Current Status

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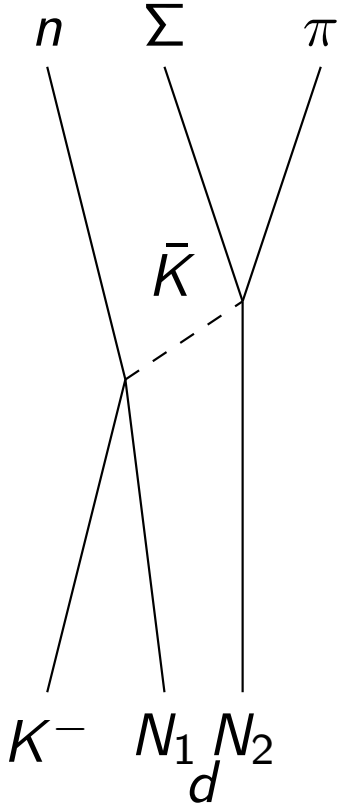
Current Status

- Chapter.1 Introduction check is finished.
  - Introduce some theoritial calculation.
- Chapter.4 Disscussion is being written.
  - Comparison with theoriticcal calculation.
    Calculation by K. Miyagawa et. el.
    Dyamical Coupled Chanel(DCC), H. Kamano et. el.
  - Fit assuming the 2-step reaction.
    I have not written document yet.
    Responce function will be updated by Kawasaki.
    $\Rightarrow$ Fitting will be revaised.
  - Chapter.2 Expermental setup and Chapter.3 Analysis have not arrenged.

Table of Content

Fitting assuming the 2-step reaction

This reaction was explaned by K. Miyagawa [3].



$$\frac{d\sigma}{dMd\Omega} = \int T_{K^- p\to \bar{K}N}\Phi_d(q_{N2})G_0 T_{\bar{K}N\to\pi\Sigma}dq$$

$$f_{res}(M_{\pi\Sigma}) = \left|\int T_{\bar{K}N\to\bar{K}N}G_0\Phi_d(q_{N2})\right|$$

$$G_0(q_1,q_2) = \frac{1}{q_0^q - \mathbf{q}^2 + i\epsilon}$$

: Green Function of the $\bar{K}$

$T_{K^- p\to\bar{K}N}$: Data from Gopal et. el. [1]

$\Phi(q_{N2})$: Wave-function of deuteron [2]

[1] G. P. Gopal et al., Nucl. Phys. B **119**, 362 (1977).

[2] R. Machleidt, Phys. Rev. C**63**, 024001 (2001).

[3] K. Miyagawa and J. Haidenbauer, Phys. Rev. C **85**, 065201 (2012).

Fitting assuming the 2-step reaction

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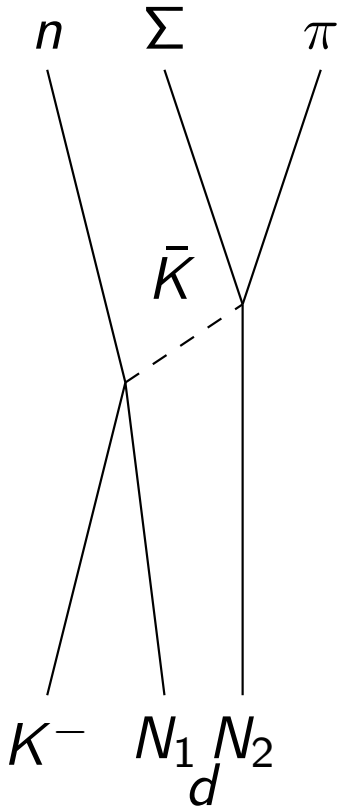


$$\frac{d\sigma}{dMd\Omega} = \int T_{K^- p \to \bar{K} N} \Phi_d(q_N 2) G_0 T_{\bar{K} N \to \pi\Sigma} dq$$

$$f_{res}(M_{\pi\Sigma}) = \left| \int T_{\bar{K} N \to \bar{K} N} G_0 \Phi_d(q_{N2}) \right|$$

- I use Noumi's f_{res}.
- f_{res} will be updated by Kawasaki.

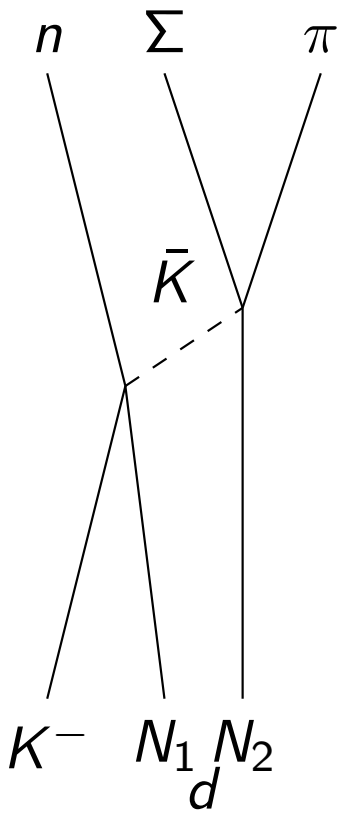
$\Rightarrow$ The fitting will be updated.

[1] G. P. Gopal et al., Nucl. Phys. B **119**, 362 (1977).

[2] R. Machleidt, Phys. Rev. C**63**, 024001 (2001).

[3] K. Miyagawa and J. Haidenbauer, Phys. Rev. C **85**, 065201 (2012).

Fitting assuming the 2-step reaction



$$\frac{d\sigma}{dMd\Omega} = \int T_{K^- p \to \bar{K} N} \Phi_d(q_N 2) G_0 T_{\bar{K}N \to \pi\Sigma} dq$$

$$T_{\bar{K}N \to \pi\Sigma} = \frac{e^{i\delta}}{\sqrt{k_1}} \frac{\sqrt{\mathbf{Im}A - \frac{1}{2}|A|^2 \mathbf{Im}Rk^2}}{1 - iAk_2 + \frac{1}{2}ARk_2^2}$$

$$T_{\bar{K}N \to \bar{K}N} = \frac{A}{1 - iAk_2 + \frac{1}{2}ARk_2^2}$$

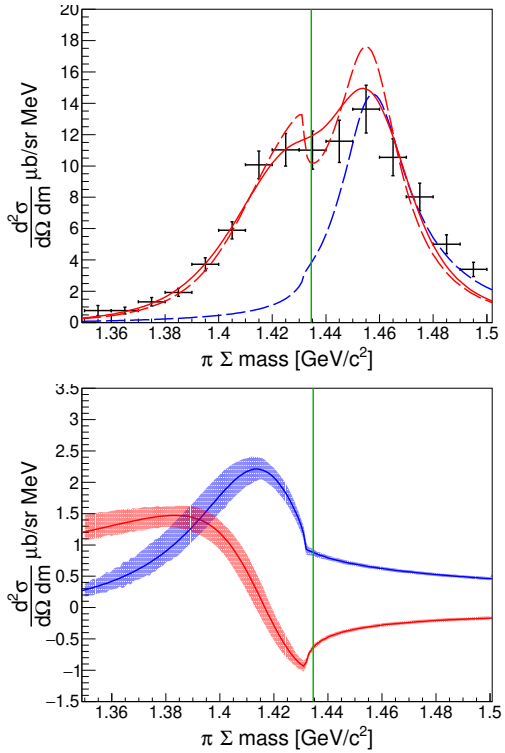
$$\Rightarrow (Poleposition) : 1 - iAk_2 + \frac{1}{2}ARk_2^2 = 0$$

This fitting 2-complex, A & R param and scaling factor.

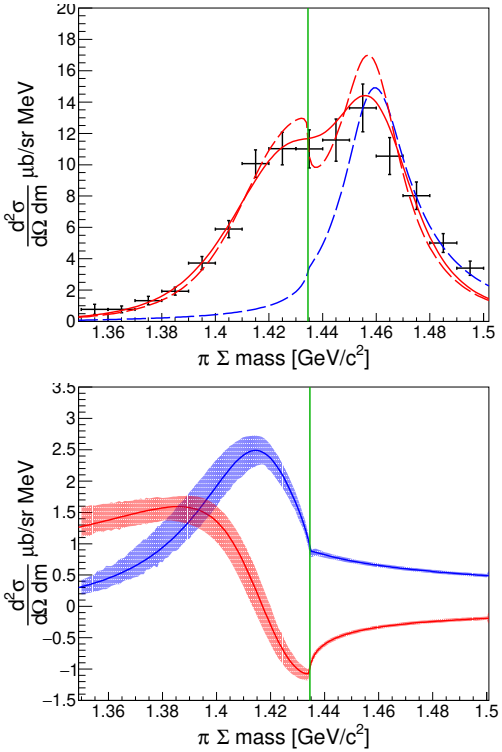
$\Rightarrow$ 5 parameters

Fitting result

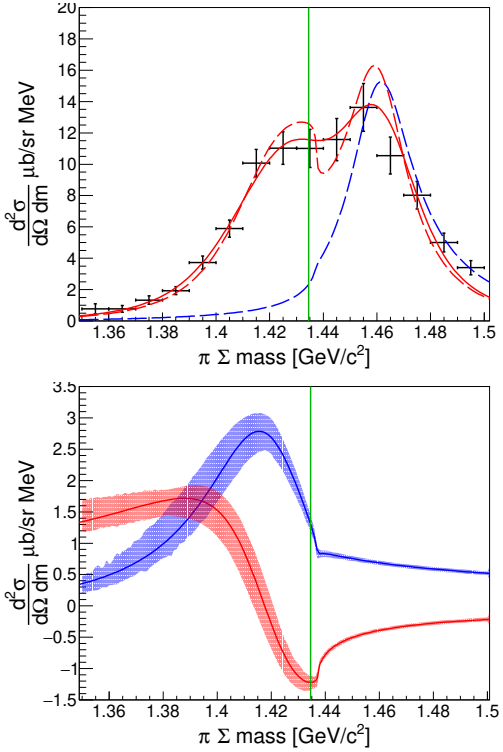
$K^- p$ threshold



$\bar{K}N$ threshold

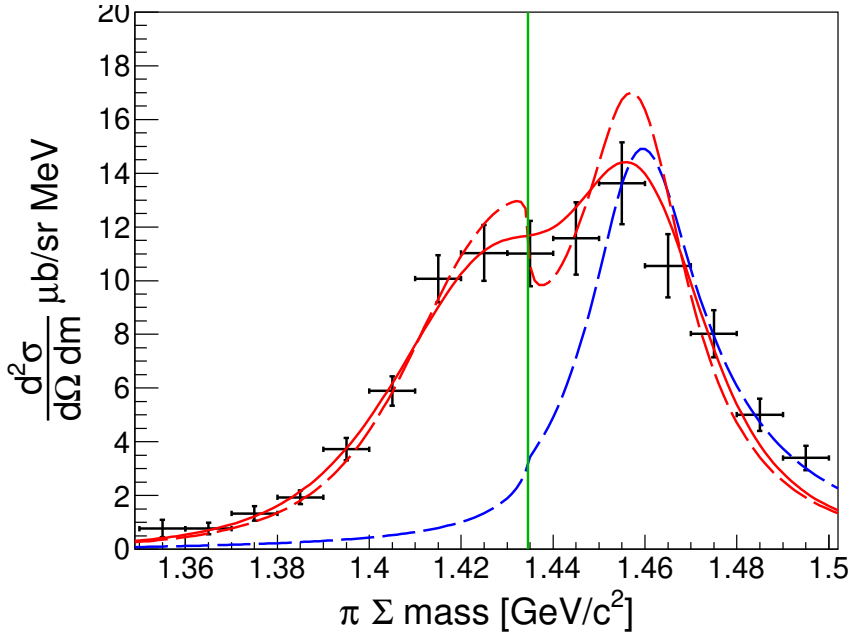


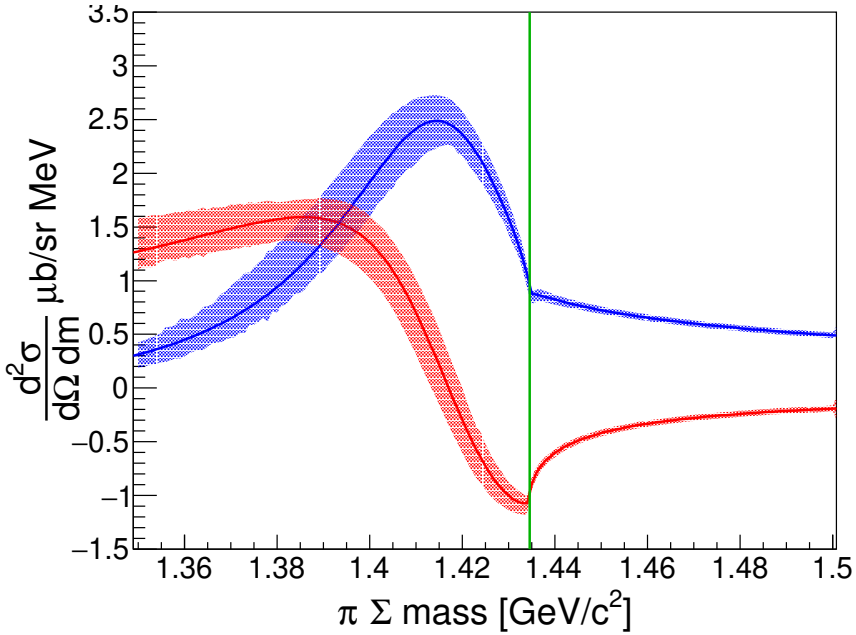
$K^0 n$ threshold



	A_{re}	A_{im}	R_{re}	R_{im}	M	Γ
$K^- p$	-0.95 ± 0.11	0.94 ± 0.16	-0.27 ± 0.40	0.52 ± 0.18	1417.6	30.3
$\bar{K}N$	-1.05 ± 0.12	0.86 ± 0.15	-0.22 ± 0.40	0.42 ± 0.16	1418.3	27.8
$K^0 n$	-1.13 ± 0.13	0.79 ± 0.15	-0.16 ± 0.40	0.33 ± 0.16	1419.3	25.9

Fitting result with $\bar{K}N = \frac{1}{2}(K^- p + K^0 n)$ threshold





$$Scale = 0.0372 \pm 0.0047$$

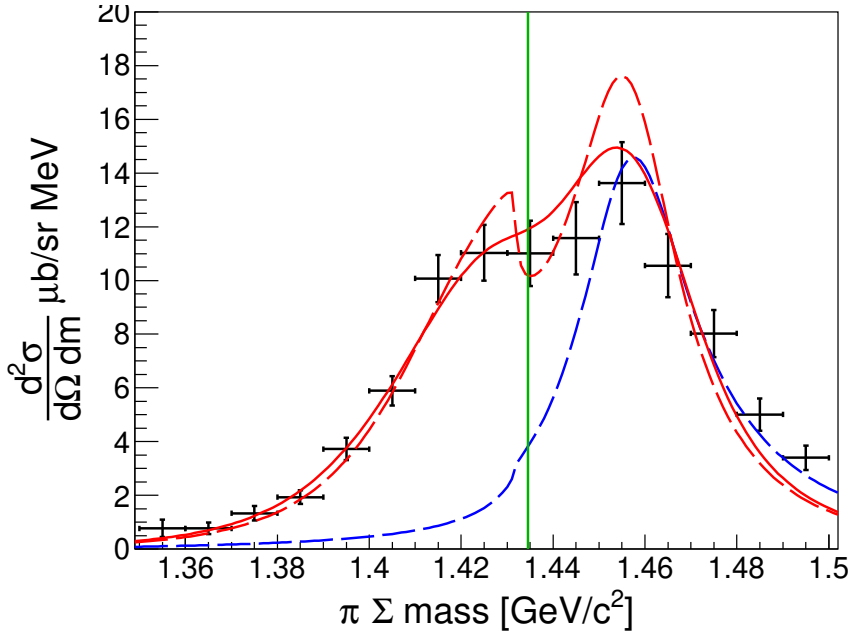
$$A = -1.05 \pm 0.12 + (0.86 \pm 0.15)i$$

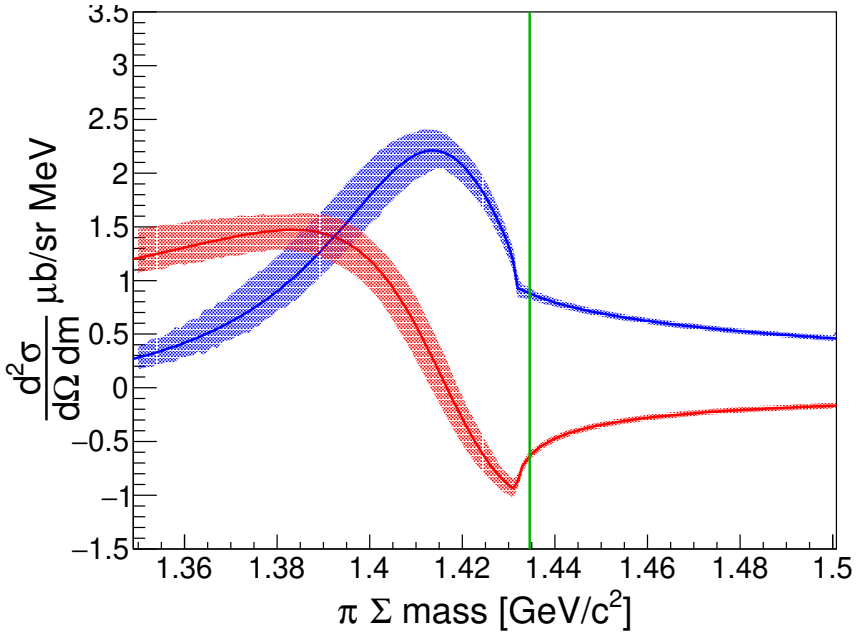
$$R = -0.22 \pm 0.40 - (0.42 \pm 0.16)i$$

$$M = 1418.3\text{MeV}$$

$$\Gamma = 27.8\text{MeV}$$

Fitting result with $K^- p$ threshold





$$Scale = 0.0377 \pm 0.0042$$

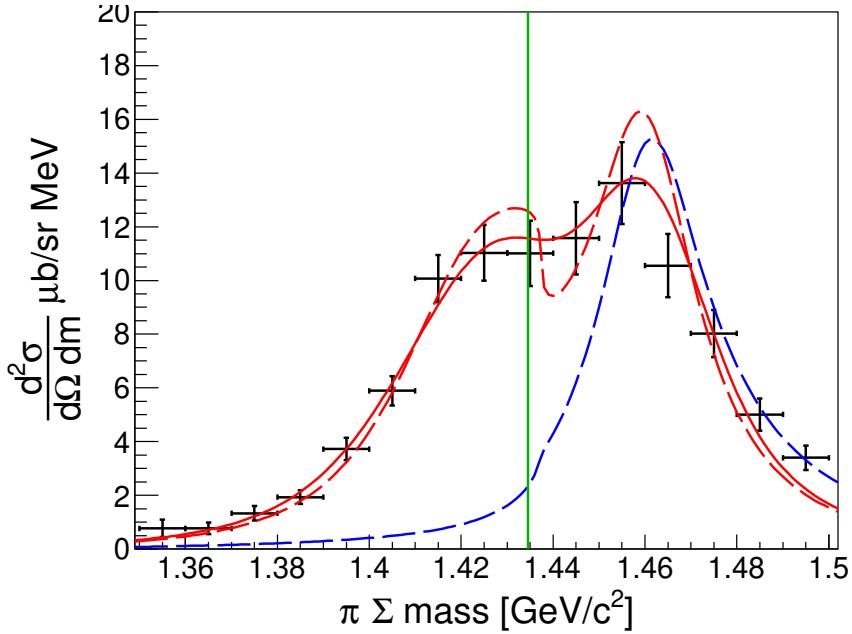
$$A = -0.95 \pm 0.11 + (0.94 \pm 0.16)i$$

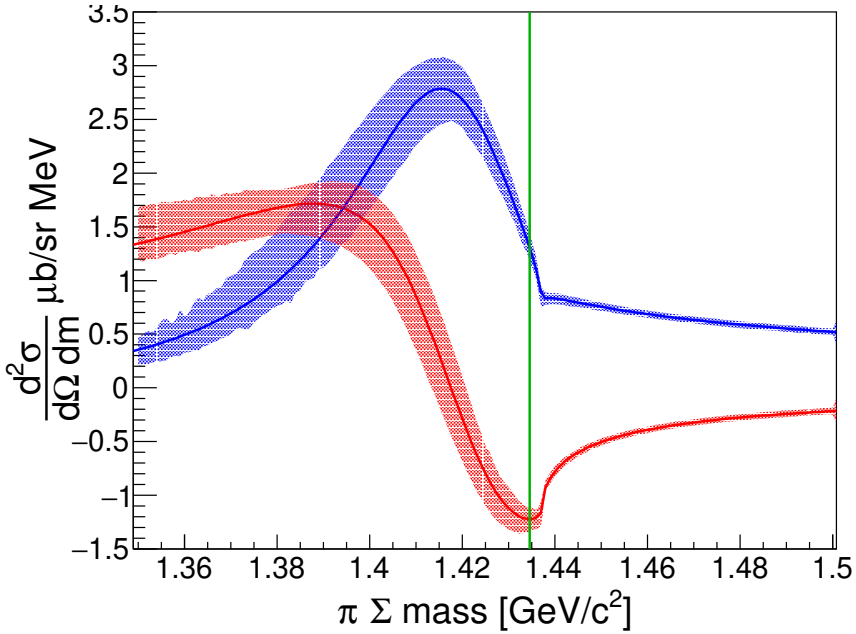
$$R = -0.27 \pm 0.40 - (0.52 \pm 0.18)i$$

$$M = 1417.6\text{MeV}$$

$$\Gamma = 30.3\text{MeV}$$

Fitting result with $K^0 n$ threshold





$$Scale = 0.0367 \pm 0.0053$$

$$A = -1.13 \pm 0.13 + (0.79 \pm 0.15)i$$

$$R = -0.16 \pm 0.40 - (0.33 \pm 0.16)i$$

$$M = 1419.3\text{MeV}$$

$$\Gamma = 25.9\text{MeV}$$