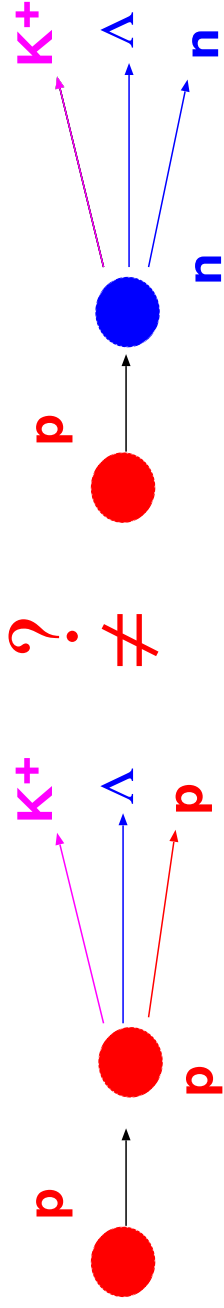


K^+ production from pn and pD interactions

Yury Valdau
for the ANKE collaboration

Motivation



Input parameter for pA, AA models

Theoretical predictions

1) $\sigma_n^{K^+}/\sigma_p^{K^+} \sim 1$,

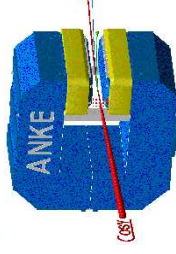
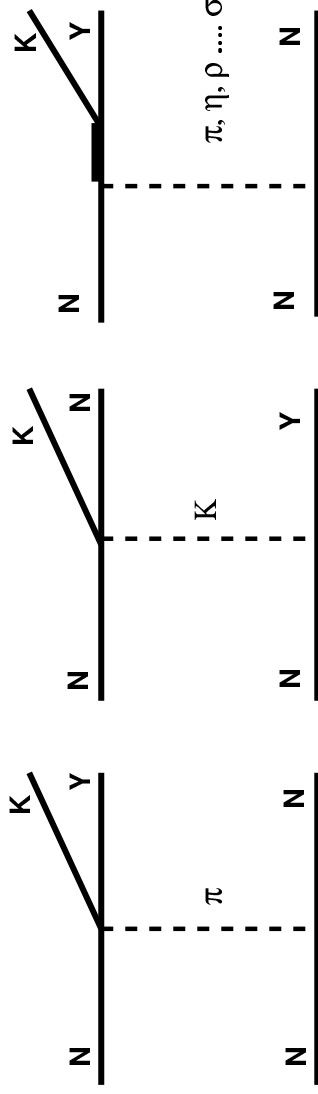
P.A. Piroué and A. J. S. Smith, Phys. Rev. 148, 1315 (1966).

2) $\sigma_n^{K^+}/\sigma_p^{K^+} \sim 2$,

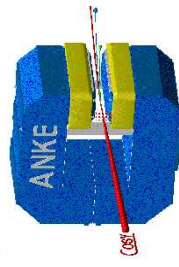
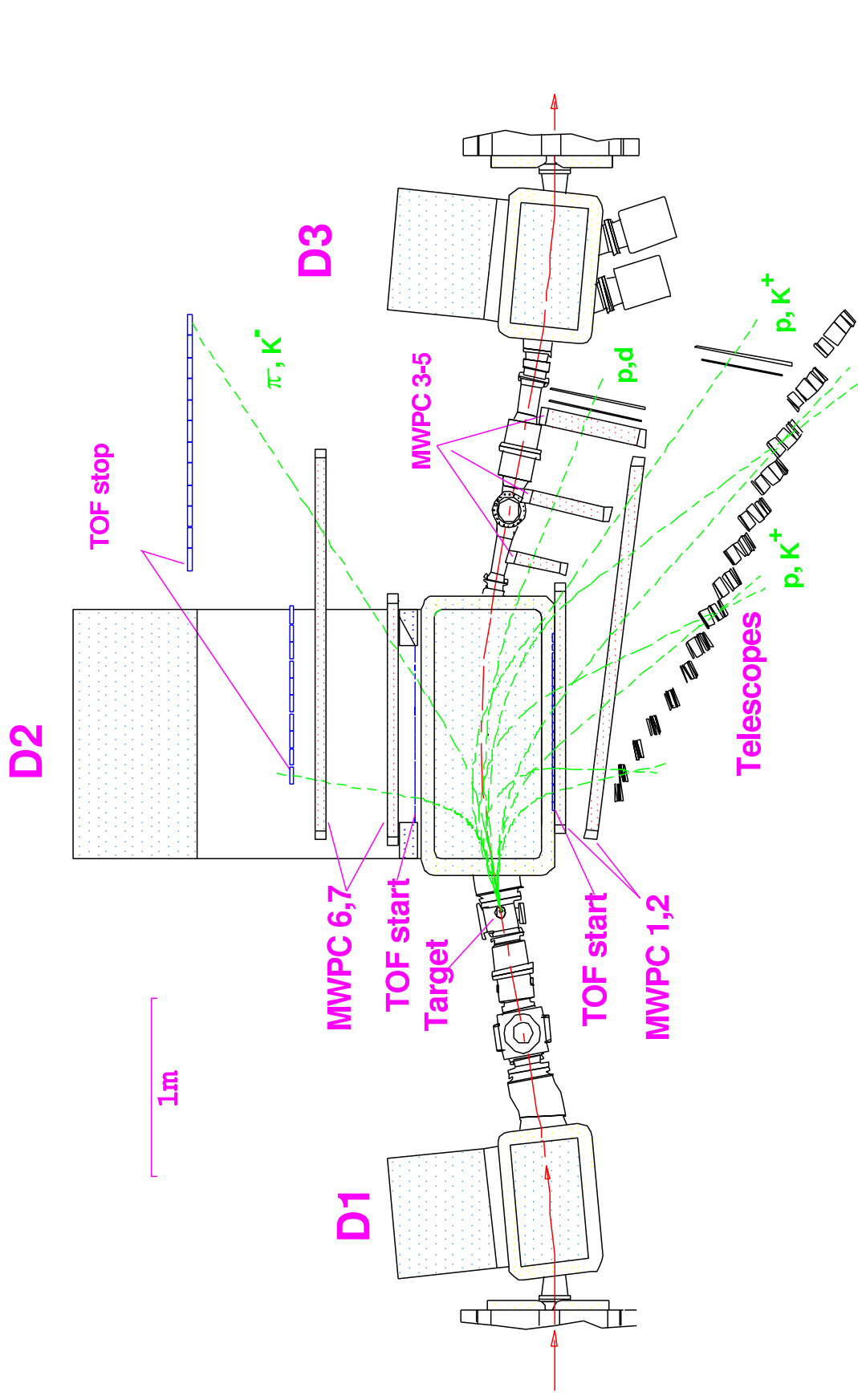
K.Tsushima et al., Phys.Rev. C59 369 (1999).

3) $\sigma_n^{K^+}/\sigma_p^{K^+} \sim 6$,

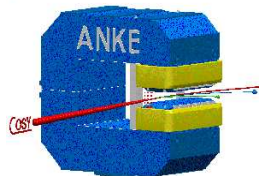
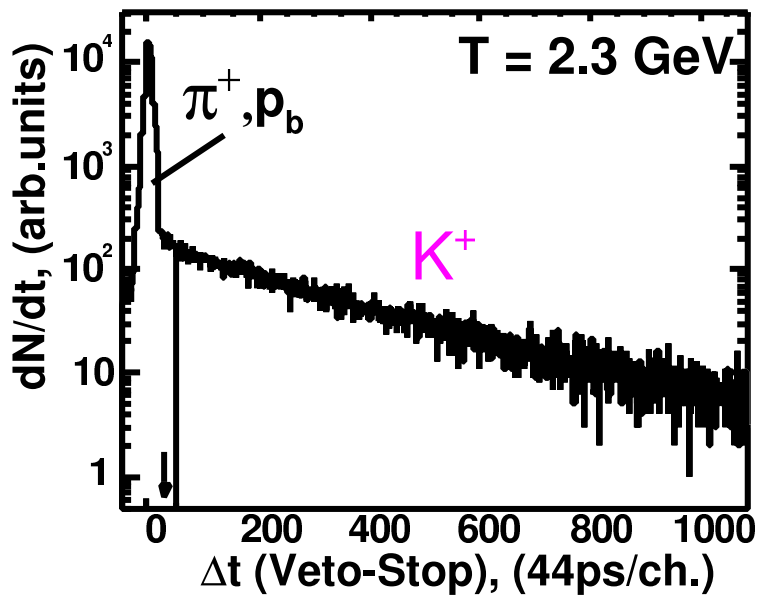
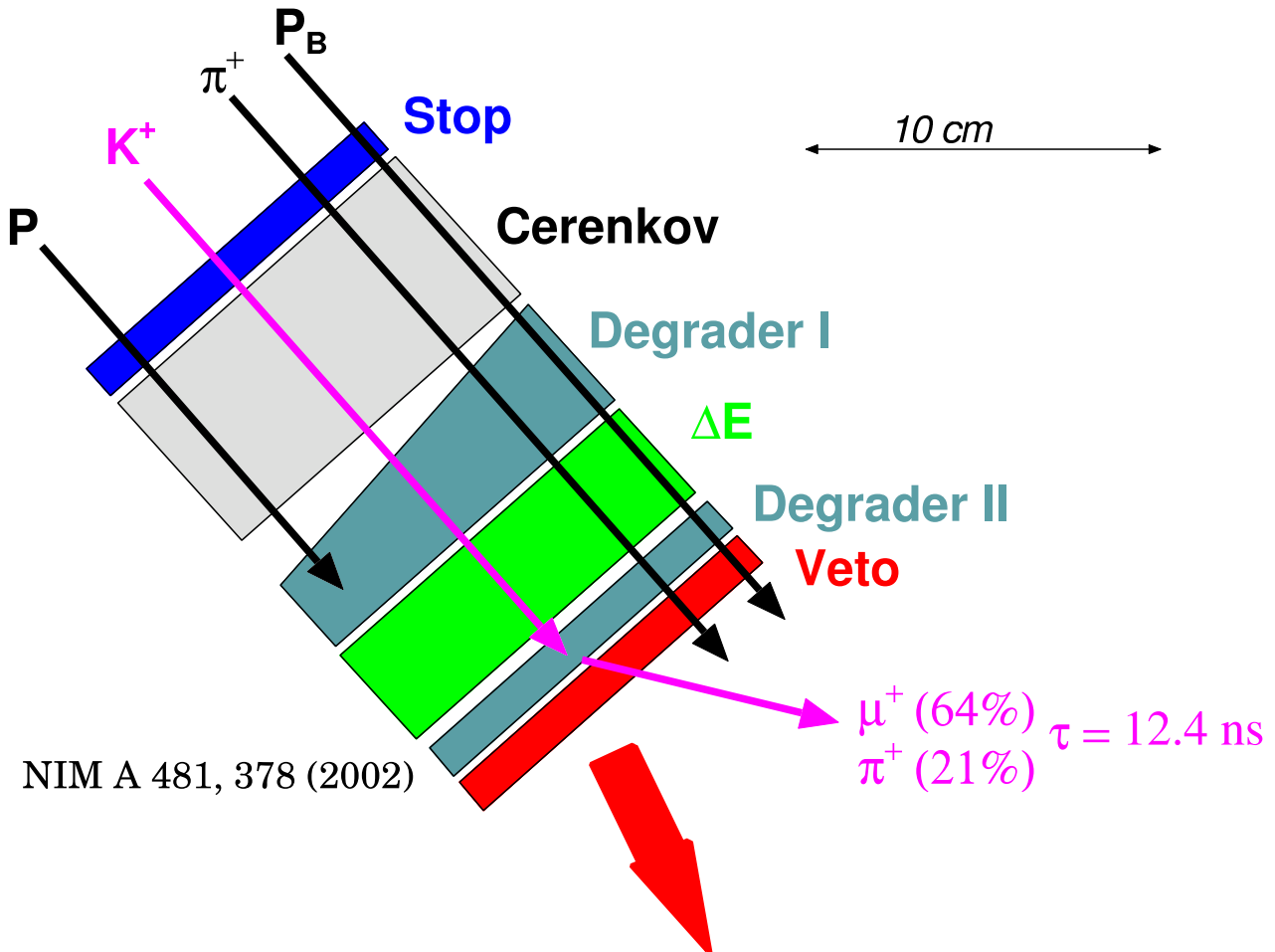
G.Faldt and C. Wilkin, Z.Phys. A 357, 241 (1997).



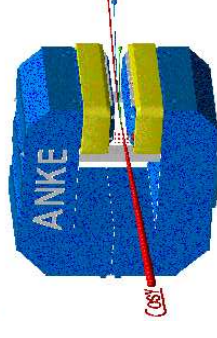
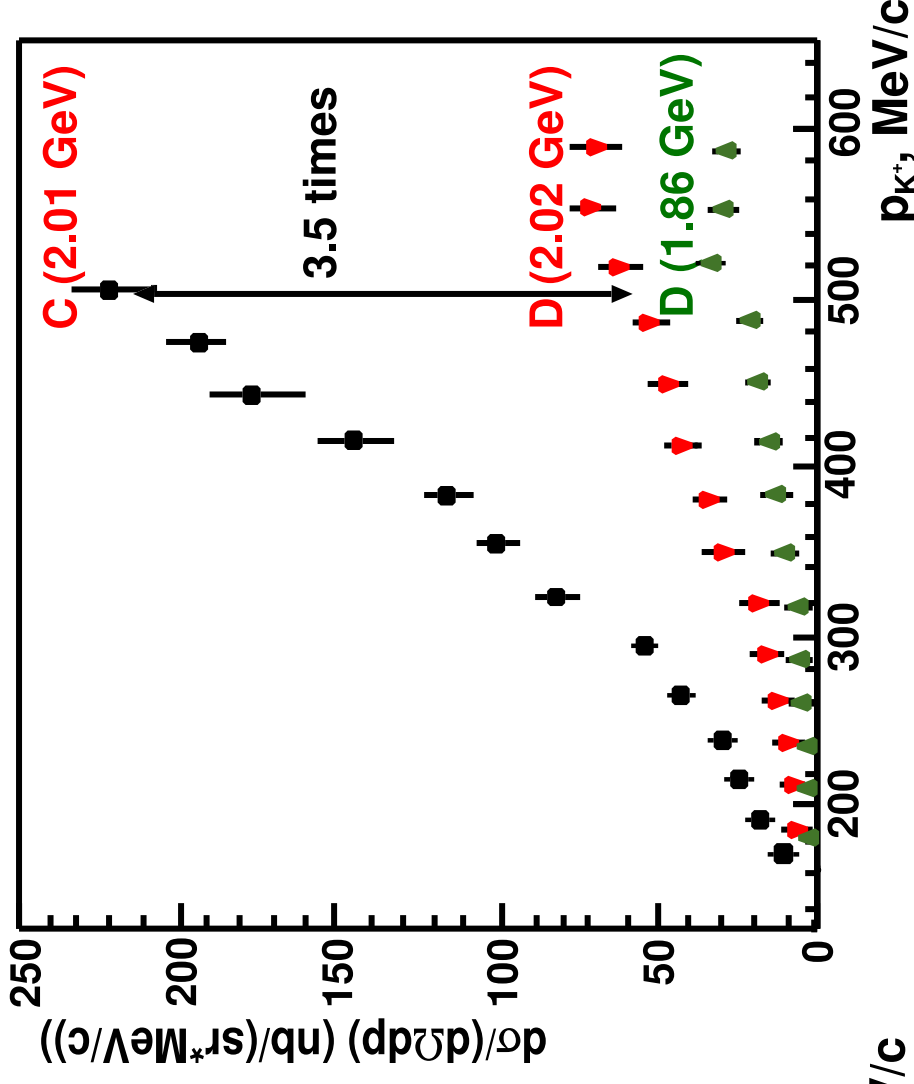
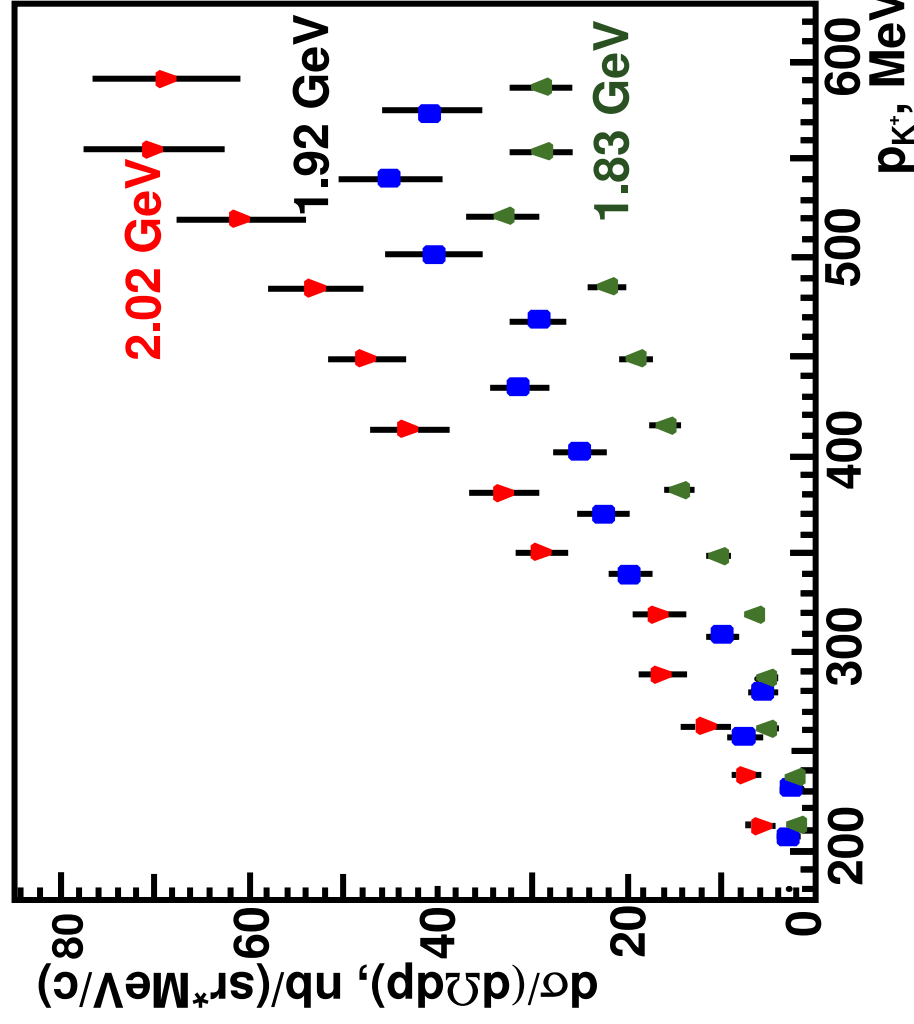
Spectrometer ANKE



K⁺ identification: *Range telescopes*



pd- \rightarrow K $^+$ X and pC- \rightarrow K $^+$ X

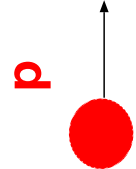
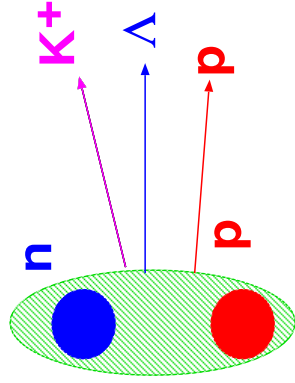


Model for K^+ production on the deuteron

	1.83 GeV	1.92 GeV	2.02 GeV
$\sigma_{\mu b}$	7.116	12.667	19.420
$\sigma_{\mu b}$	0.008	0.393	1.680
$\sigma_{\mu b}$	0.010	0.621	2.776

$$\sigma(N_1 N_2 \rightarrow N_3 K^+ X) = a(S/S_0 - 1) b(S_0/S) c$$

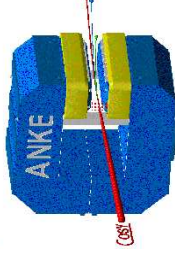
K. Tsushima, A. Sibirtsev, A.W. Thomas and G.Q. Li, Phys.Rev. C59 (1999) pp369-387.



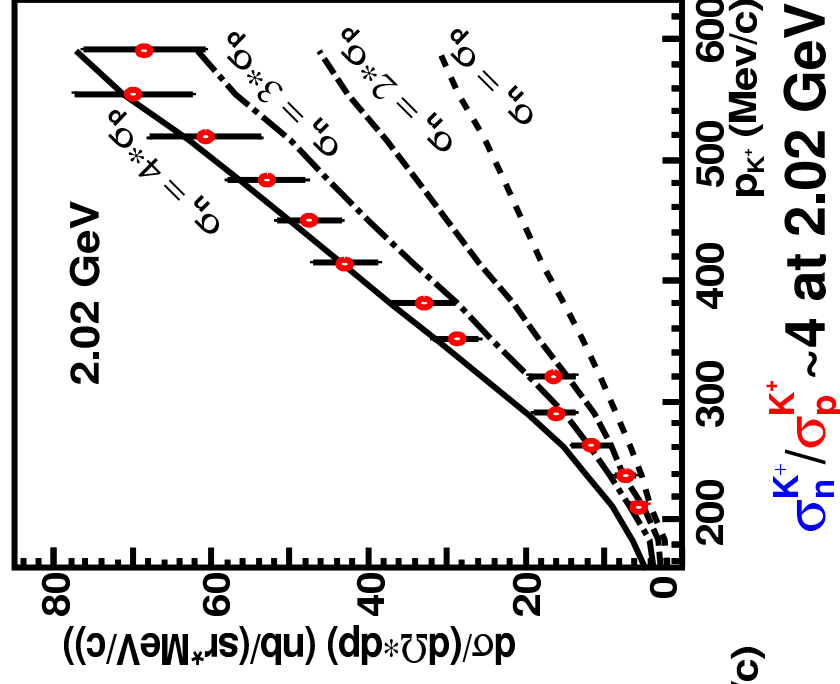
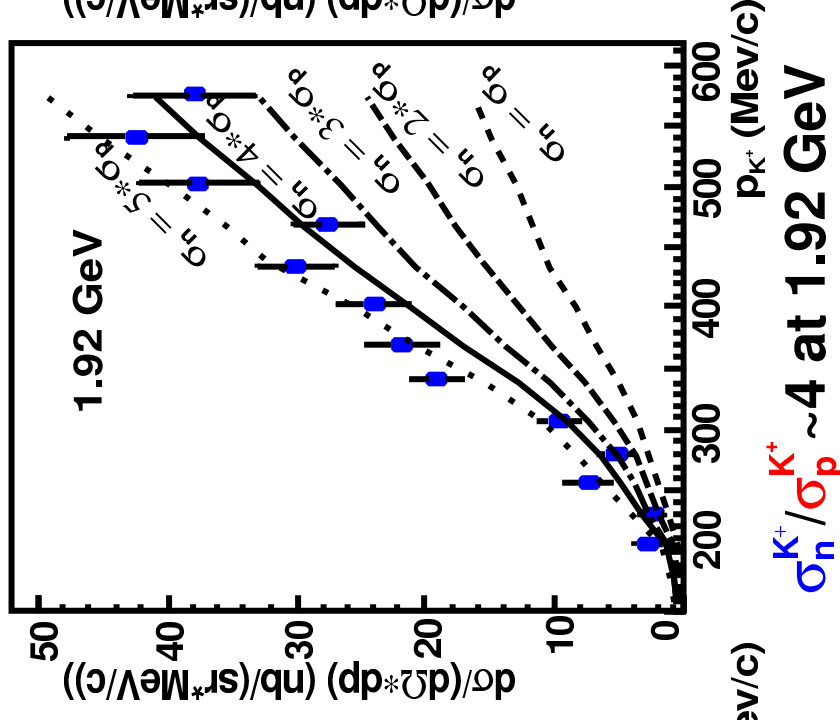
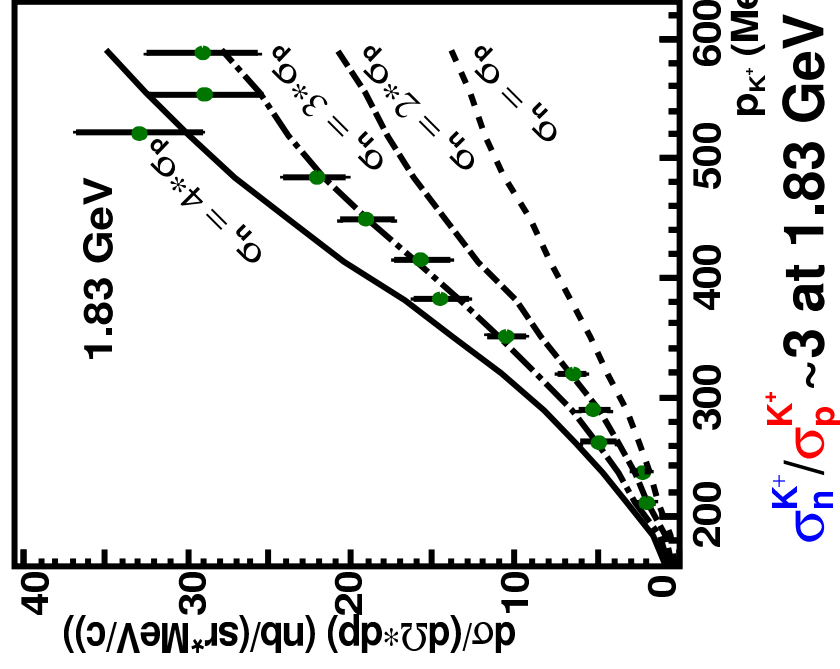
	1.83 GeV	1.92 GeV	2.02 GeV
$\sigma_{\mu b}$	3.852	7.002	10.865
$\sigma_{\mu b}$	0.005	0.311	1.361
$\sigma_{\mu b}$	0.001	0.105	0.522

All the reactions with an additional pion in final state have negligible cross sections, because our energy is too close to their threshold ($T_{NN} = 1.95\text{GeV}$).

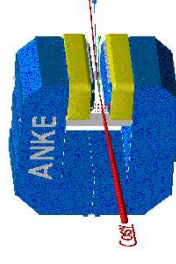
$$\sigma_D = \sigma_p + \sigma_n = \sigma_p (1 + \sigma_n / \sigma_p)$$



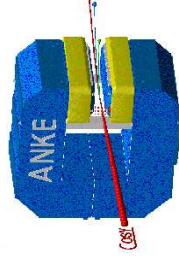
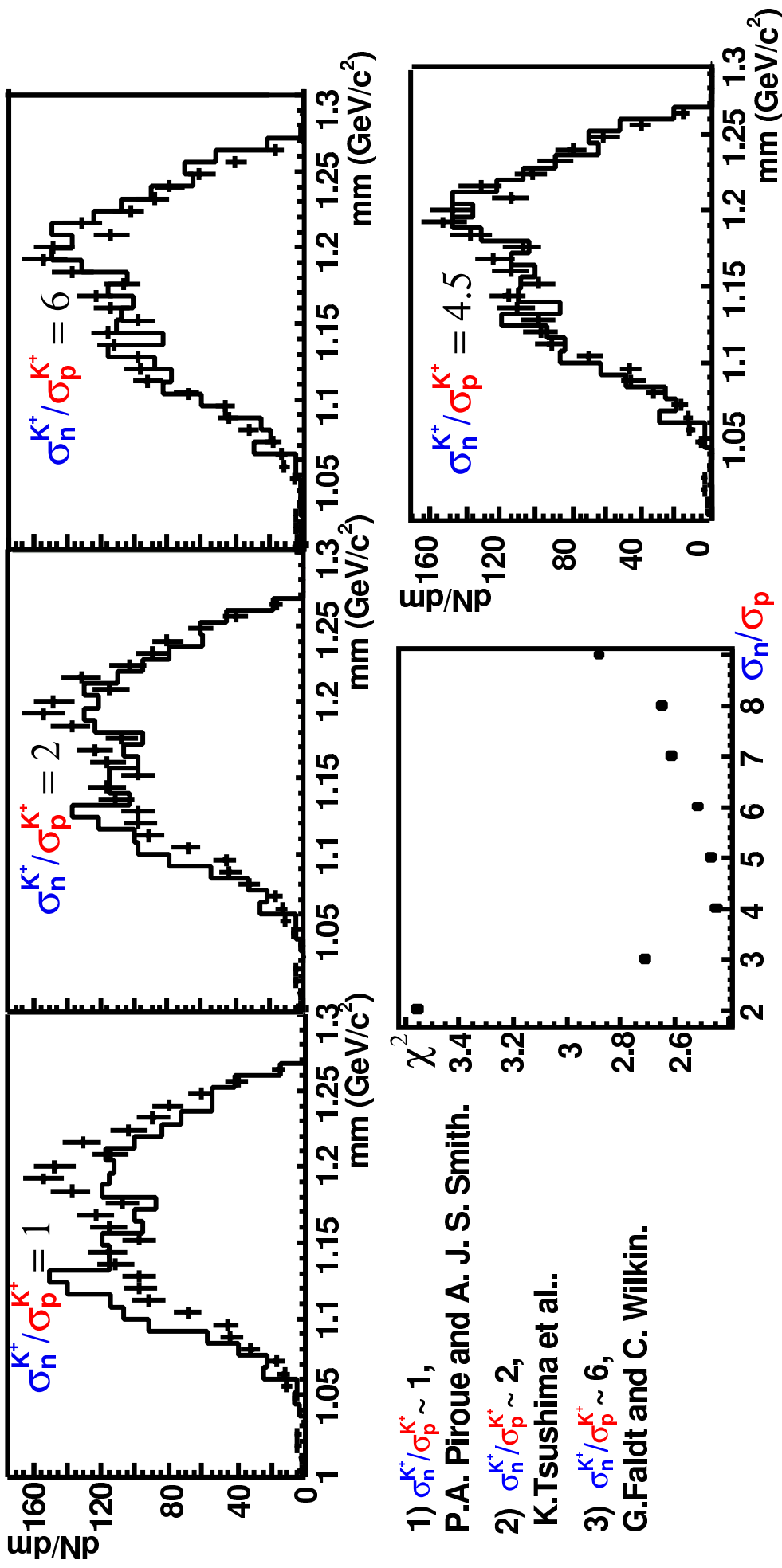
K^+ inclusive spectra $pD \rightarrow K^+ X$



M. Büscher et al., accepted for publication in
EPJ A, nucl-ex/0401031



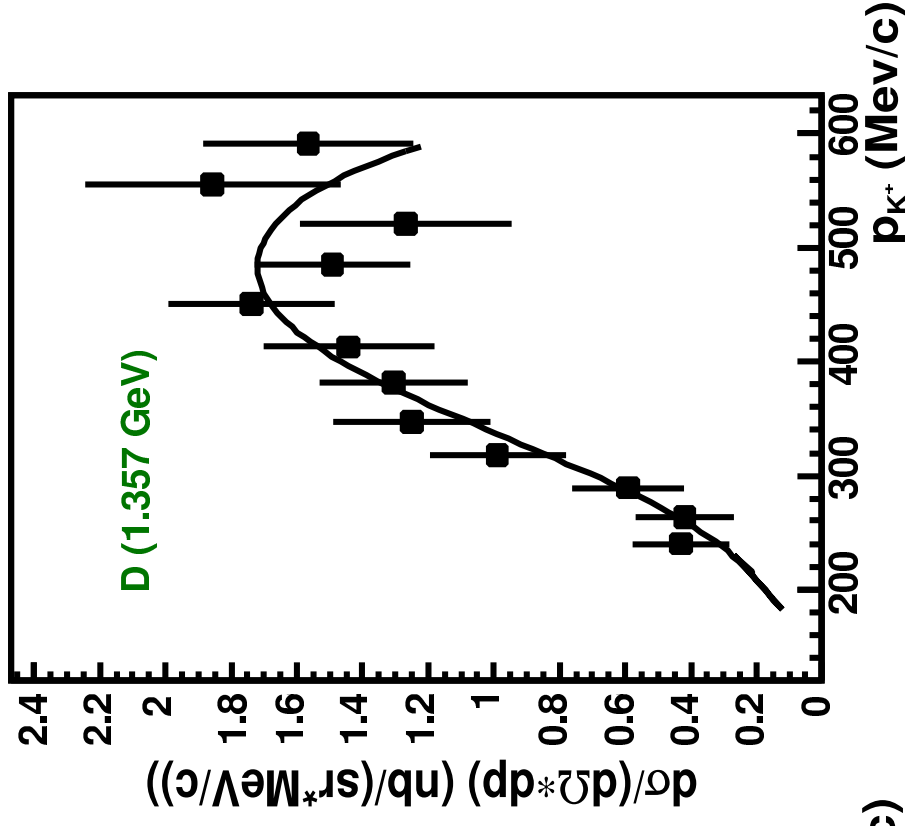
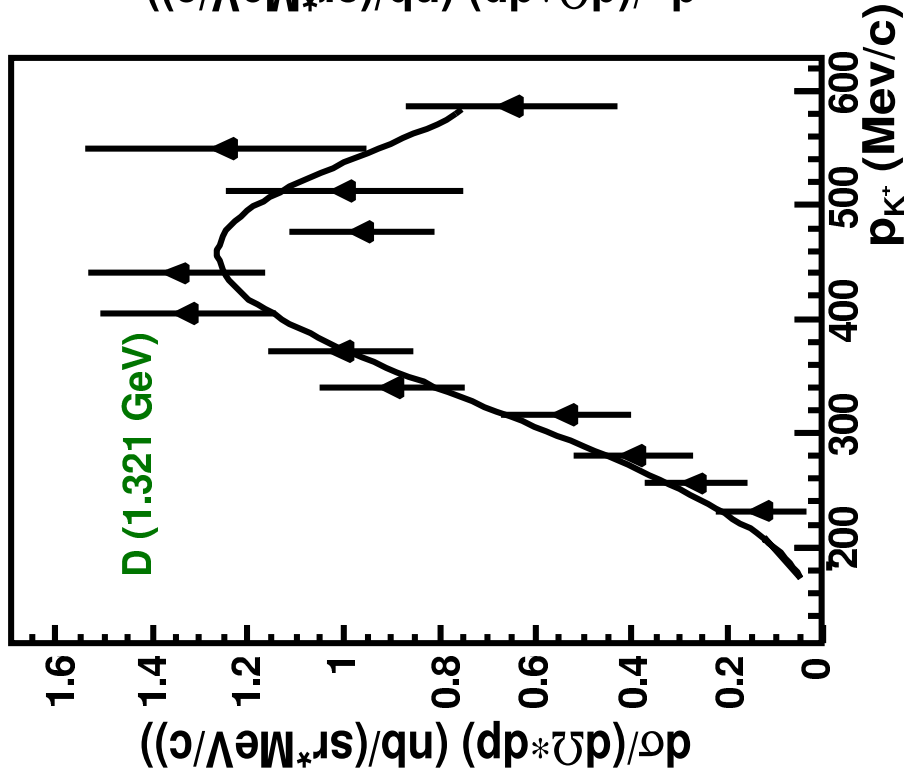
K⁺p missing mass spectra for 2.02 GeV



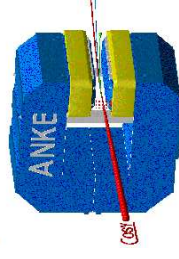
The best agreement

$\sigma_n^{K^+}/\sigma_p^{K^+} \sim 4.5$ at 2.02 GeV

$pd \rightarrow K^+ X$ at 1.321 and 1.357 GeV



Model: PSP + FSI (pn, n Λ , p Λ)



Summary:

- 1) $\sigma_n^{K^+}/\sigma_p^{K^+} \sim 3-4$ from inclusive spectra
at $T_p=1.83, 1.92$ and 2.02 GeV
- 2) $\sigma_n^{K^+}/\sigma_p^{K^+} \sim 4$ from correlation (K^+p) missing mass
spectra at $T_p=2.02$ GeV
- 3) $\sigma_C^{K^+}/\sigma_D^{K^+} \sim 3.5$ from our experimental data at $T_p=2.02$ GeV
- 4) $\sigma_D^{K^+}/\sigma_p^{K^+} = 2.96$ $\sigma_D^{\pi^+}/\sigma_p^{\pi^+}$ at $T_p=2.65$ GeV. From approximation
to the experimental π^+ data $\sigma_D^{K^+}/\sigma_p^{K^+} \sim 3.4$

