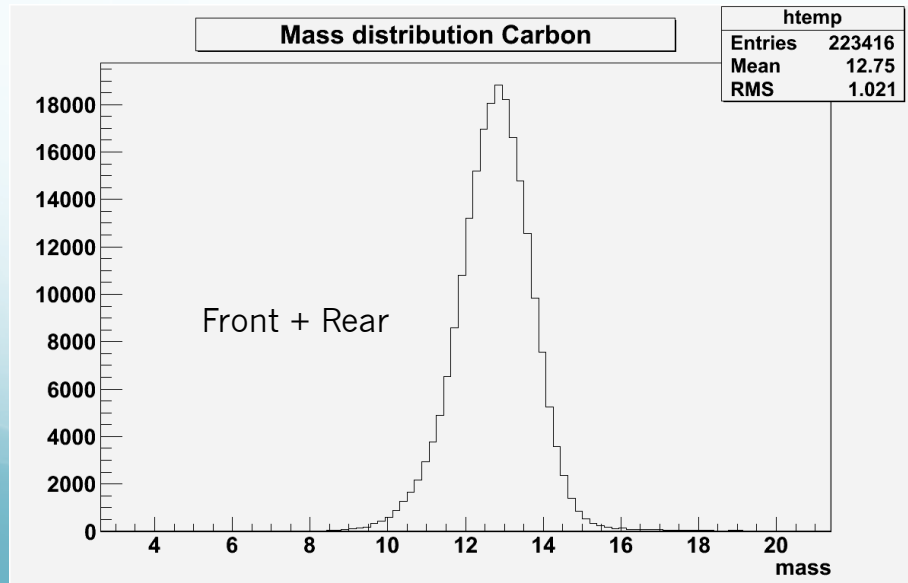


Slat 53 (front wall) => See Z = 6 as Z = 5.

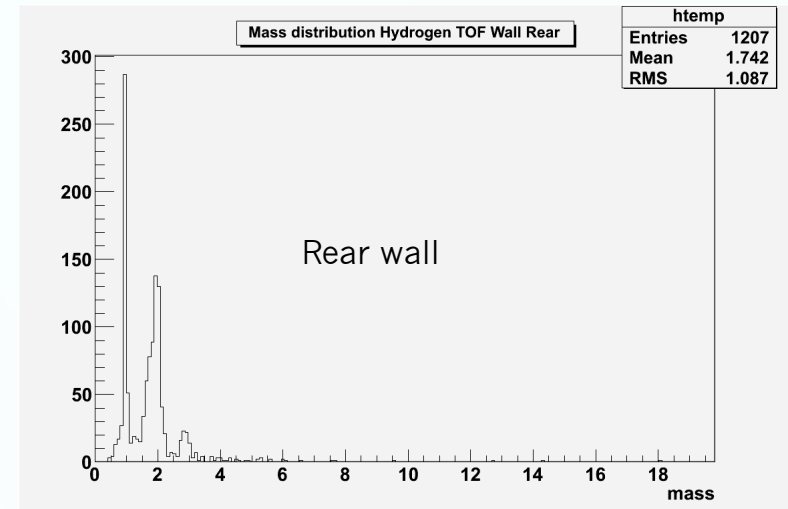
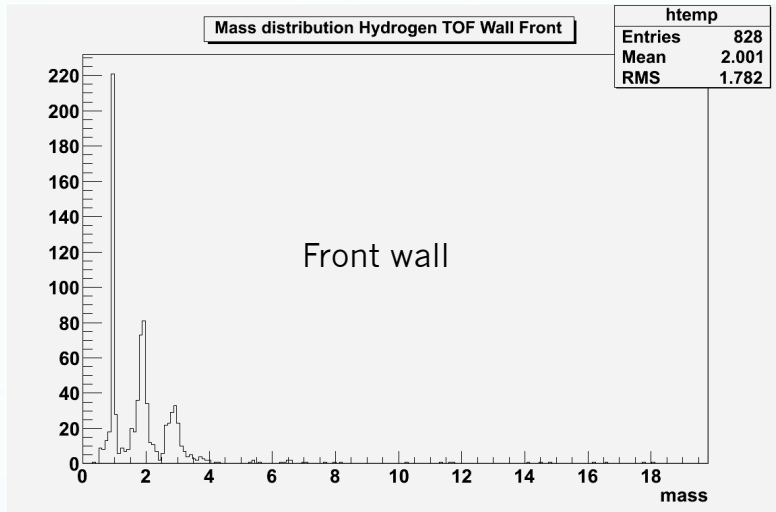
Mass distribution Carbon (DATA)



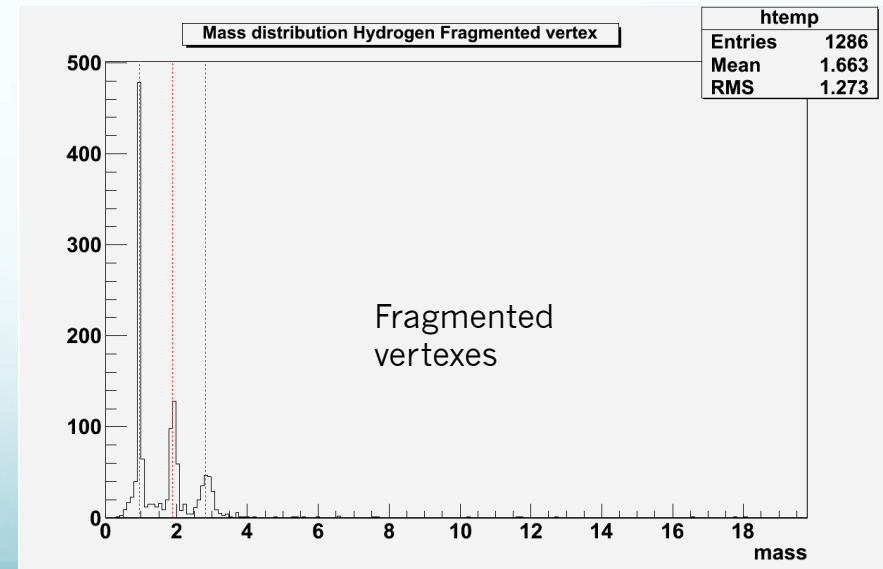
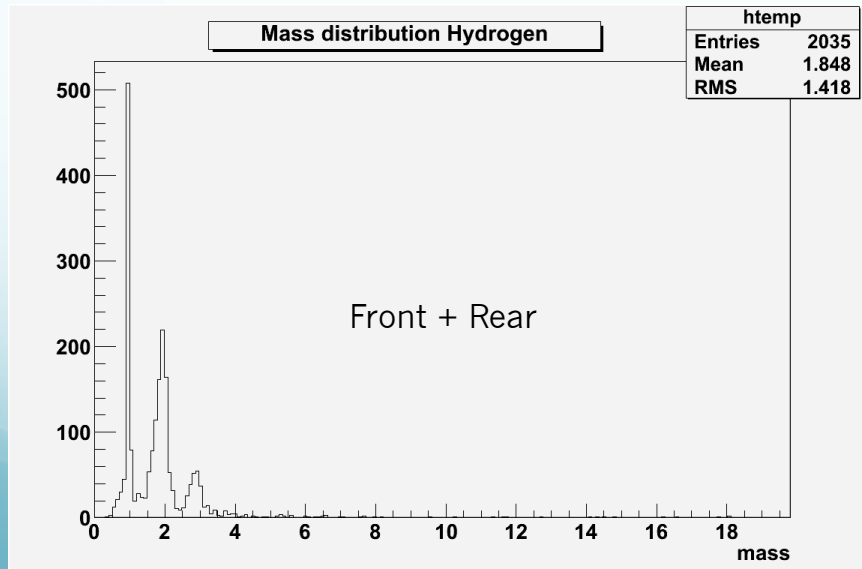
Production run



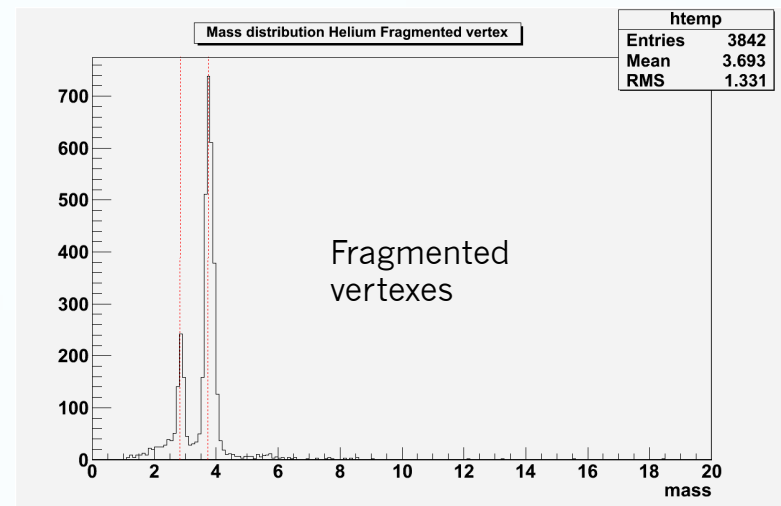
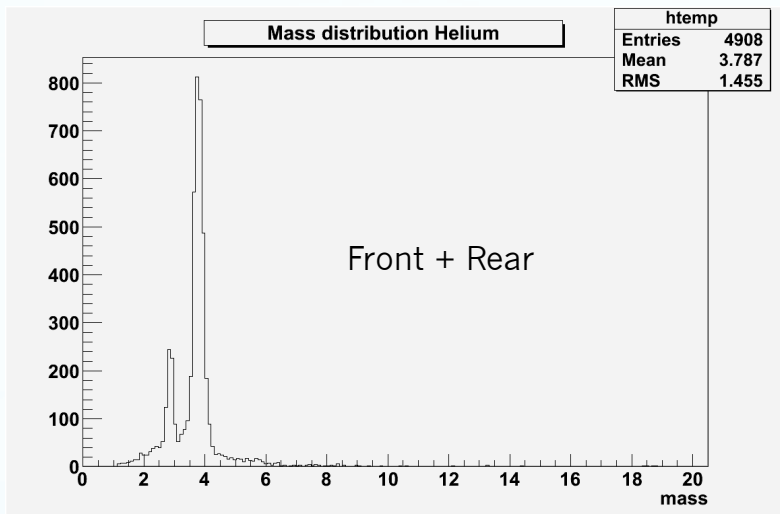
Mass distribution Hydrogen (MC)



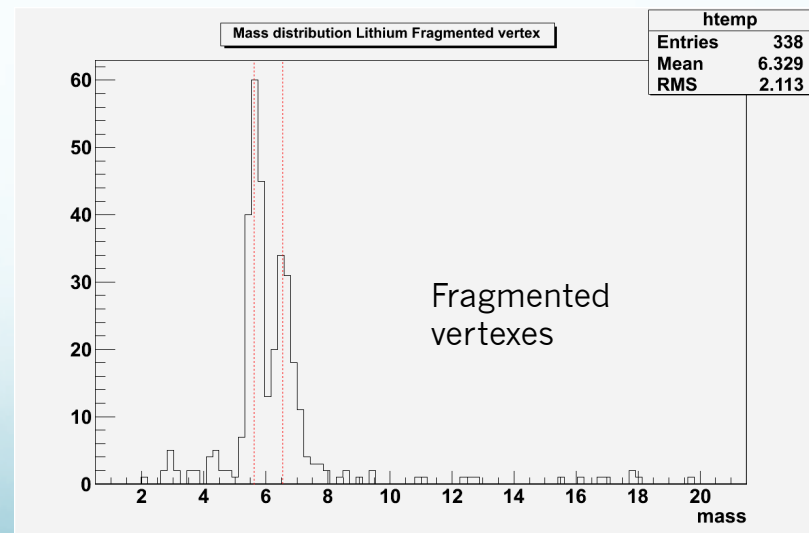
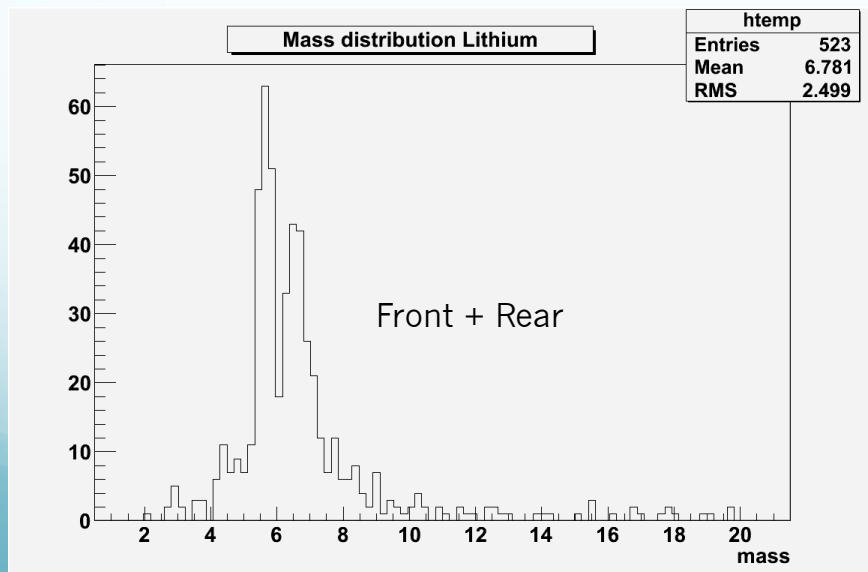
Monte Carlo



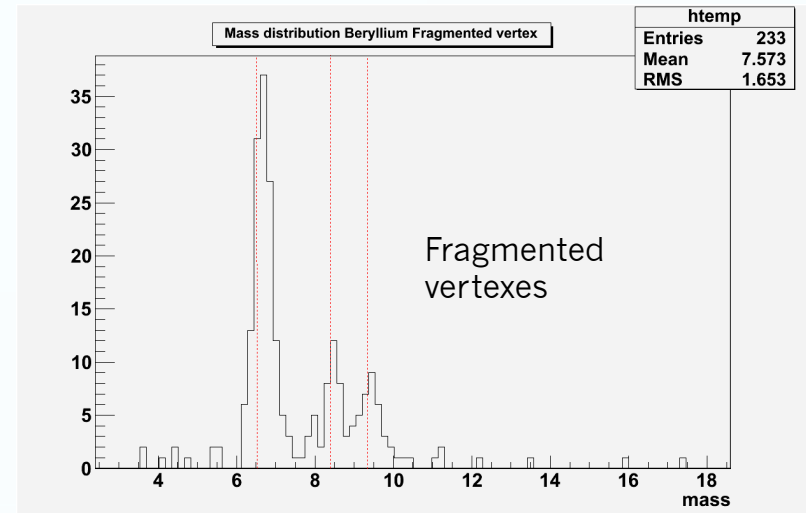
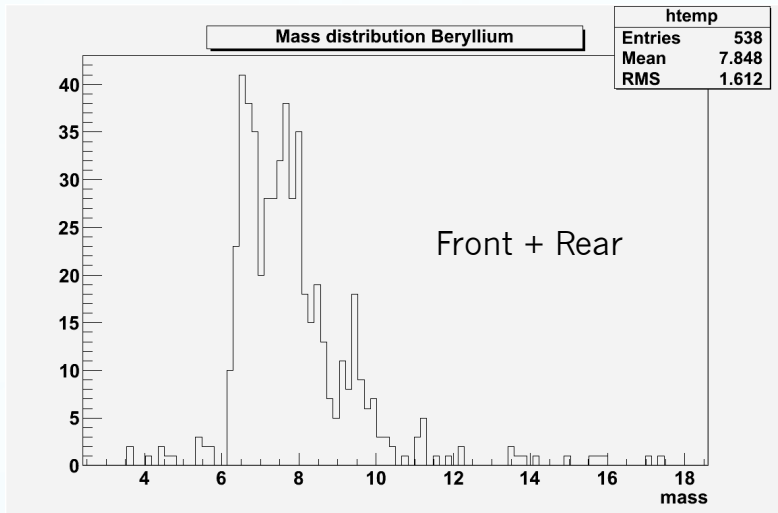
Mass distribution Helium - Lithium (MC)



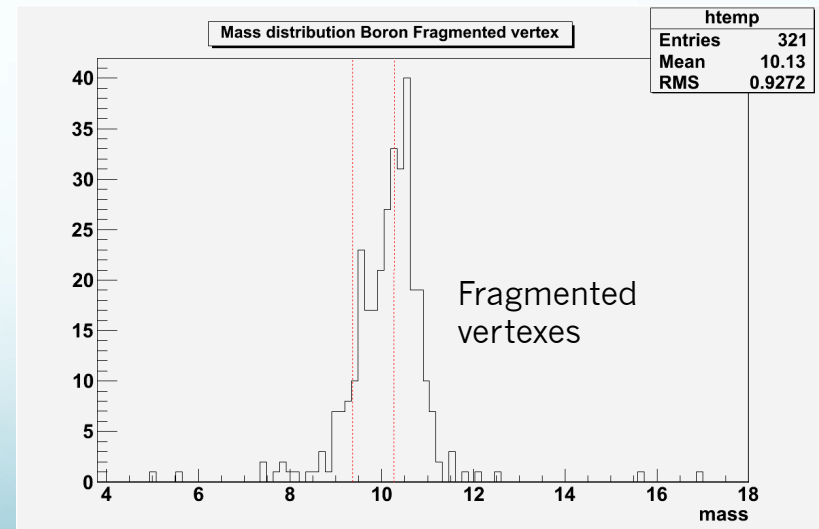
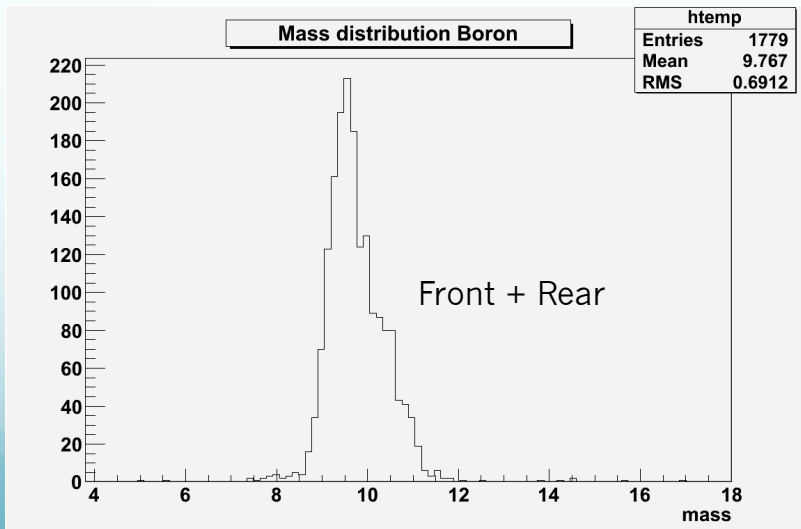
Monte Carlo



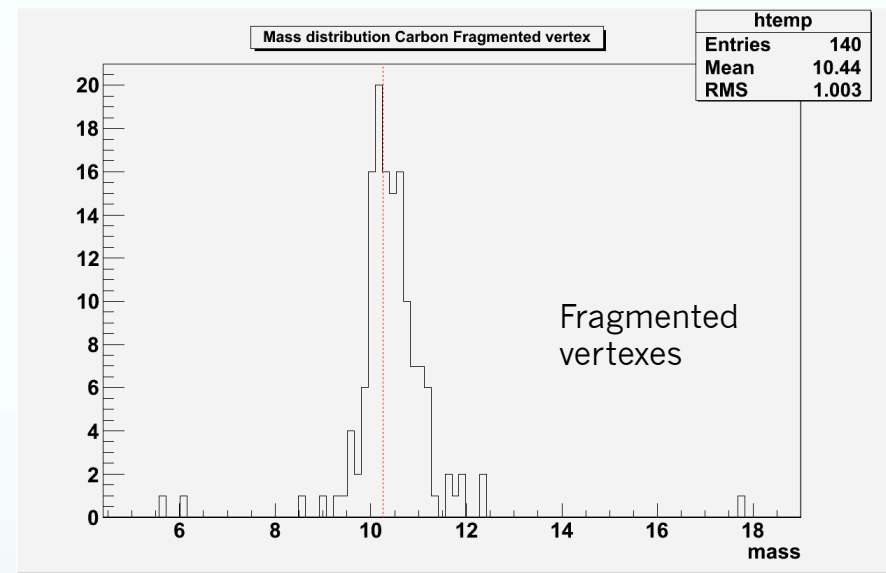
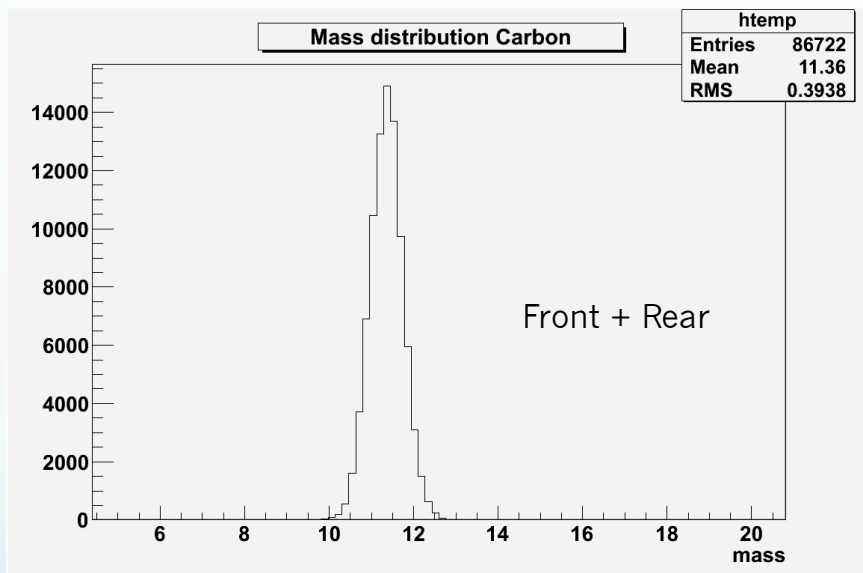
Mass distribution Beryllium- Boron (MC)



Monte Carlo



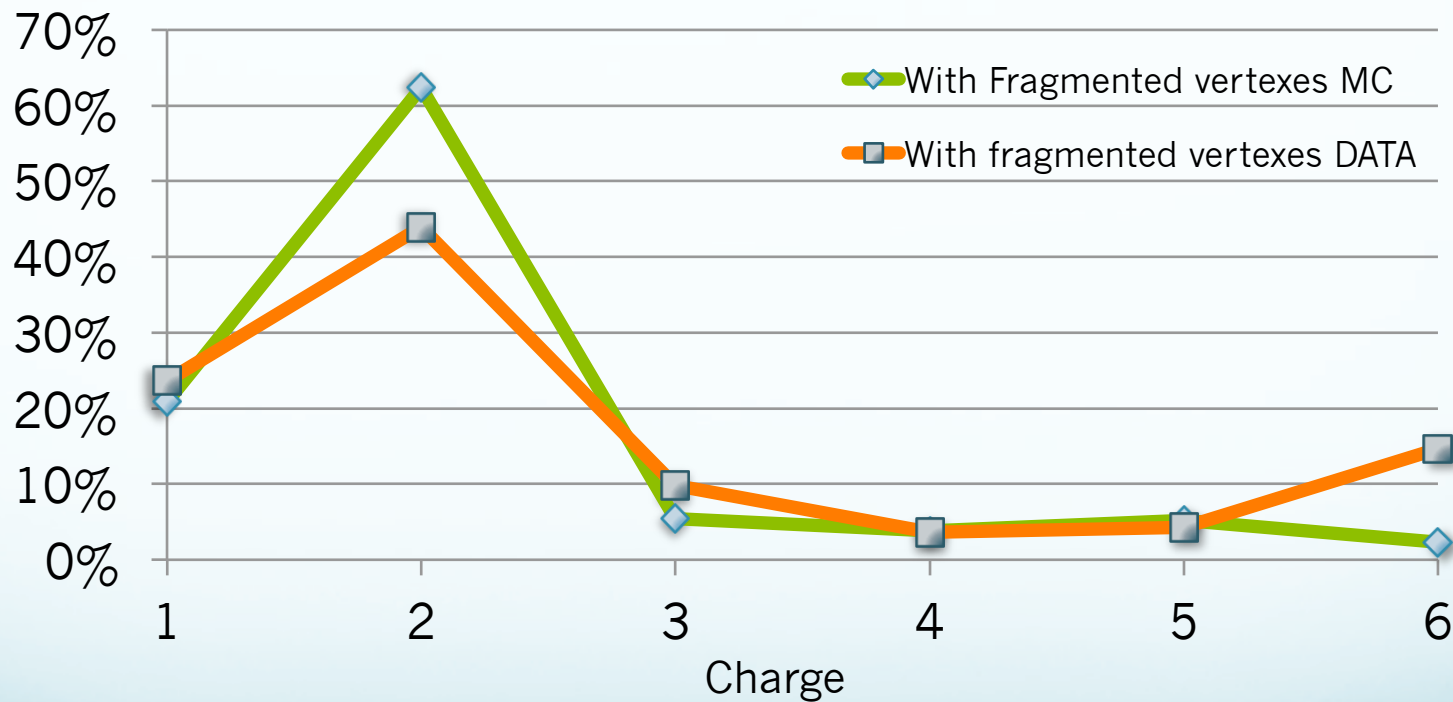
Mass distribution Carbon (MC)



Monte Carlo

Comparison between DATA and MC

% of fragmented tracks for each Z



Impact of using tracks from reconstructed vertexes

Production runs

of reconstructed tracks using vertexes compared to # of tracks using all tracks from VTX

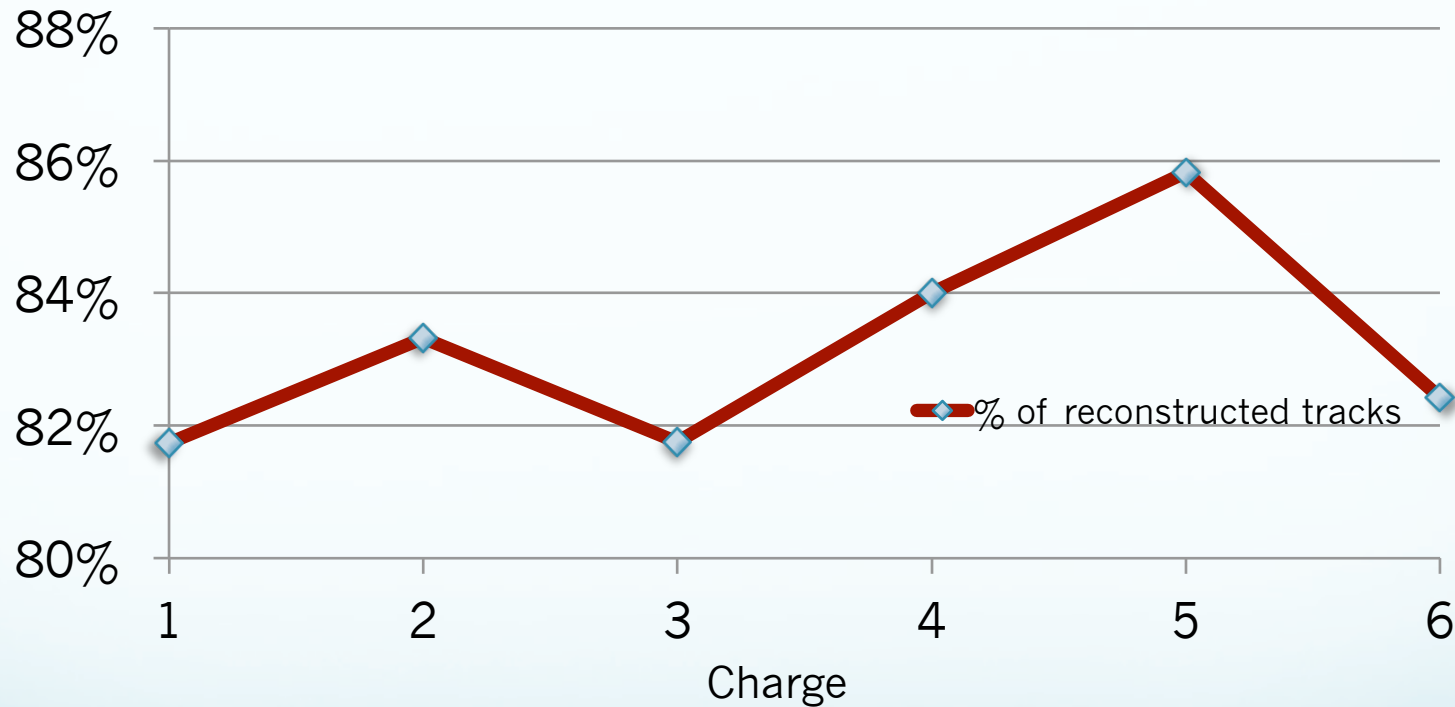


=> We are losing between 5 and 20% of tracks for each Z if using tracks coming from reconstructed vertexes instead of using all the tracks reconstructed by VTX detector.

Impact of using BM matching condition

Production runs + vertexes required

of reconstructed tracks using BM matching compared to # of tracks using all vertexes

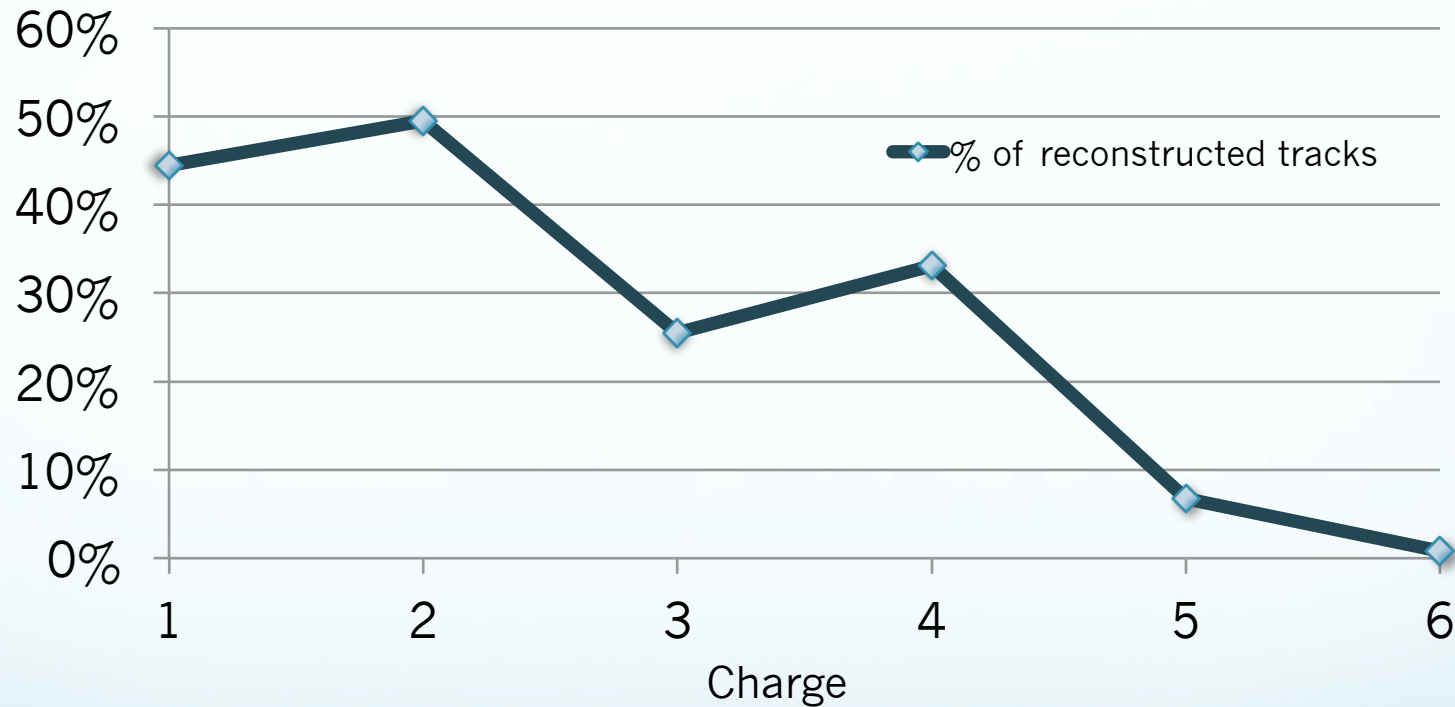


=> We are ~15% of tracks for each Z if using tracks matched with BM instead of using all vertexes.

Impact of using fragmented vertexes condition

Production runs + vertexing + BM matching required

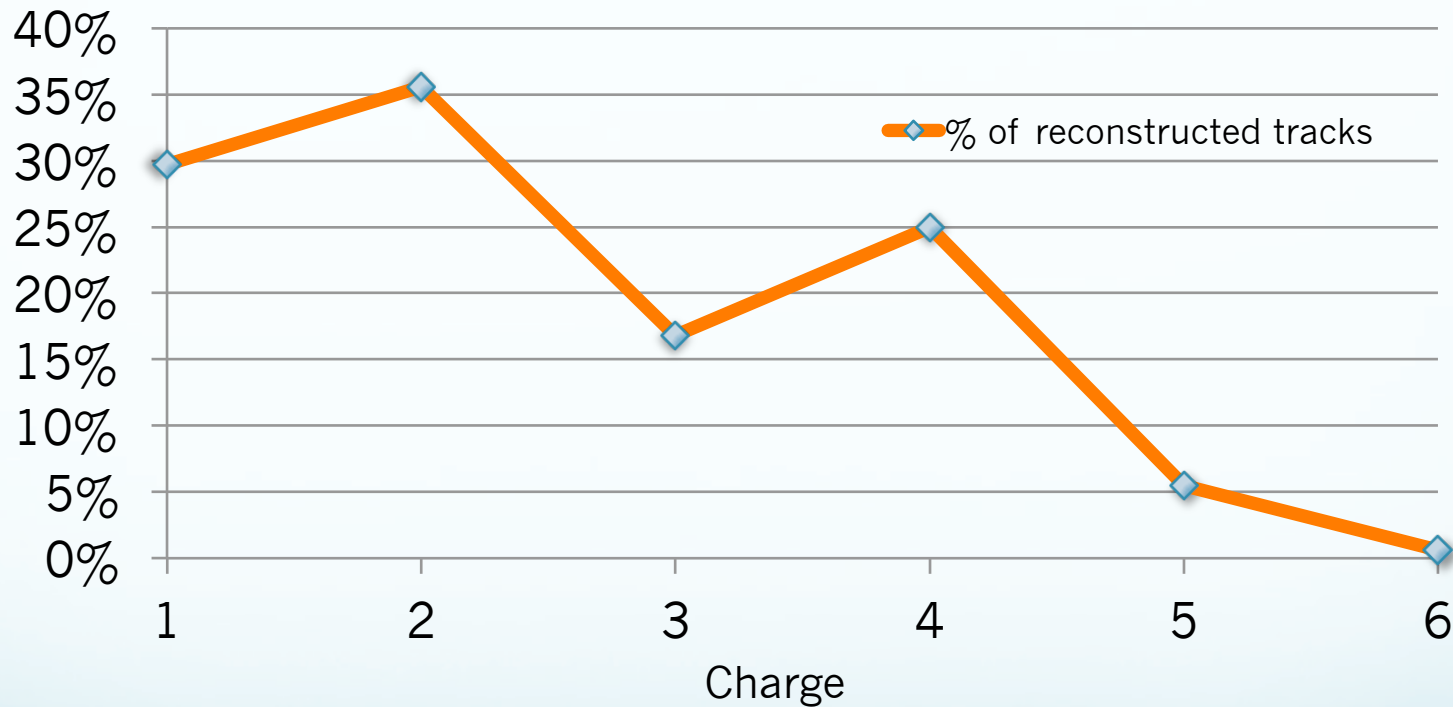
**# of reconstructed tracks using fragmented vertexes
compared to # of tracks using all vertexes**



=> We are losing a big part of tracks while using fragmented vertexes condition (# of tracks in vertex > 1).

Conclusion

of reconstructed tracks using fragmented events compared to # of reconstructed using all available tracks from VTX

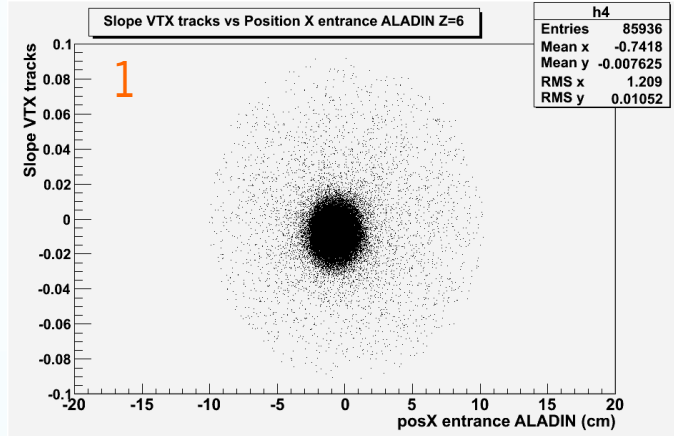


=> Important differences between no condition and all restrictive conditions in number of reconstructed tracks.

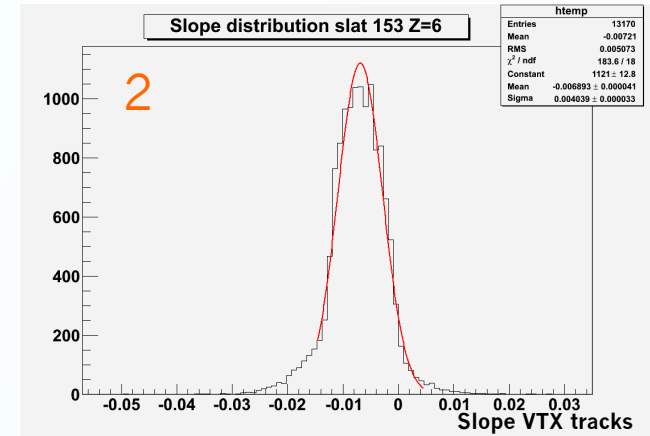
Influence of slat width on momentum/mass distribution (DATA)

Constraint: We don't have the exact X position in slat (slat width ~26mm).

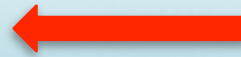
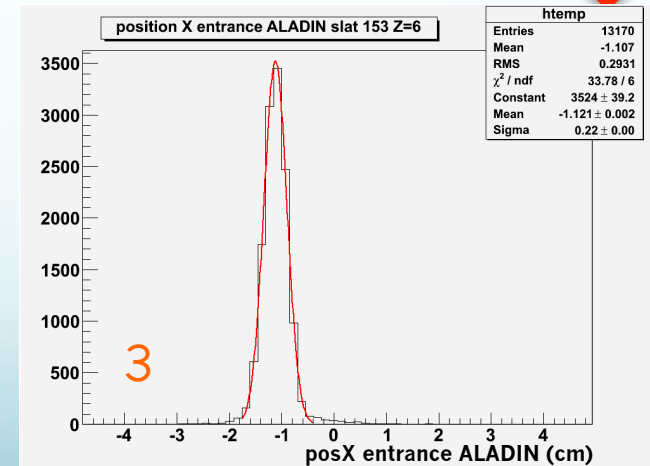
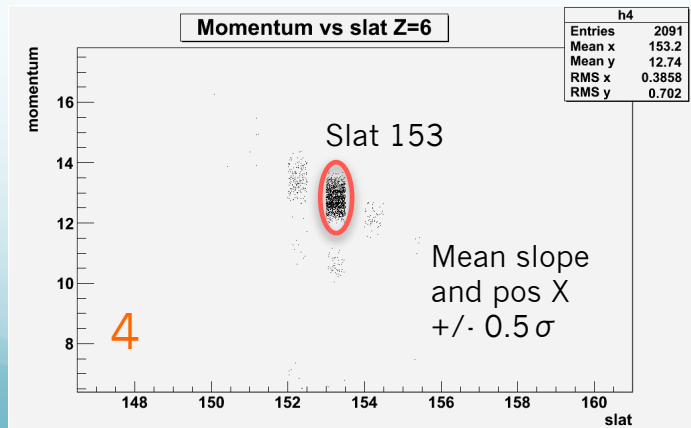
Consequences ?



Slat 153



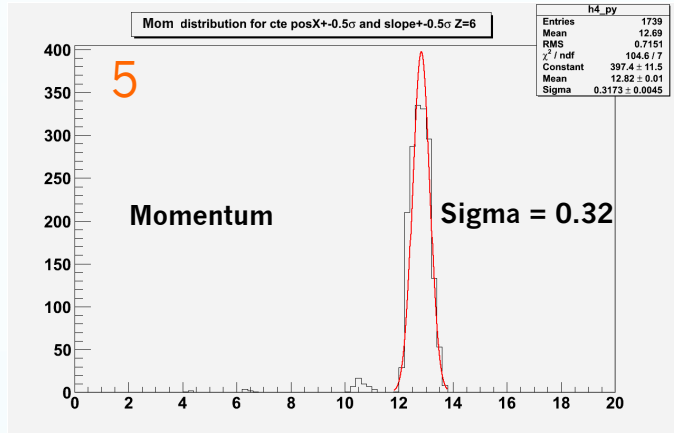
Production run



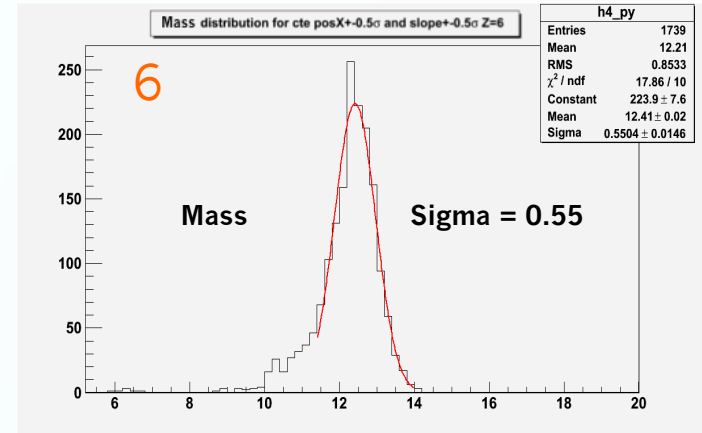
What about mass distribution ?

Influence of slat width on momentum/mass distribution (DATA)

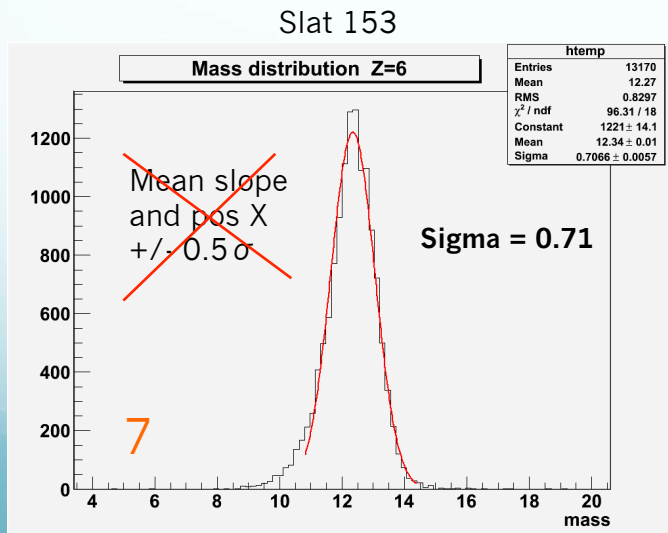
Constraint: We don't have the exact X position in slat (slat width ~26mm).



Slat 153



Production run



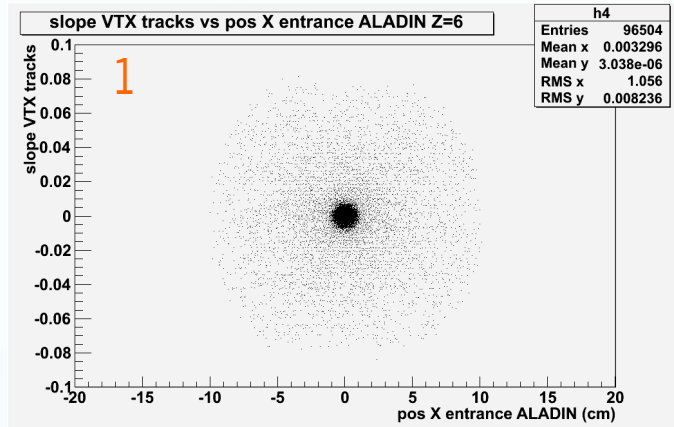
$$Mass = \frac{Final\ Momentum}{\beta * \gamma}$$

=> RMS increases because of $\beta * \gamma$!!

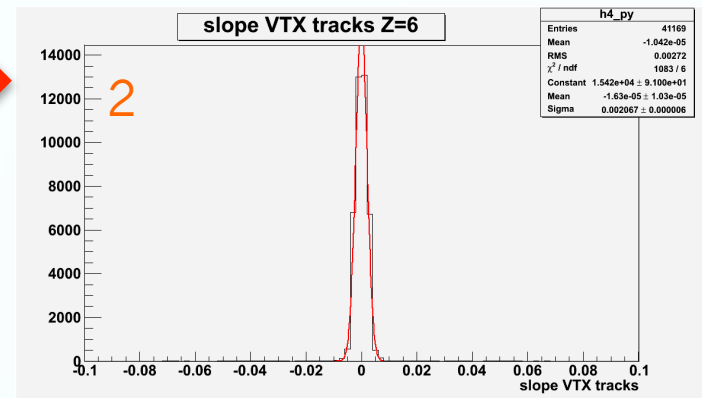
Influence of slat width on momentum/mass distribution (MC)

Constraint: We don't have the exact X position in slat (slat width ~26mm).

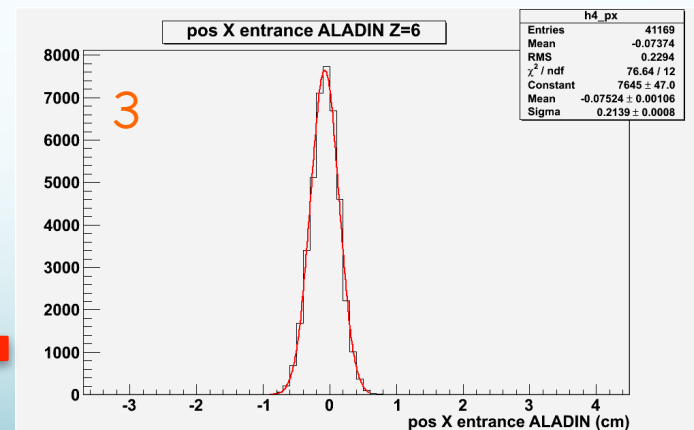
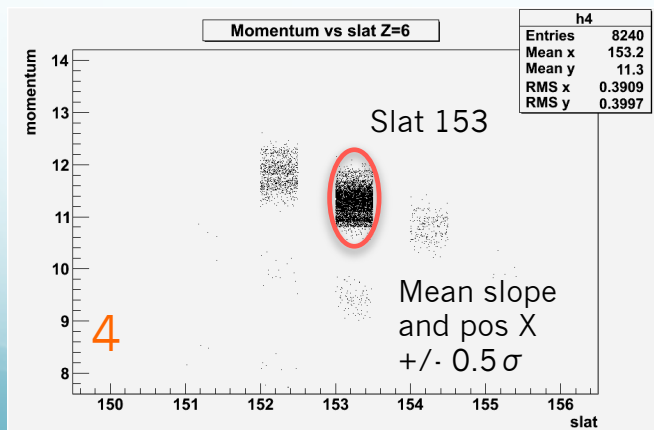
Consequences ?



Slat 153



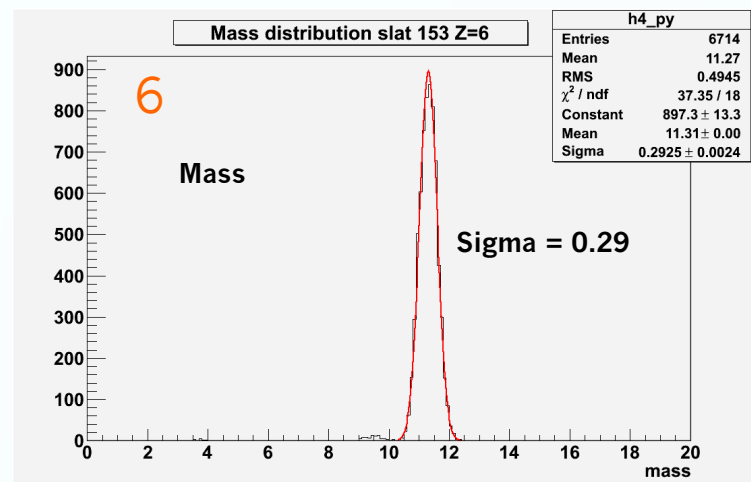
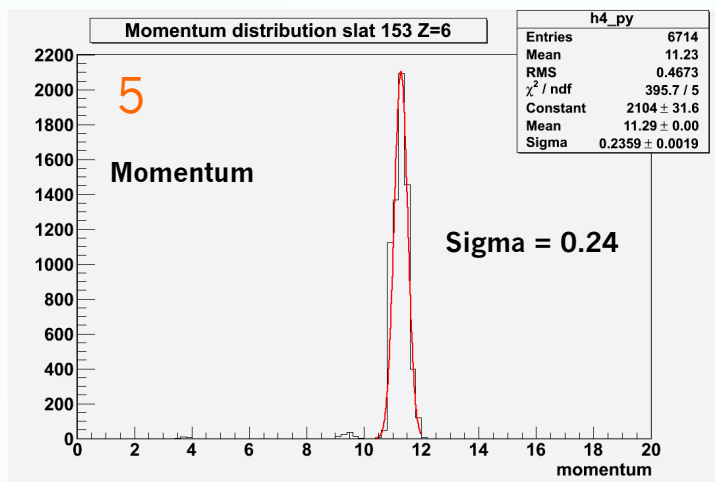
Monte Carlo



What about mass distribution ?

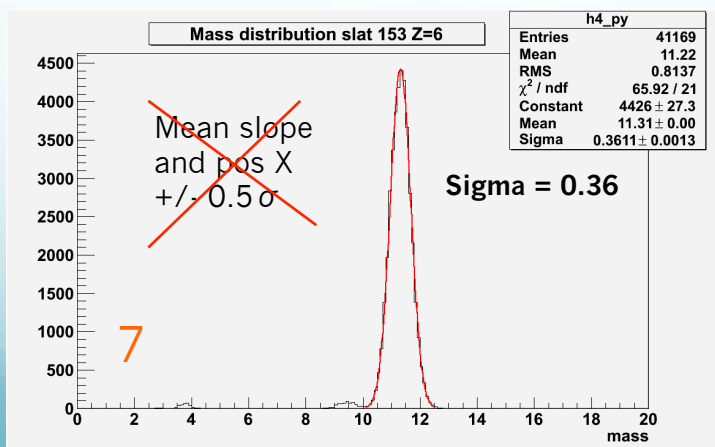
Influence of slat width on momentum/mass distribution (MC)

Constraint: We don't have the exact X position in slat (slat width ~26mm).



Slat 153

Monte Carlo



One slat width (26mm)	MC	DATA
Momentum σ with cuts	0.24	0.32
Mass σ with cuts	0.29	0.55
Mass σ without cuts	0.36	0.71

Conclusion and outlooks

- Beginning of convergence between MC and Data.
 - Still improving the global reconstruction algorithm.
-
- The general shape of mass distributions will not change a lot in the future.