$d(K^-, nK^0)''n$ Analysis
Background estimation

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$d(K^-, nK^0)$" n" analysis — Background Subtraction

- Signal
  $K^- d \to K^{0}$" n" $n_{detected}$
- Background process.
  - $K^- d \to \pi \Sigma_{forward}$" n" : $\Sigma_{forward} \to \pi n_{detected}$
  - $K^- d \to \pi$" Σ" $n_{detected}$
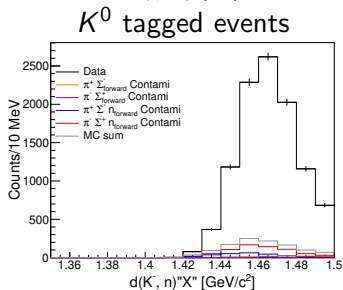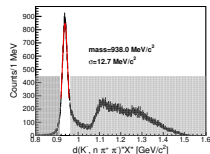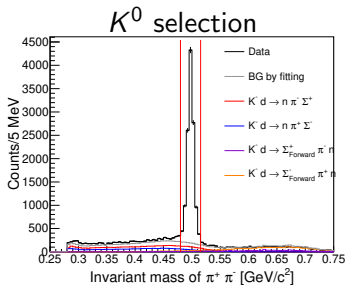- These strength was estimated by template fitting.
- Acceptance correction was performed event-by-event using 2D histogram of K^0 $cos\theta$ and mom.

$$\frac{d^2\sigma}{d\Omega dm_{d(K^-,n)"X"}} = N(m_{d(K^-,n)"X"})/A(\cos\theta_{K^0}, p_{K^0})$$

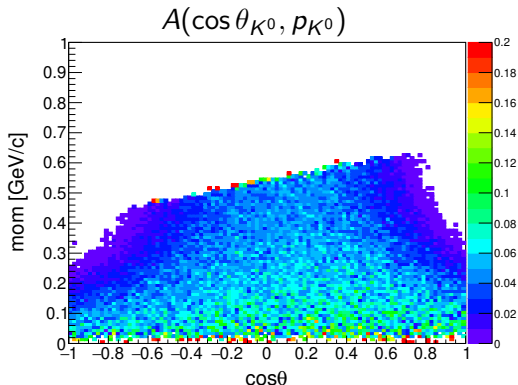- Updated $\frac{d^2\sigma}{d\Omega dm_{d(K^-,n)"X"}}$

K^0 tagged events
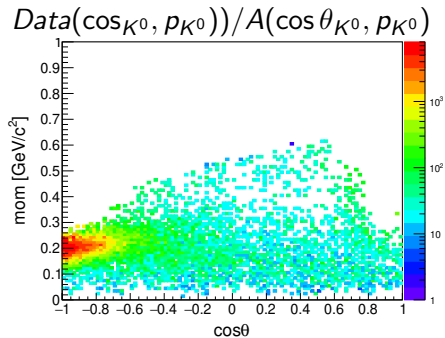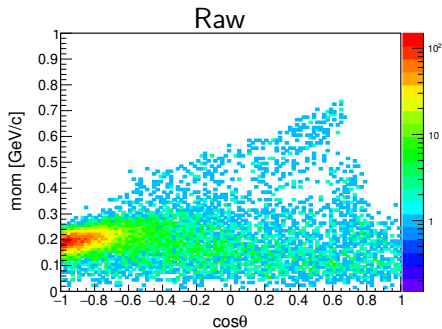
- Event sample
  $d(K^-, n\pi^+\pi^-)$" n" was selected.

K^0 selection

K^0 tagged events

Acceptance distribution

$K^- d \to K^{0"} n" n_{detected} | m_{"n"K^0}$: from threshold $\sim 1.8 GeV/c^2$

(Analyzed event)/(Generated event)

$A(\cos\theta_{K^0}, p_{K^0})$

$K^0 cos\theta$ vs mom **Data**
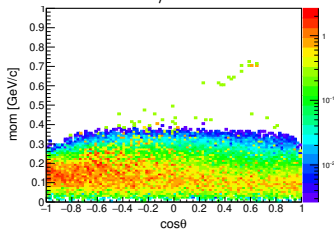

Raw

$Data(\cos_{K^0}, p_{K^0}))/A(\cos\theta_{K^0}, p_{K^0})$
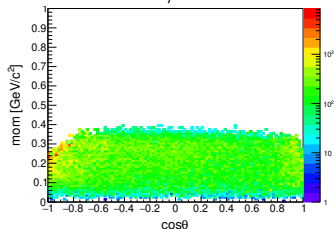
Acceptance was presented at page.4

$K^0 cos\theta$ vs mom **Background**

BG sum w/o acc corr.

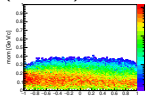
BG sum w/ acc corr.
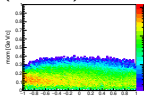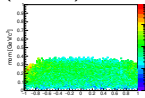

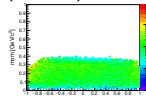These figures indicate each processes.

$(\pi^+\Sigma^-)_{backward}$

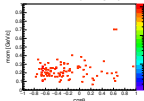$(\pi^+\Sigma^-)_{backward}$

$(\pi^+\Sigma^-)_{backward}$

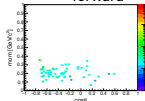$(\pi^+\Sigma^-)_{backward}$

$\pi^+\Sigma^-_{forward}$

$\pi^-\Sigma^+_{forward}$
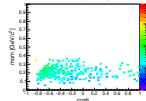

$\pi^+\Sigma^-_{forward}$

$\pi^-\Sigma^+_{forward}$

$N(d(K^-, n)" X")/Acc(\cos\theta_{K^0}, mom_{K^0})$
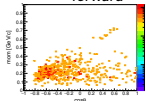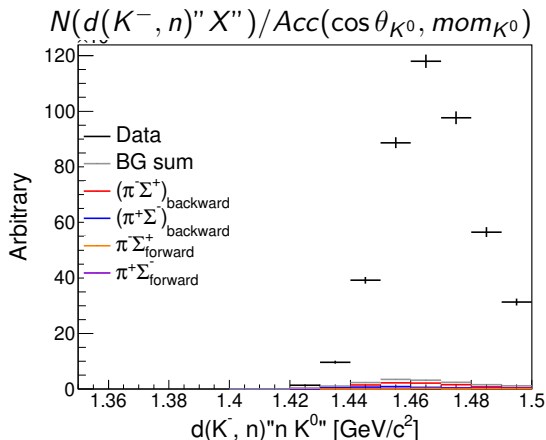
Background processes were adopted same analysis.
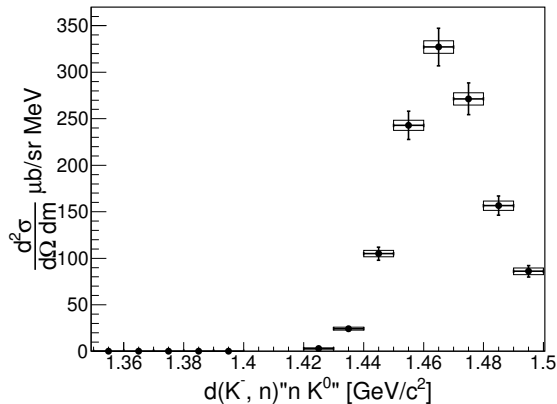
Box indicates statical errors.

I have taken BG in $d(K^-, n)$" nK^0" cross section.
$\rightarrow$ These effect was very small.
I uploaded Cross section value at ag

Back Up

Scaling Factor

- Luminosity

$$L = N_{beam} N_{target} Eff_{DAQ} Eff_{Trigger} = 5870 \pm 150$$
$$N_{target} = l(10cm) \times \rho(0.169g/cm^3) \times N_A/N_d$$
$$N_{beam} N_{DAQ} N_{trigger} \text{ were estimated run-by-run.}$$

- Neutron Efficiency
  $Eff_{NC} = 0.317 \pm 0.016$ by $K^- d \to K^0 n$ reaction (RUN62)
  $Overkill_{\overline{CVC \cup PC}} = 0.081 \pm 0.007$ (RUN78)
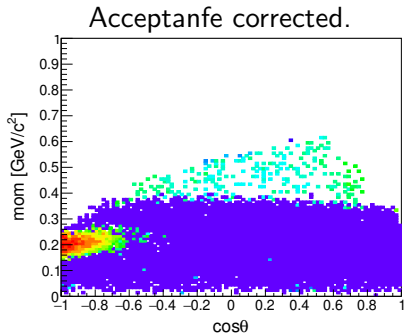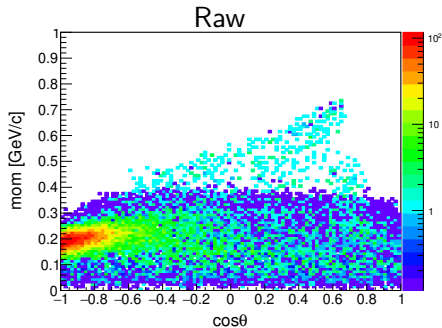- CDC efficeincy
  RUN68 IH and CDH was used as trigger counters $\sim 0.977 \pm 0.004$
  RUN78 was estimated from the value that CDC layer1 was used
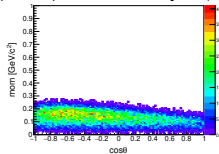 instead of IH.

Scaling Factor Table

name	value	error	error ratio
Luminosity	5870	150	2.55%
Eff_{NC}	0.291	0.16	5.04%
Eff_{CDC}	0.977	0.004	0.41%
Sum			5.65%

$K^0 cos\theta$ vs mom **BG subtracted**

Raw

Acceptanfe corrected.

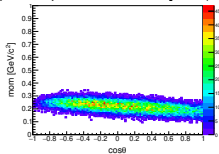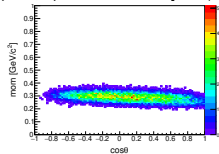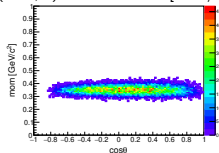# $K^0 \cos\theta$ vs mom $(d(K^-, n)"X"$ dependence)

$d(K^-, n) : 1.45 \sim 1.50 \ [GeV/c^2]$

$d(K^-, n) : 1.50 \sim 1.55 \ [GeV/c^2]$

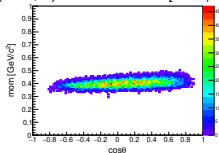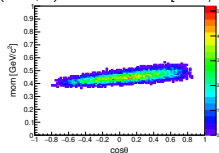$d(K^-, n) : 1.55 \sim 1.60 \ [GeV/c^2]$

$d(K^-, n) : 1.60 \sim 1.65 \ [GeV/c^2]$

$d(K^-, n) : 1.65 \sim 1.70 \ [GeV/c^2]$

$d(K^-, n) : 1.70 \sim 1.75 \ [GeV/c^2]$

$d(K^-, n) : 175 \sim 1.80 \ [GeV/c^2]$