S-2S meeting

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27Aug2014

Contents

About correction using

“Energy loss vs. missing mass”

Effects of decayed particles on the energy loss correction

At first, elementary process is considered:

$$p + K^- \rightarrow \Xi^- + K^+$$

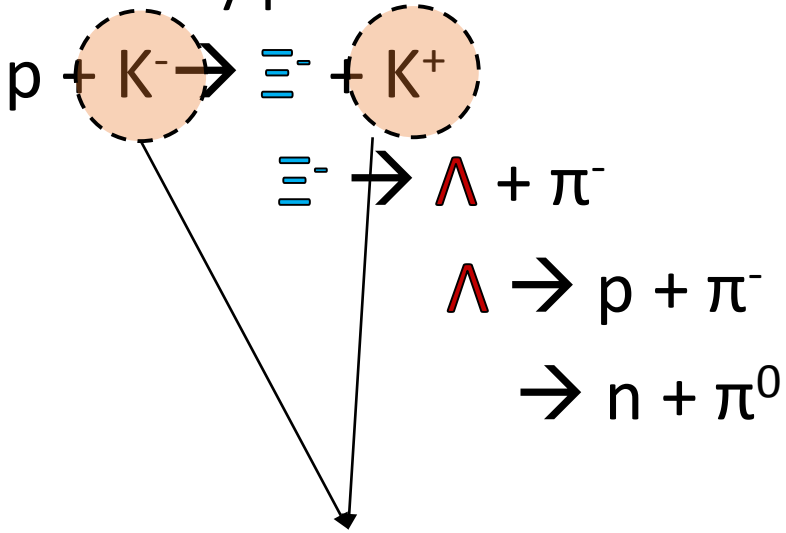
$$\Xi^- \rightarrow \Lambda + \pi^-$$

$$\Lambda \rightarrow p + \pi^-$$

$$\rightarrow n + \pi^0$$

Effects of decayed particles on the energy loss correction

At first, elementary process is considered:

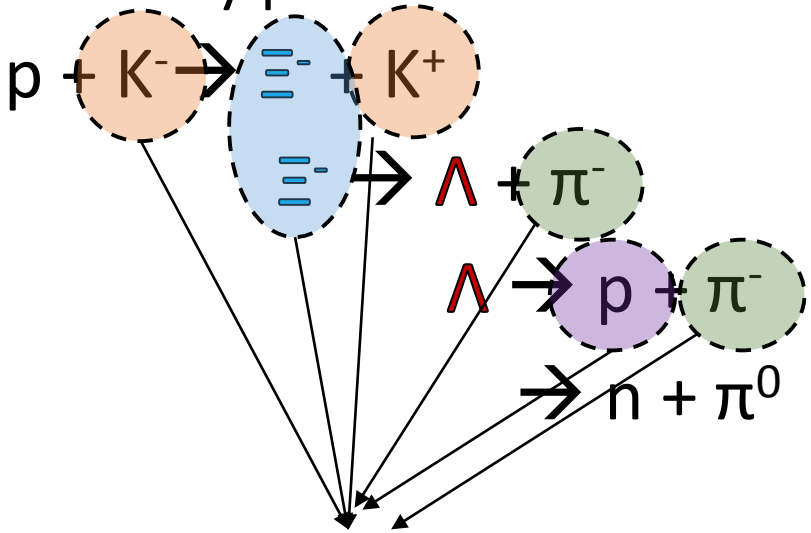


Correlation between dE and mm can be seen ;)

→ *Correction is possible.*

Effects of decayed particles on the energy loss correction

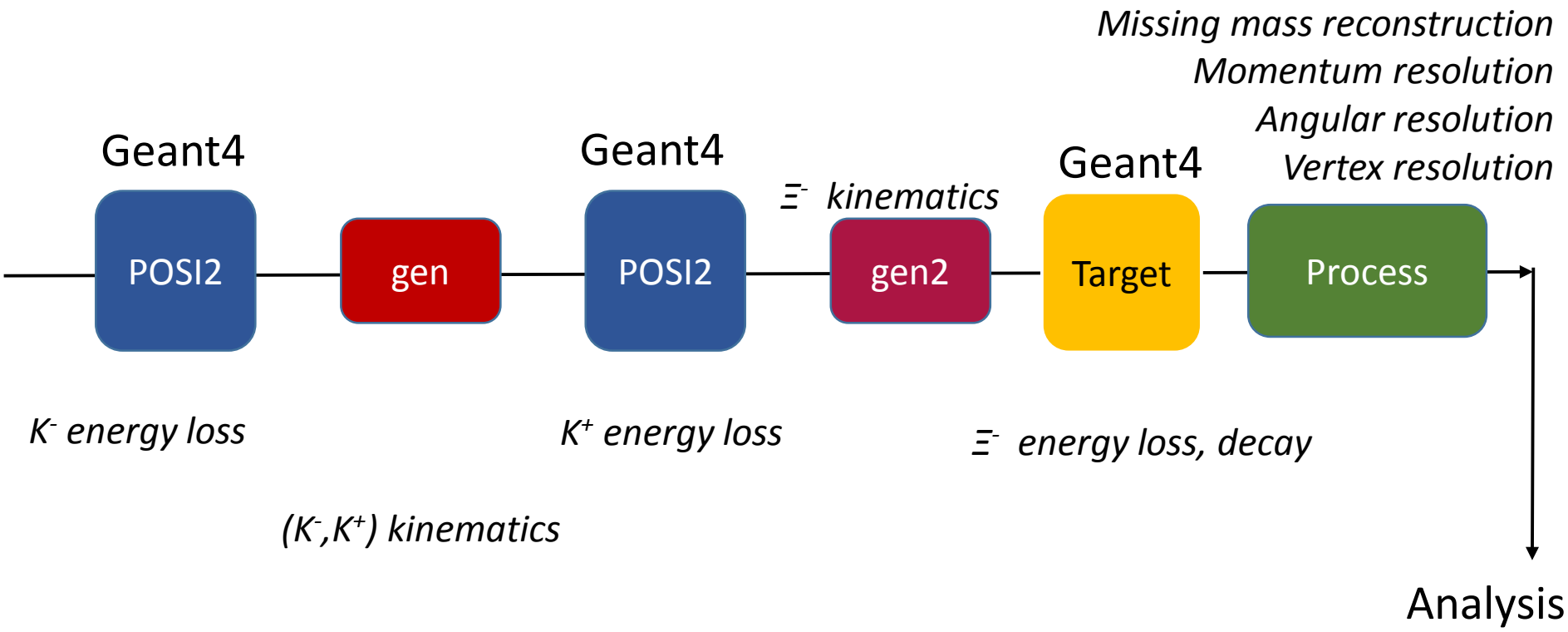
At first, elementary process is considered:



Can correlation between dE and mm be seen ??

→ *Is the correction possible ??*

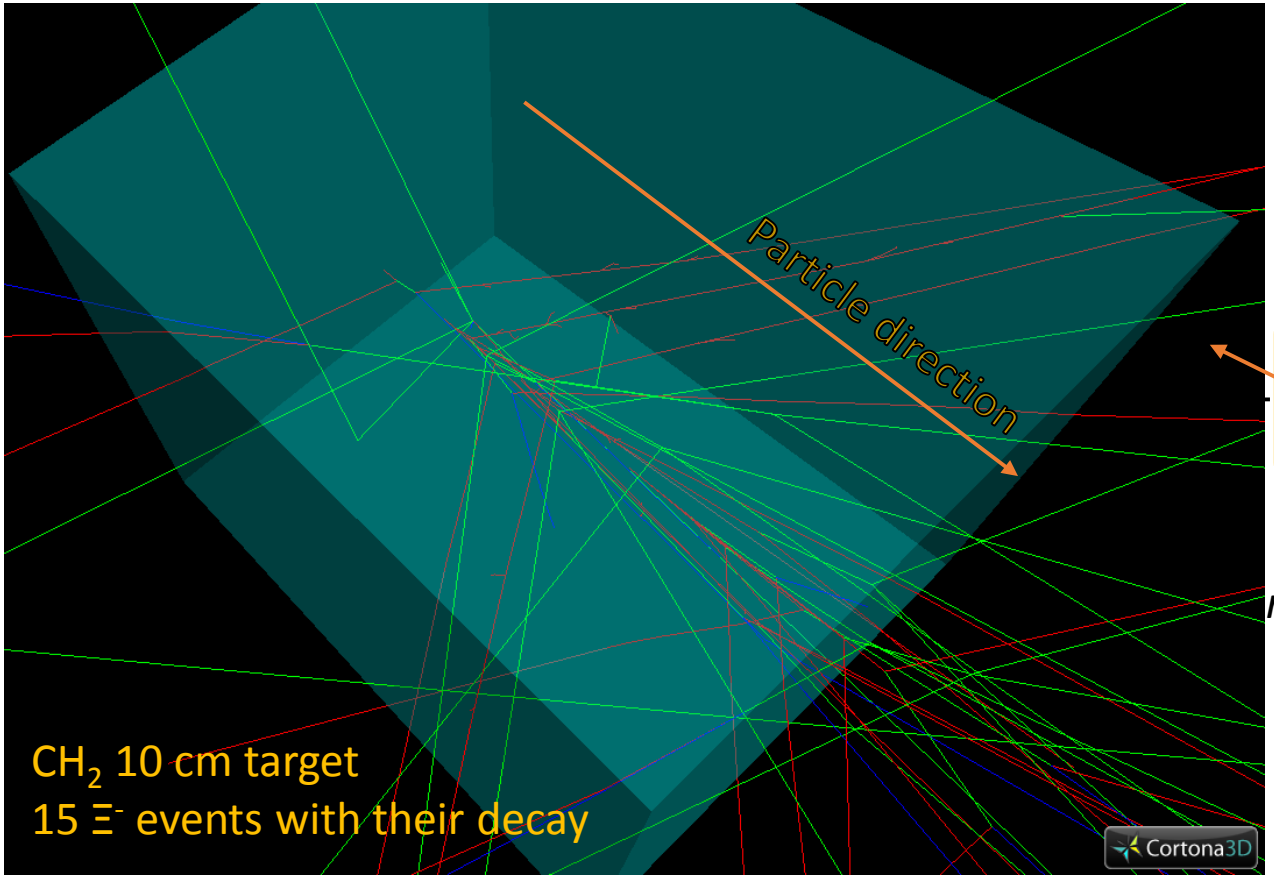
Flow of Monte Carlo simulation



Analysis memo:

http://www-nh.scphys.kyoto-u.ac.jp/~gogami/doc/g4_mmresolution/

Flow of Monte Carlo simulation



Missing mass reconstruction
Momentum resolution
Angular resolution
Vertex resolution

Geant4

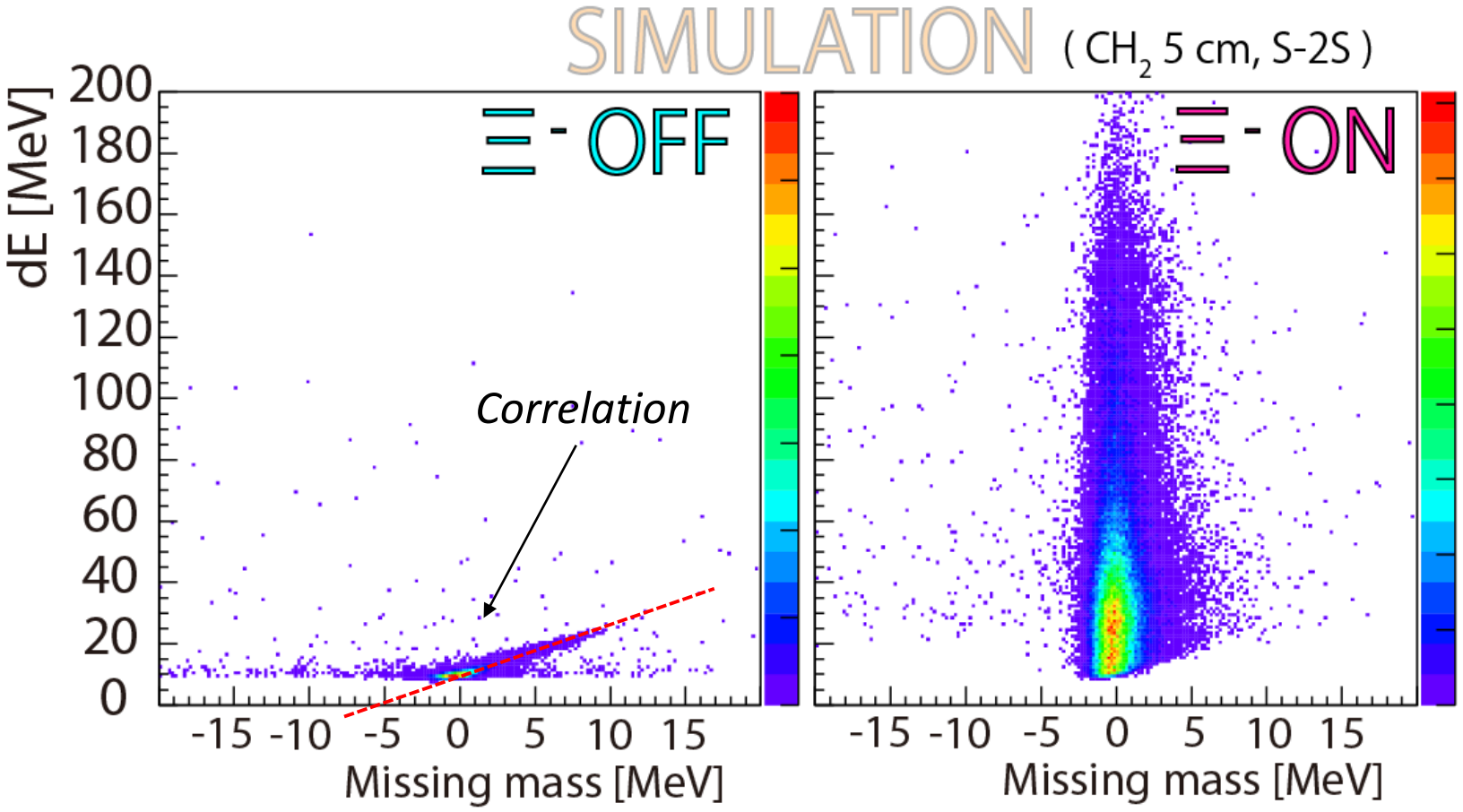
Target → Process → Analysis

nergy loss, decay

Analysis memo:

http://www-nh.scphys.kyoto-u.ac.jp/~gogami/doc/g4_mmresolution/

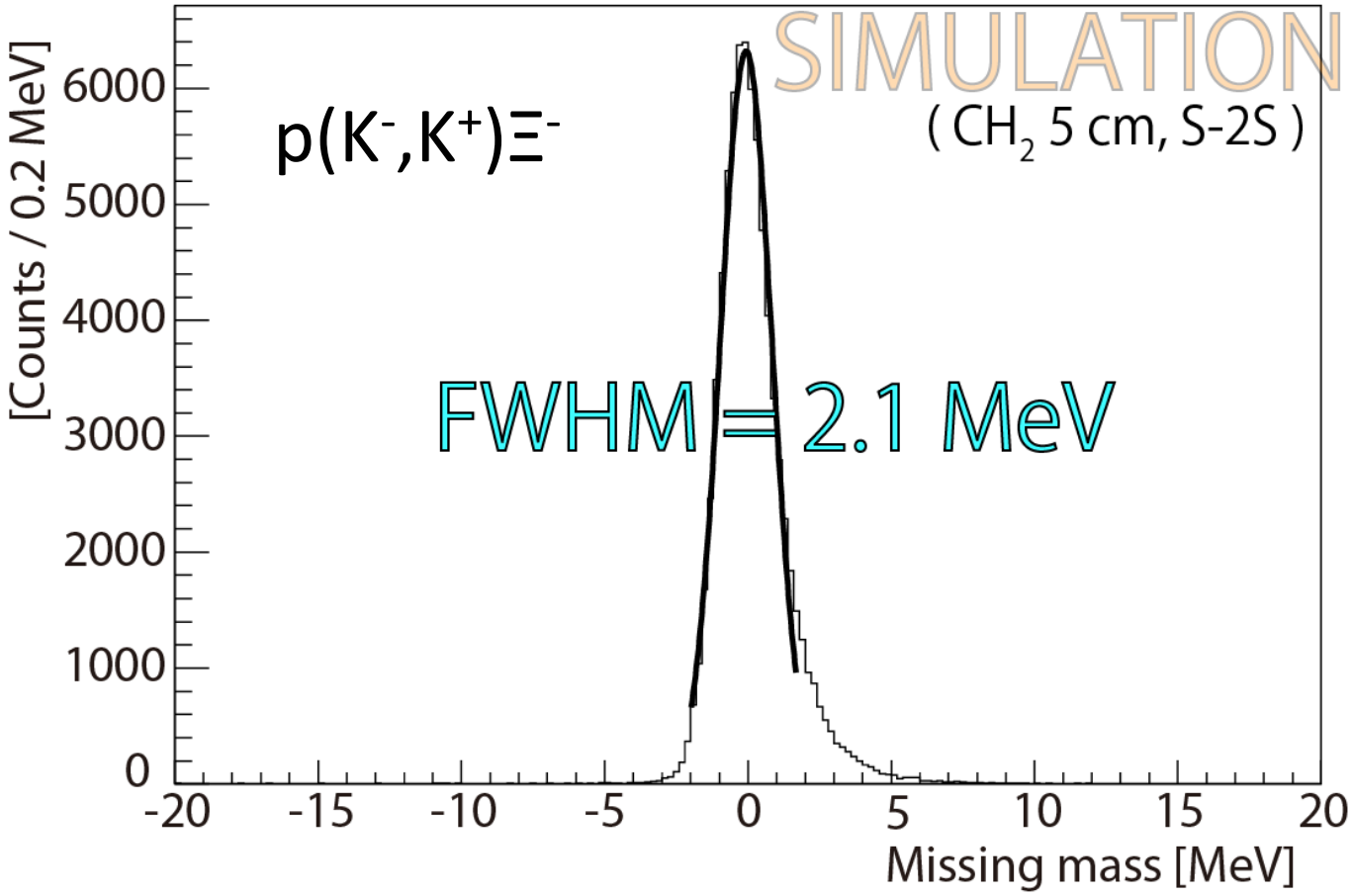
Energy loss vs. missing mass



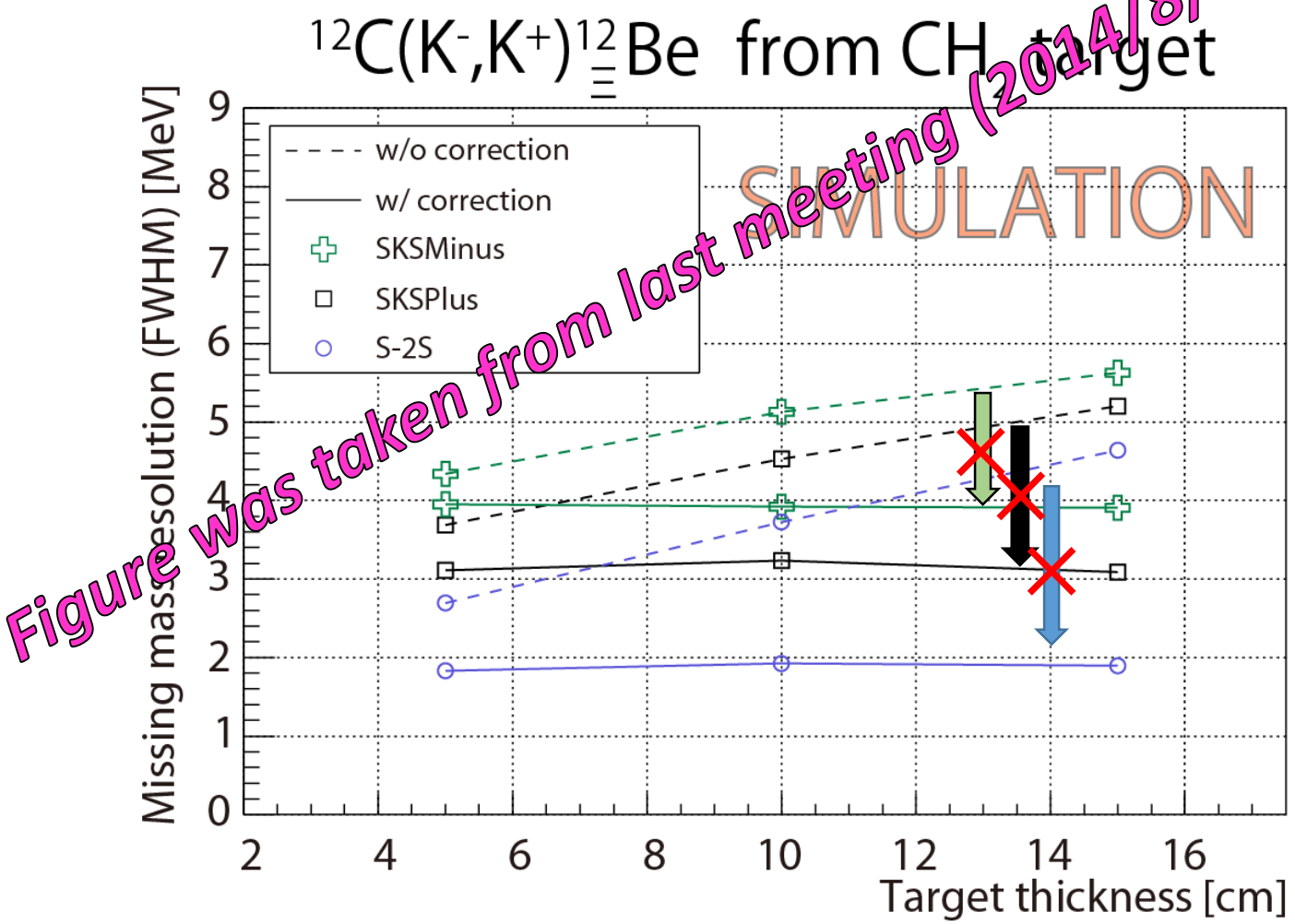
(K^- and K^+)

(K^- , K^+ , Ξ^- and decayed particle from Ξ^-)

Missing mass spectrum w/o energy loss correction



Missing mass resolutions vs. Target thickness



Summary

Hard to apply energy loss correction to the reconstructed missing mass.

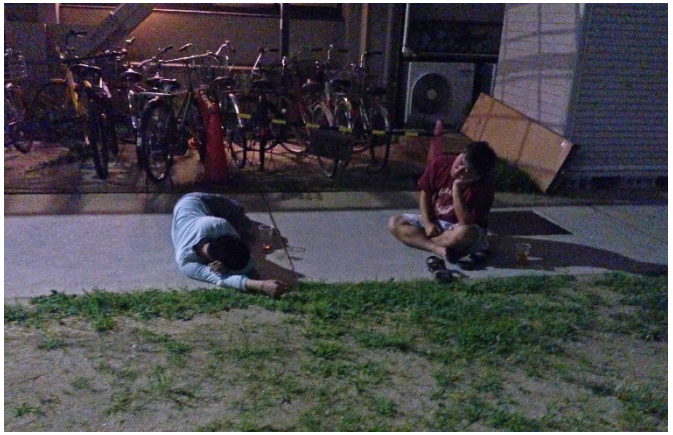
Outlook

- School and workshop
  - Indian summer school @ Prague, Czech Republic (9/2 – 9/9)
  - 新学術「中性子性物質」研究会 +「ストレンジネスを含む原子核の最近の展開」研究会 @ 熱川 (9/23 – 9/25)

- Design of frame for TOF detectors (with Shunsuke)
- Drift chambers (with Shunsuke)
  - Design and construction
  - Frame
  - Preamp
- Water Cerenkov detector (with Kohei)
  - Analysis of data of prototype detector
  - Design
  - Frame

Time table

END



BBQ @理学研究科5号棟 (2014/8/22) → 写真

Backup

Assumptions

The natural width was not taken into account.
dE resolution was not considered.
Effect of the inverse transfer matrix is zero.
Assumed resolutions are the following:

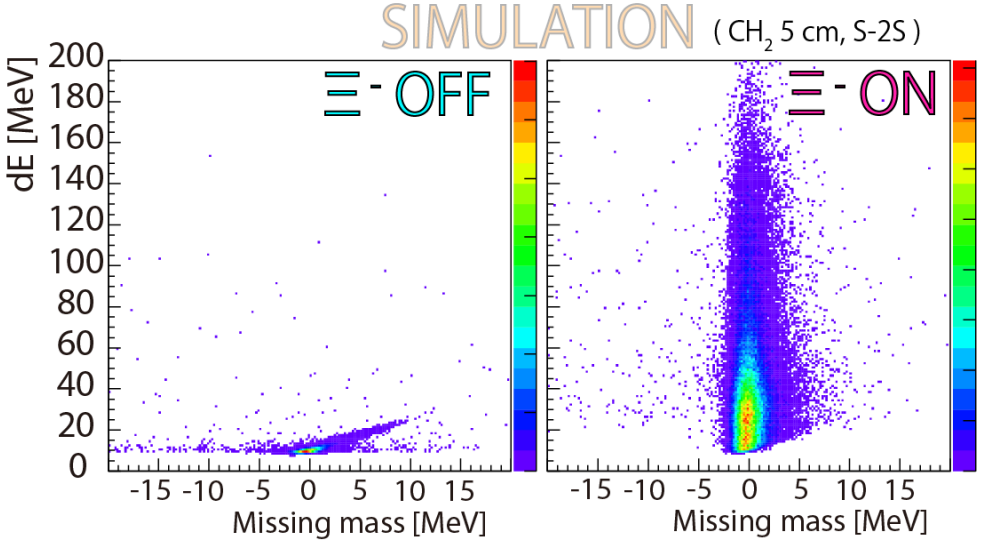
K^-: $\frac{\Delta p}{p} = 1.0 \times 10^{-3}$,

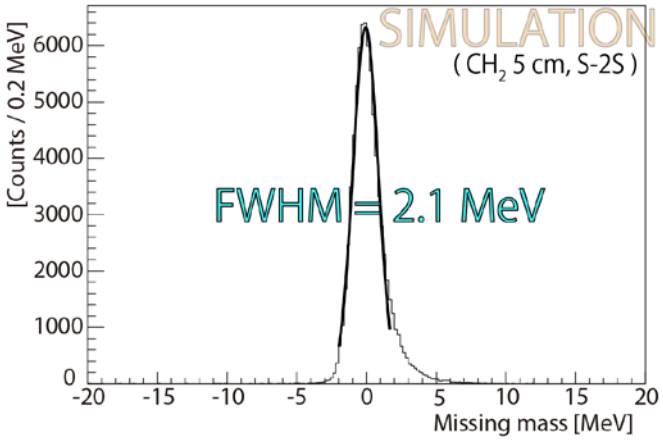
K^+: $\frac{\Delta p}{p} = 5.0 \times 10^{-4}$ (S-2S), 2.7×10^{-3} (SKSMinus),

$\Delta\vartheta = 2.0\ mrad$.

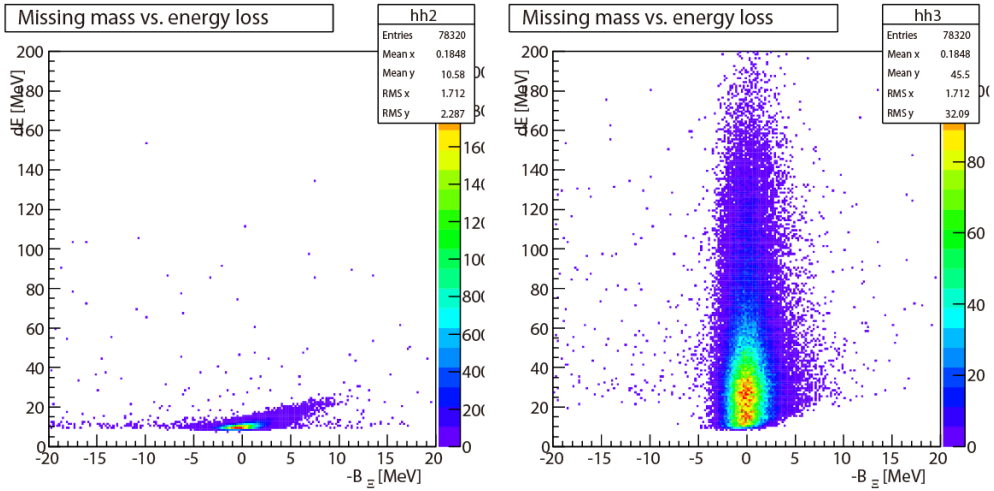
$p(K^-,K^+)\Xi^-$

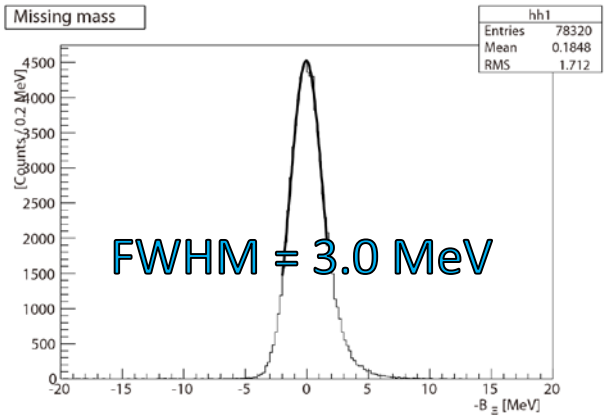
5 cm CH_2 target





S-2S

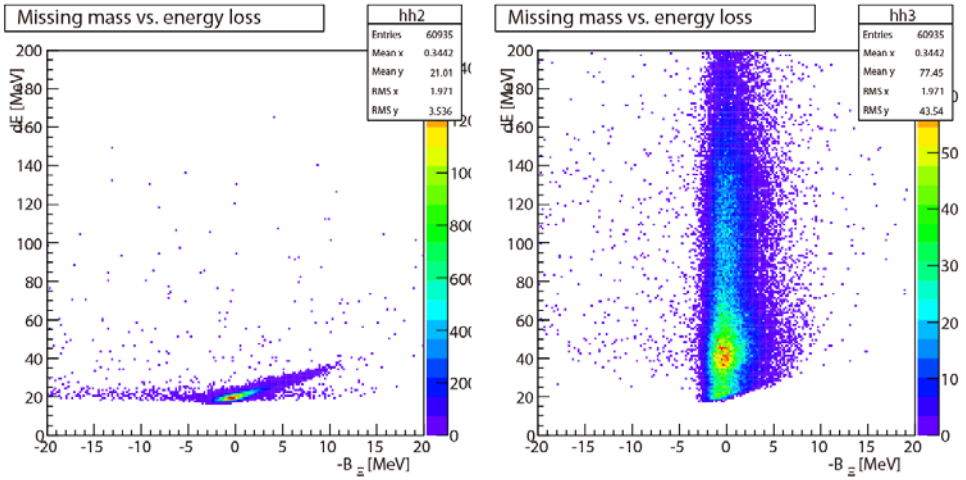


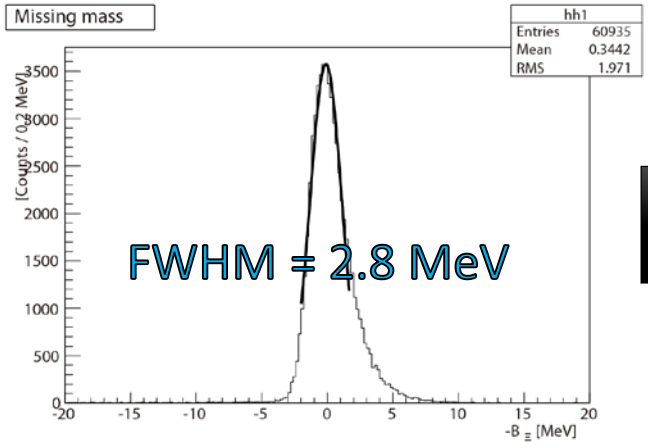


SKS

$p(K^-,K^+)\Xi^-$

10 cm CH_2 target





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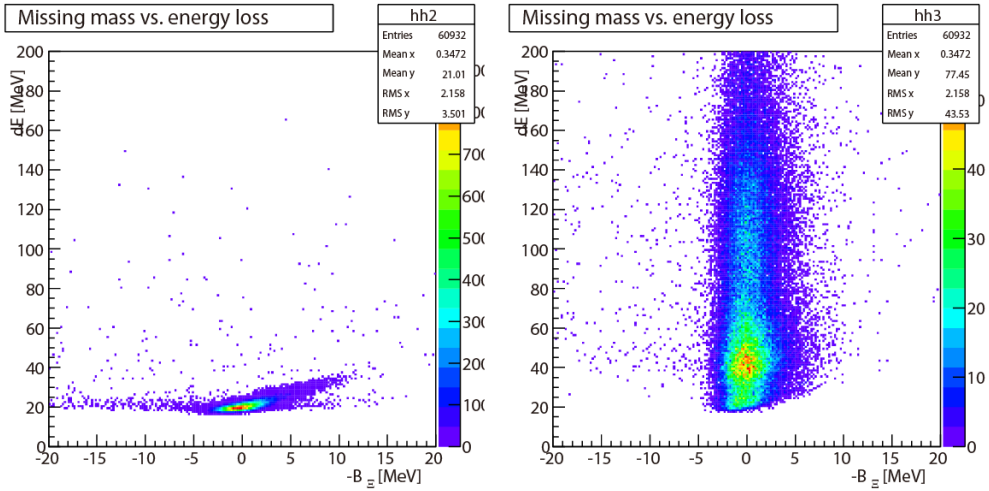
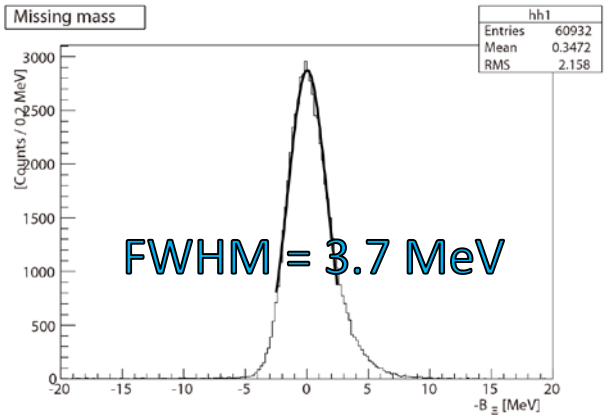
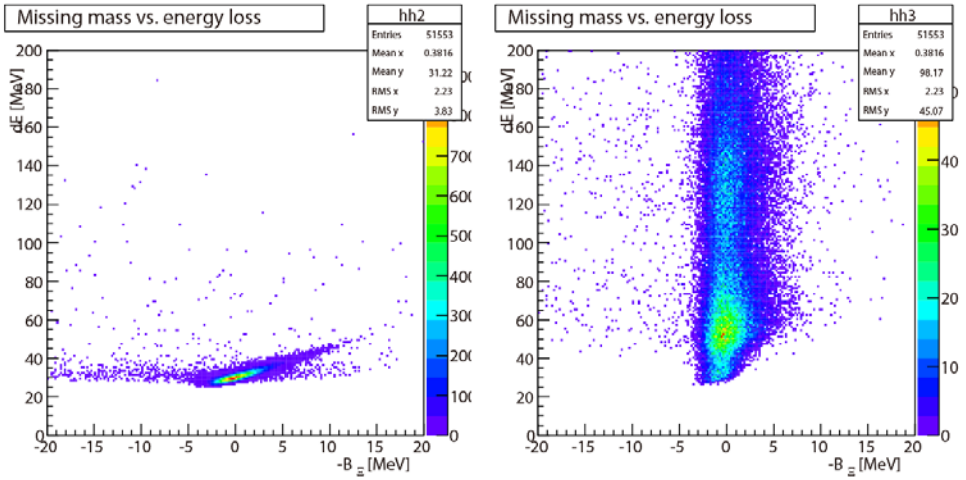


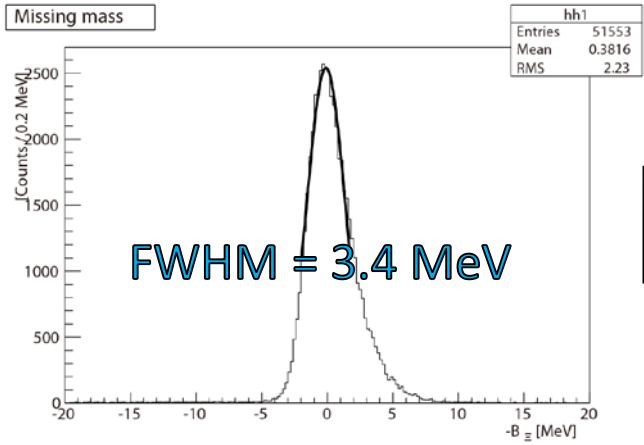


SKS

$p(K^-,K^+)\Xi^-$

15 cm CH_2 target





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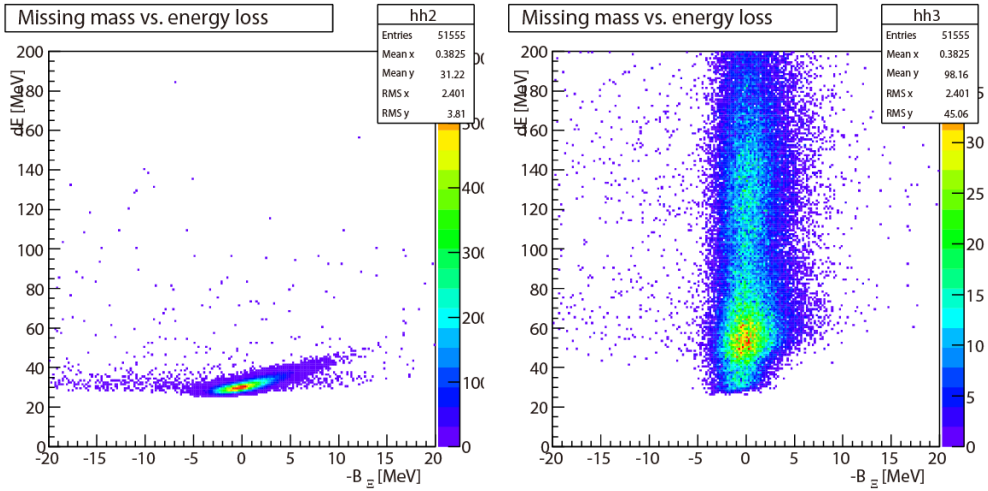

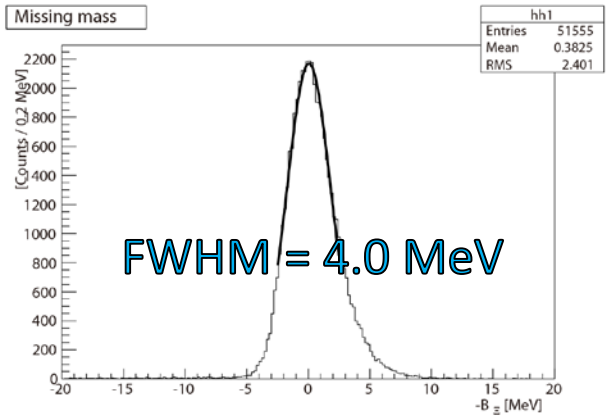

SKS

Fitting results

Opened ROOT file: ch2_5cm_xi_s-2s.root
FWHM = -2.12272 +/- 0.00925584

Opened ROOT file: ch2_5cm_xi_sks.root
FWHM = 3.0601 +/- 0.0242771

Opened ROOT file: ch2_10cm_xi_s-2s.root
FWHM = 2.8251 +/- 0.0224839

Opened ROOT file: ch2_10cm_xi_sks.root
FWHM = 3.67928 +/- 0.049222

Opened ROOT file: ch2_15cm_xi_s-2s.root
FWHM = 3.40172 +/- 0.0427497

Opened ROOT file: ch2_15cm_xi_sks.root
FWHM = 4.06866 +/- 0.0739831