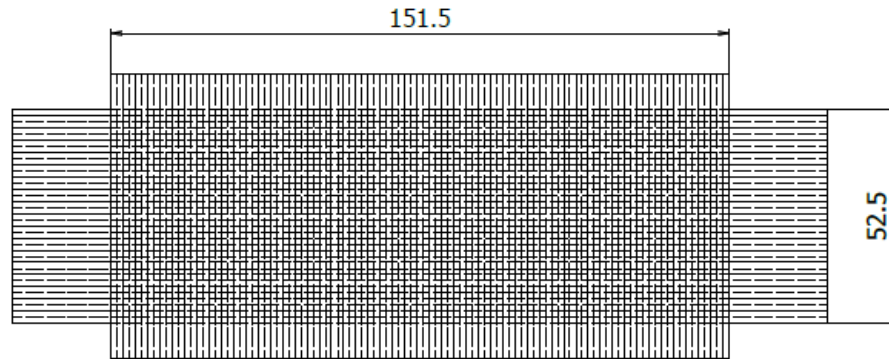


Fiber target simulation for the S-2S experiment

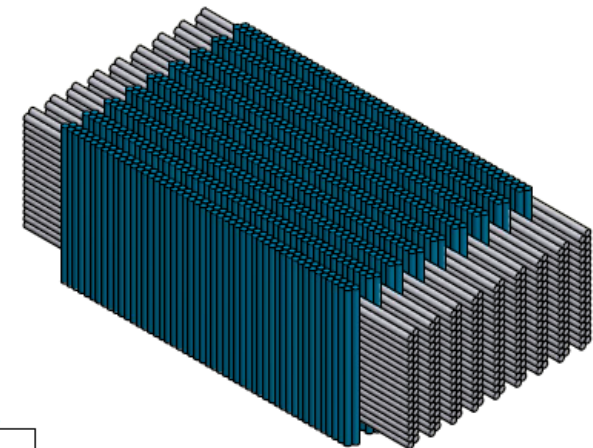
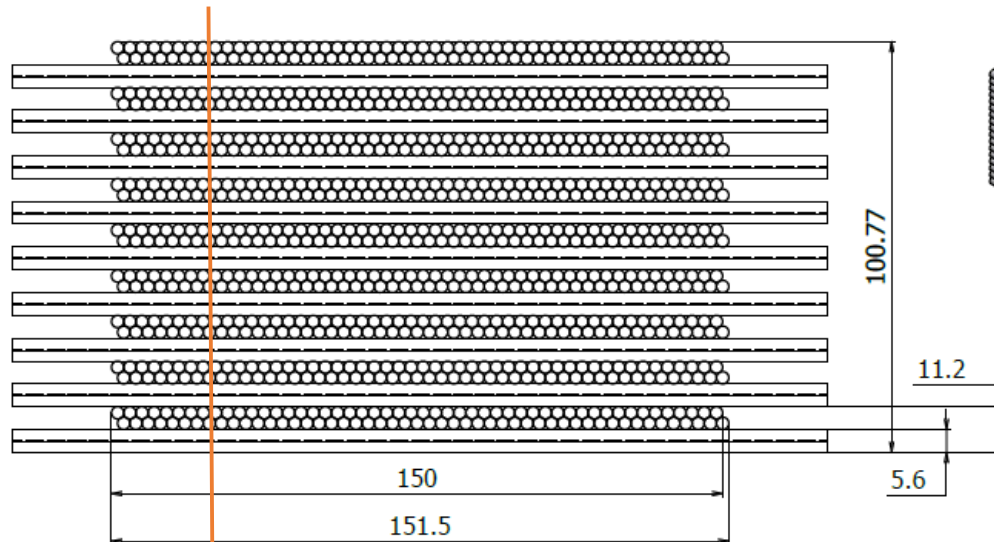
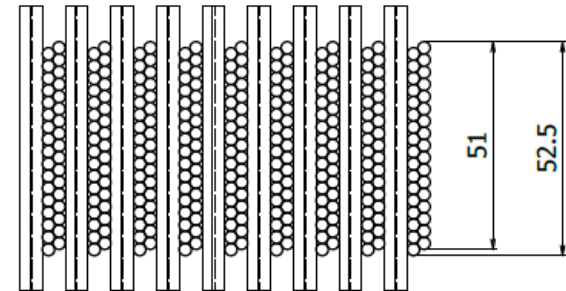
Toshiyuki Gogami

2015/10/17

Setup in the simulation

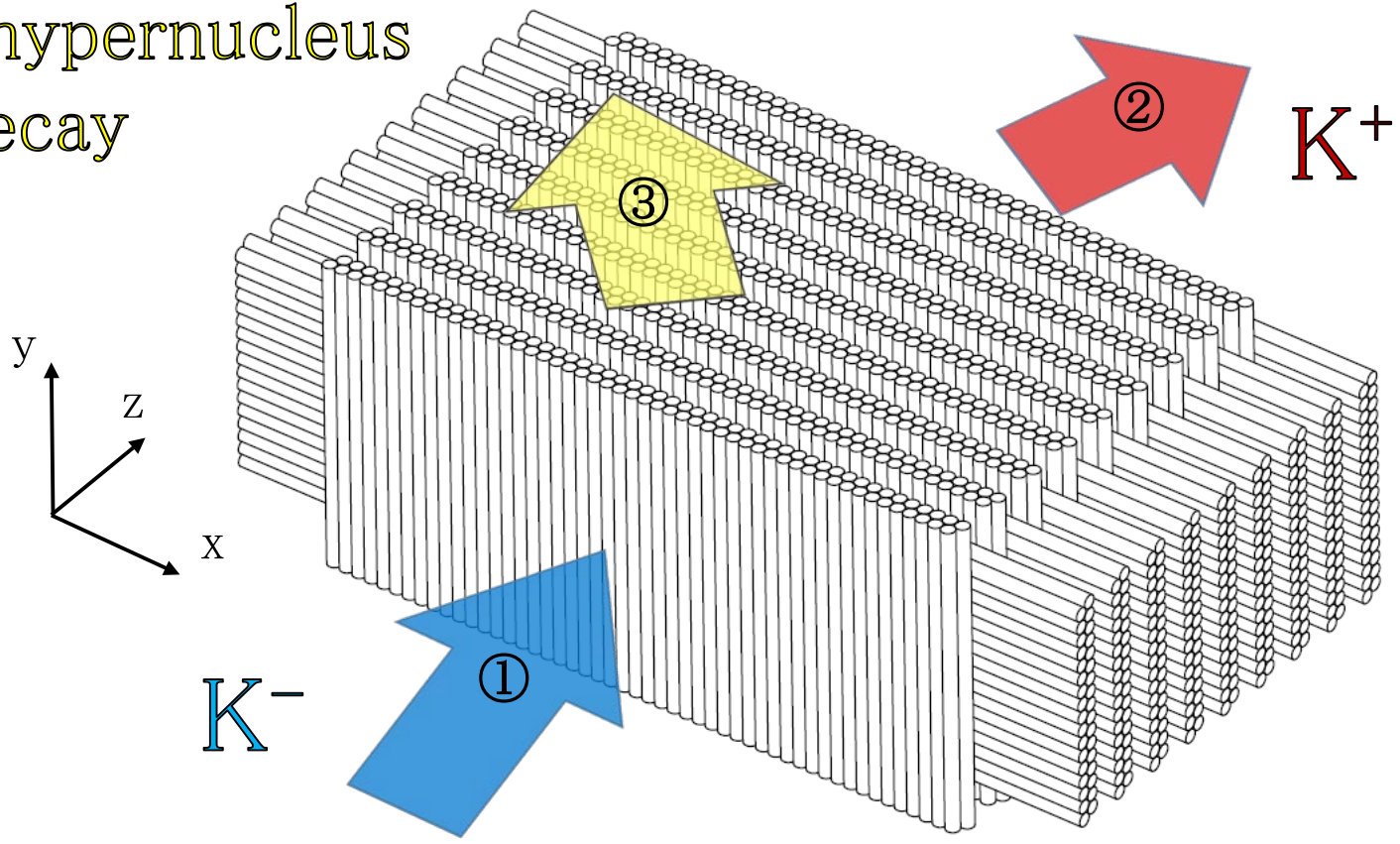


SIDE view

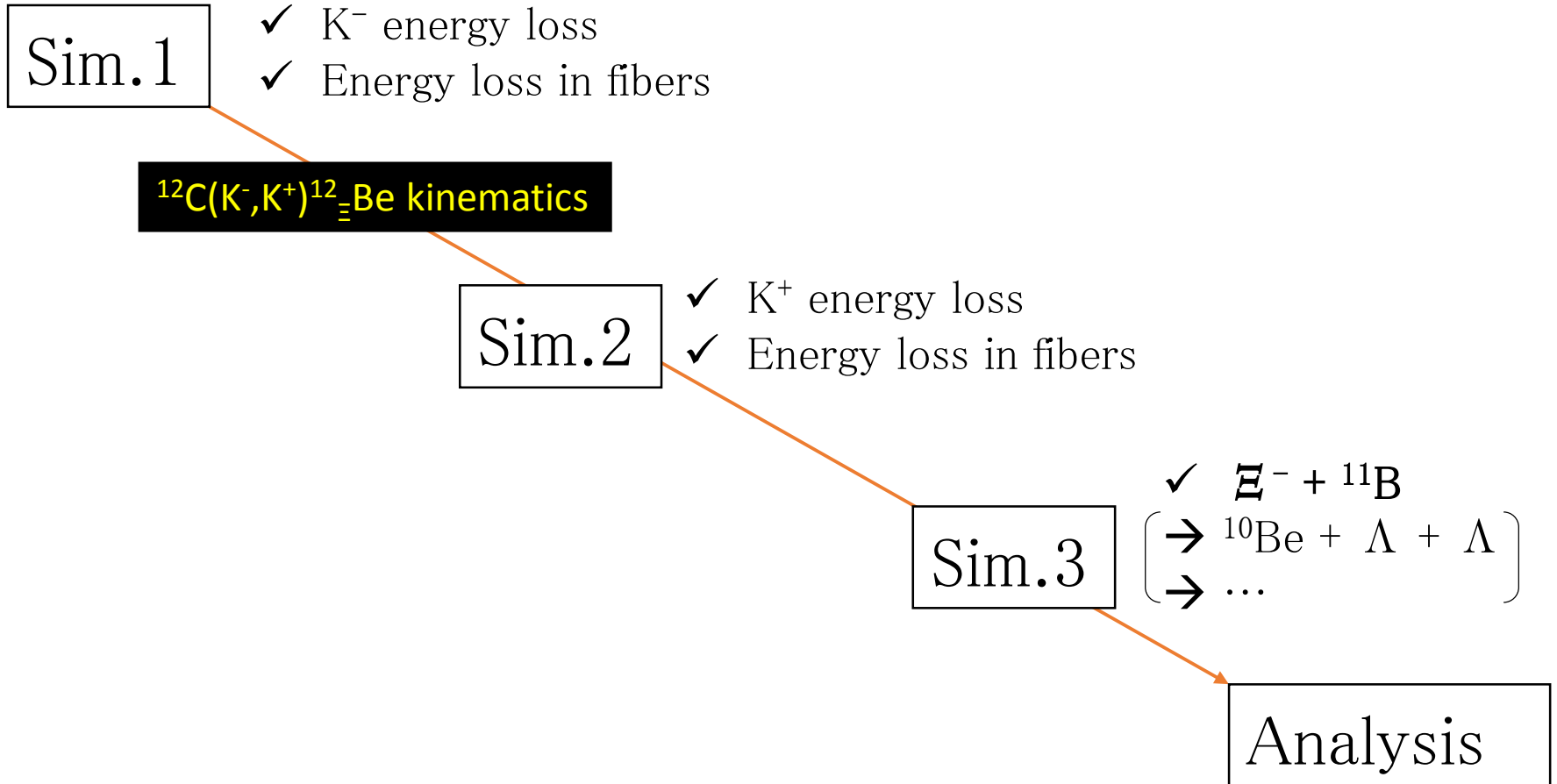


Geant4 Monte Carlo Simulation

Ξ^- hypernucleus
→ Decay



Simulation Flow



Assumptions in the simulation

Assumptions

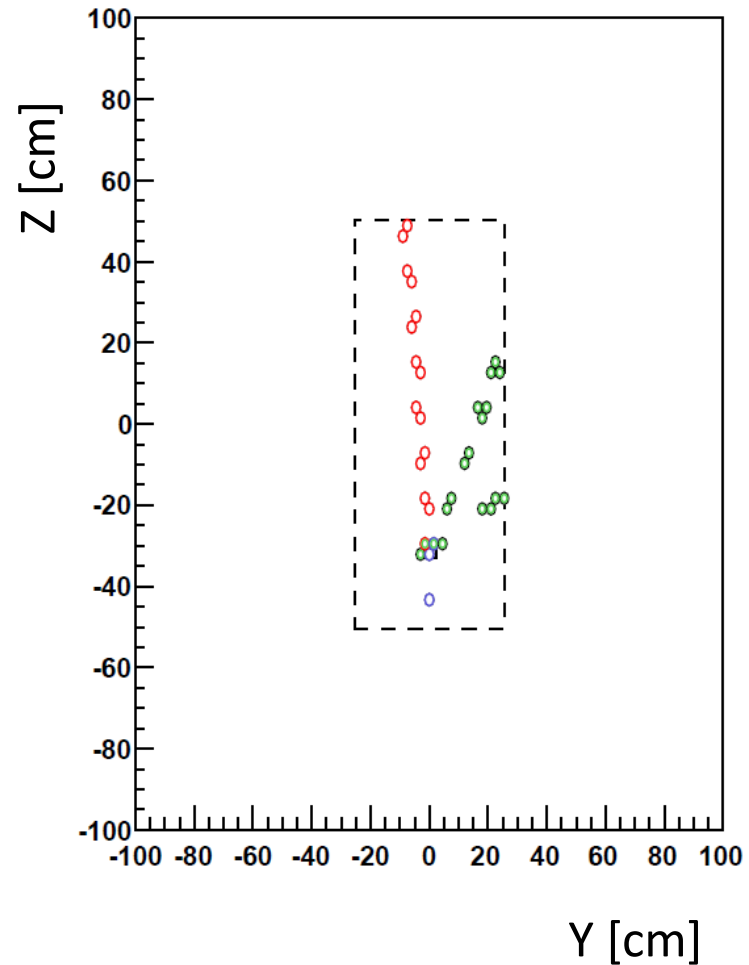
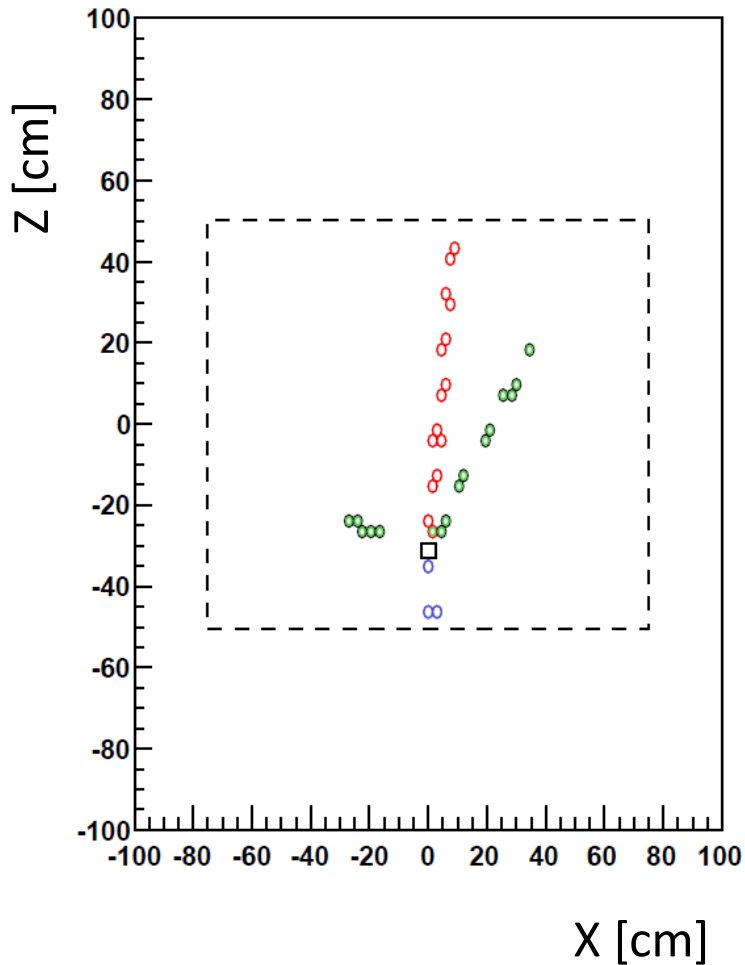
- $p_{\{K^-\}}: 1.8 \text{ GeV}/c$
- $B_{\Xi} = 4.5 \text{ MeV}$
- Incident K^- angle: 0 deg
- Ξ production point: Random in z-axis, but zero for x and y
- $\Delta p/p$ for K^- : $10.0E^{-4}$
- $\Delta p/p$ for K^+ : $5.0E^{-4}$

Event display (1)

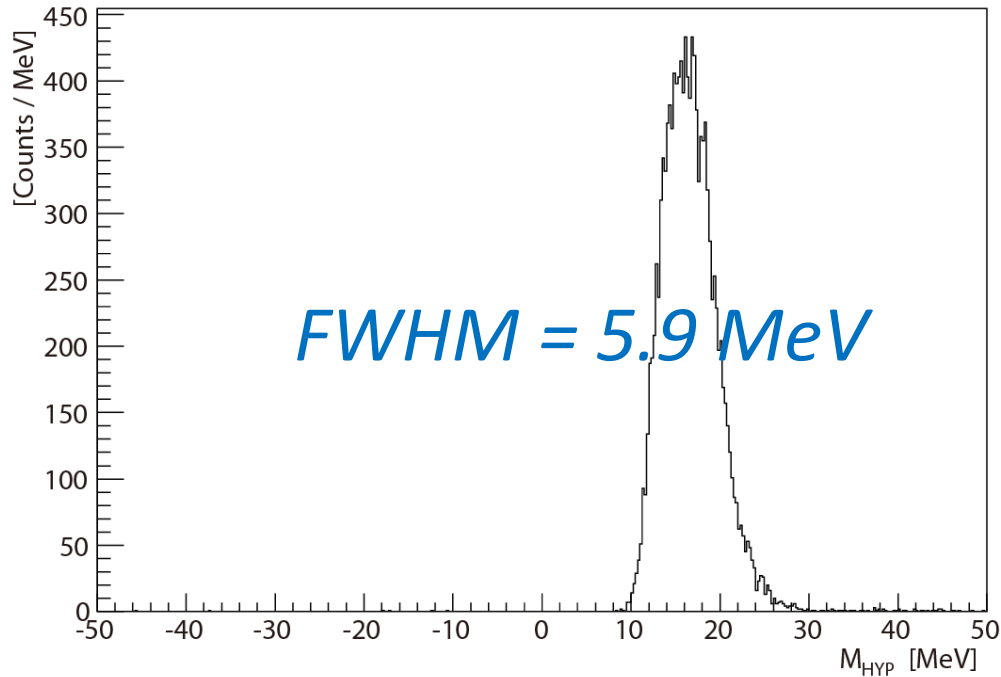
Blue: K^- related

Red: K^+ related

Black + Green: Ξ hyp. related.



Missing mass distribution



The missing mass is shifted to the right side is due to the energy losses of K^- and K^+ .

→ In this slid, only the width is discussed.

Energy loss correction

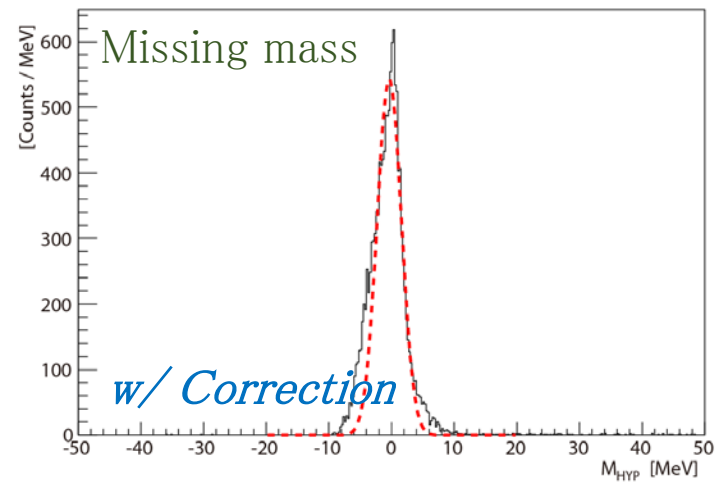
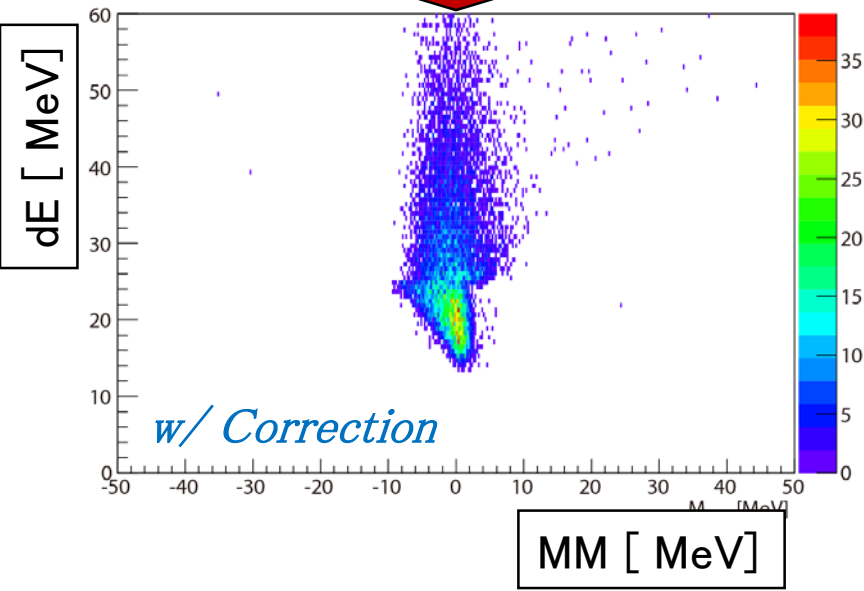
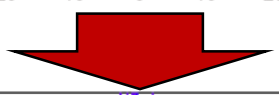
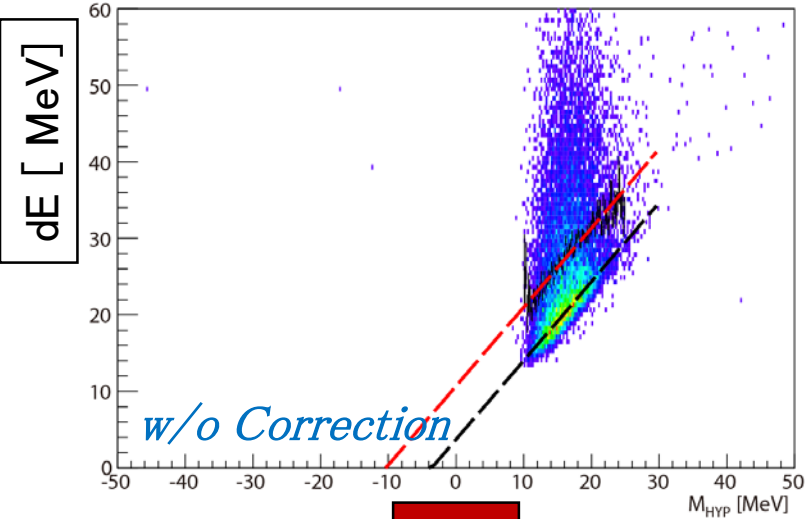
Two tests:

- I. Missing mass (MM) correction by “dE in fiber vs. MM”
- II. MM correction using dE in fiber **event by event**.

Correction using dE vs. MM

dE: Total energy loss in K^- and K^+ tracks

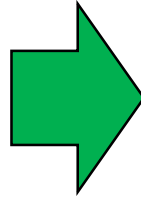
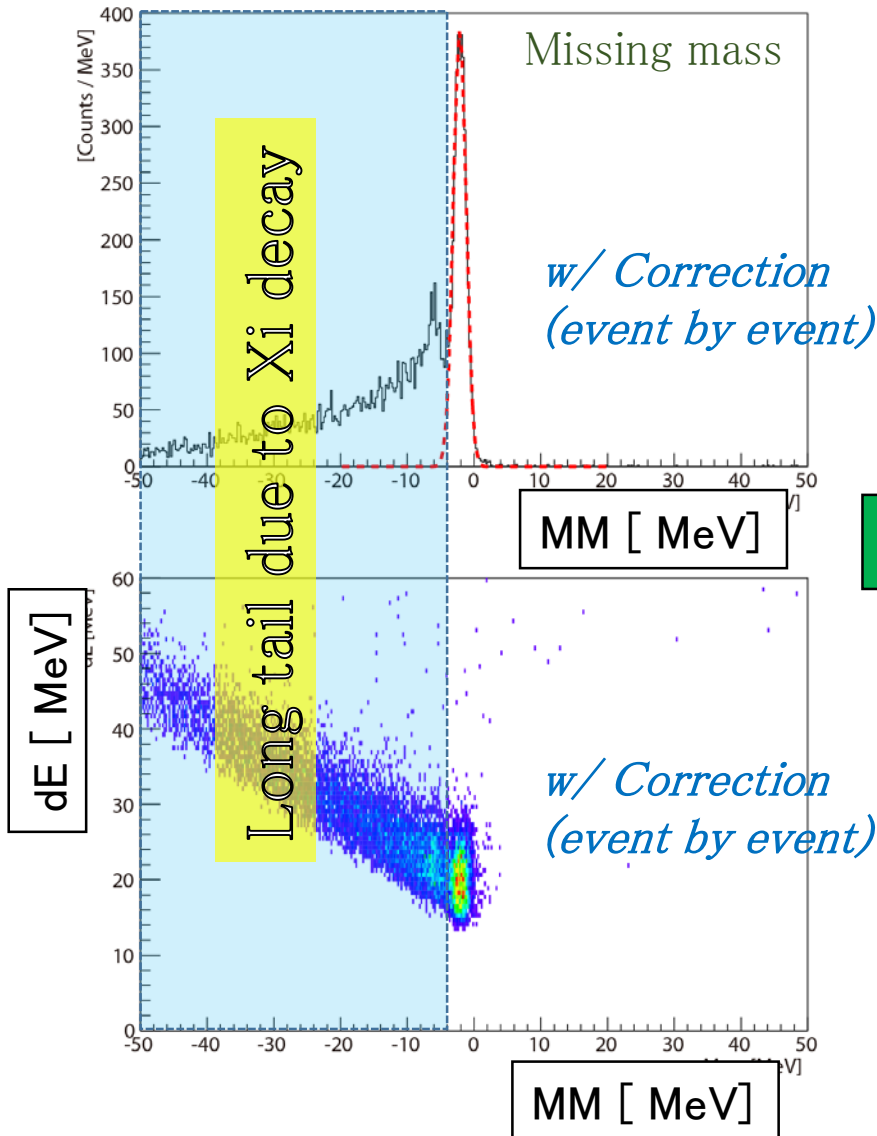
- Corrections by
- (1) Linear function (Black line)
 - (2) Shift ($MM > 25$ MeV)



FWHM = 4.5 MeV

Event by event correction

dE: Total energy loss in K^- and K^+ tracks

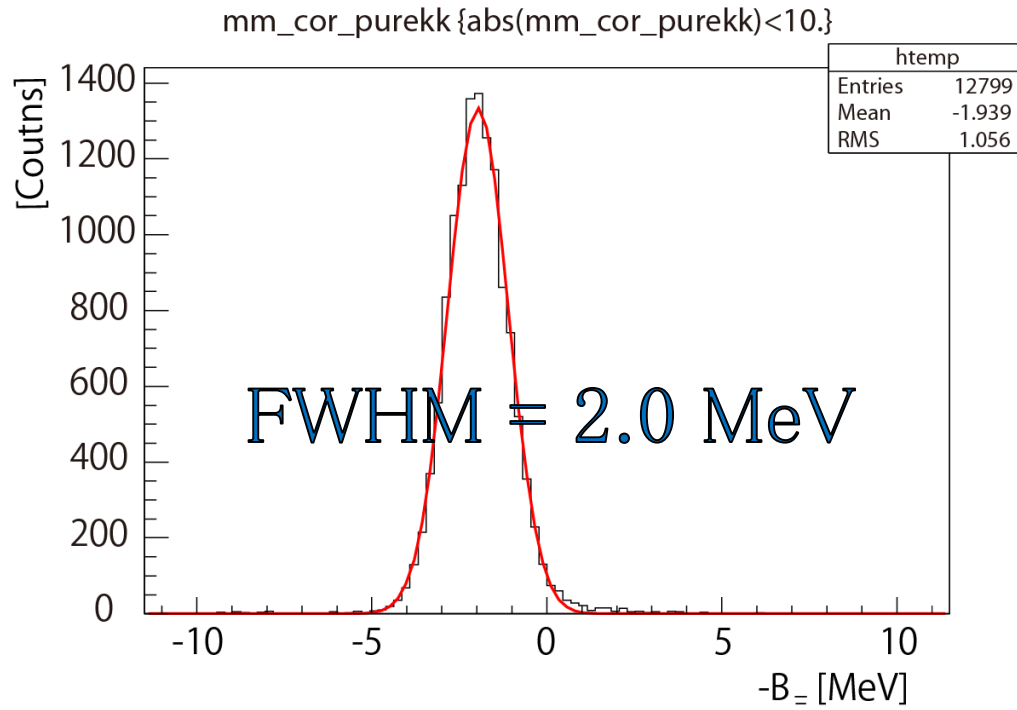


FWHM = 2.3 MeV

But, event escape in lower energy

Missing mass correction (without Ξ decay events)

理想



MM was corrected by dE
event by event *without* the Ξ decays

エネルギー損失に関して

[http://www-nh.scphys.kyoto-u.ac.jp/~gogami/s-2s/meeting/2014/gogami_S-2Smeeting\(2014_7_11\).pdf](http://www-nh.scphys.kyoto-u.ac.jp/~gogami/s-2s/meeting/2014/gogami_S-2Smeeting(2014_7_11).pdf)

の5ページ目参照です。

注) 上記のスライドのMMの計算にはバグあり(細く見えている)

Backup

Event by Event correction + dE vs. M_{HYP} correction

