germano bonomi - university of brescia & INFN pavia

on behalf of the FINUDA collaboration

FINUDA physics results

39th LNF scientific committee - 26/10/2009

University of Victoria

Seoul National University

JINR Dubna

INFN Istituto Nazionale di Fisica Nucleare

Bari University & INFN Bari

Brescia University & INFN Pavia

Pavia University & INFN Pavia

Torino Polytechnic & INFN Torino

Torino University & INFN Torino

Trieste University & INFN Trieste

L.N.F. / INFN Frascati

KEK

RIKEN

Teheran Shahid Beheshty University

FINUDA data takings

data taking	oct 2003 - jan 04	nov 2006 jun 07
int. luminosity	220 pb^{-1}	960 pb^{-1}
daily luminosity	6 pb^{-1}	10 pb^{-1}
Total events (M)	30	200
Targets	^{6}Li, ^{7}Li, ^{12}C, ^{27}Al, ^{51}V	**^{6}Li, ^{7}Li, ^{9}Be, ^{13}C, D_2O**

$$K^-_{stop} + {}^A Z \rightarrow {}^A_\Lambda Z + \pi^-$$

$$K^- + n \rightarrow \Lambda + \pi^-$$ strangeness exchange reaction

1

HYPERNUCLEI PRODUCTION

HYPERNUCLEI DECAY

$$\Lambda_{free} \rightarrow p + \pi^- \ (64.2\%)$$
$$\Lambda_{free} \rightarrow n + \pi^o \ (35.8\%)$$

Mesonic Weak Decays (MWD)

$$ {}^A_\Lambda Z \rightarrow {}^A \ (Z+1) + \pi^-$$
$$ {}^A_\Lambda Z \rightarrow {}^A \ Z + \pi^o$$

Λ decay in medium

$$\Lambda_{med} \rightarrow p + \pi^-$$
$$\Lambda_{med} \rightarrow n + \pi^o$$

NON-Mesonic Weak Decays (NMWD)

$$ {}^A_\Lambda Z \rightarrow {}^{A-2} \ (Z-1) + p + n$$
$$ {}^A_\Lambda Z \rightarrow {}^{A-2} \ Z + n + n$$

Λ decay in medium

$$\Lambda_{med} + p \rightarrow n + p$$
$$\Lambda_{med} + n \rightarrow n + n$$

Other NON-Mesonic rare decays (for example ...)

$$ {}^4_\Lambda He \rightarrow d + d$$
$$ {}^4_\Lambda He \rightarrow p + t$$
$$ {}^5_\Lambda He \rightarrow d + t$$

2

K- ABSORPTION ON FEW NUCLEONS

$$A\,(K^-, \Lambda p)\,X$$ 2 nucleons absorption

$$A\,(K^-, \Lambda d)\,X$$ 3 nucleons absorption

$$A\,(K^-, \Lambda t)\,X$$ 4 nucleons absorption

$\Lambda p,\ \Lambda d,\ \Lambda t$
invariant mass study

3

FINUDA hypernuclear spectroscopy

key features of the spectrometer

very thin targets (0.1 ÷ 0.3 g/cm^2)
transparency ➥ high resolution spectroscopy

coincidence measurement with large acceptance
complete event ➥ decay mode study

different targets in the same run
➥ high degree of flexibility

simultaneous tracking of μ^+ from the K^+ decay
$K^+ \to \mu^+ \nu_\mu$ ➥ energy and rate calibration

the "strangeness exchange" reaction **it's not** the only mechanism for a production of a **negative pion** in the **K-N interaction**

1 $K^- + n \to \Lambda + \pi^-$

2 $K^- + p \to \Sigma^- + \pi^+$

3 $K^- + (np) \to \Sigma^- + p$

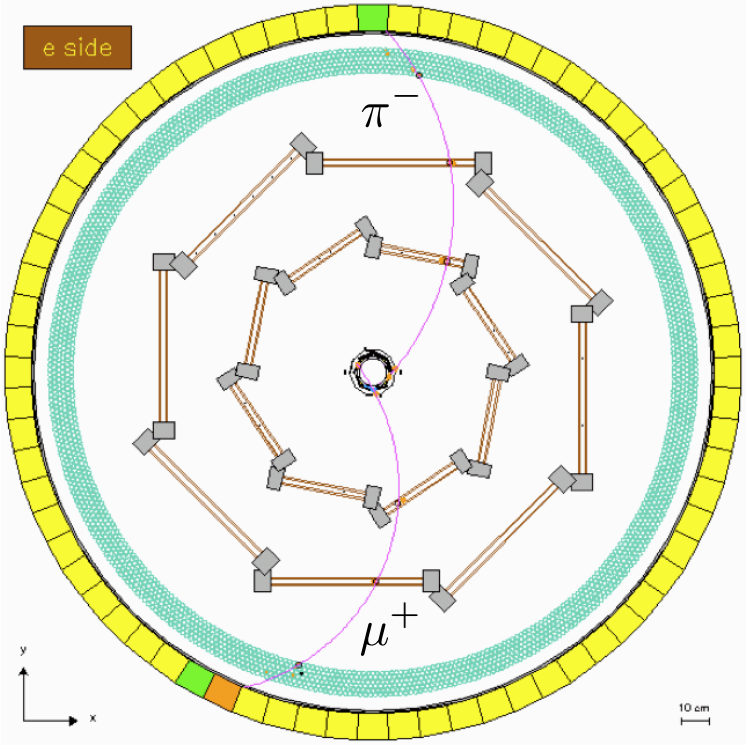
$\Sigma^- \to n + \pi^-$

4 $K^- \to \mu^- + \bar{\nu}_\mu$

backgrounds

hypernucleus

$$K^-_{stop} + {}^A_Z \to {}^A_\Lambda Z + \pi^-$$



by conserving energy and momentum

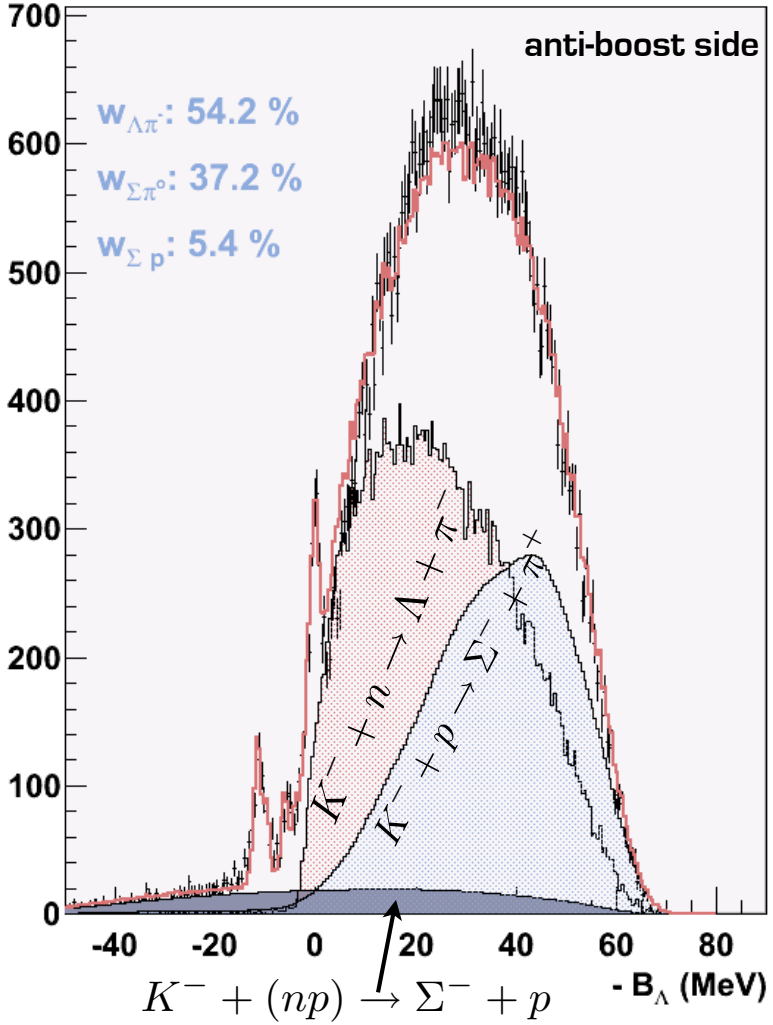
$$m_{hyp} = \sqrt{(m_{K^-} + m_{^A_Z} - E_{\pi^-})^2 - p^2_\pi}$$

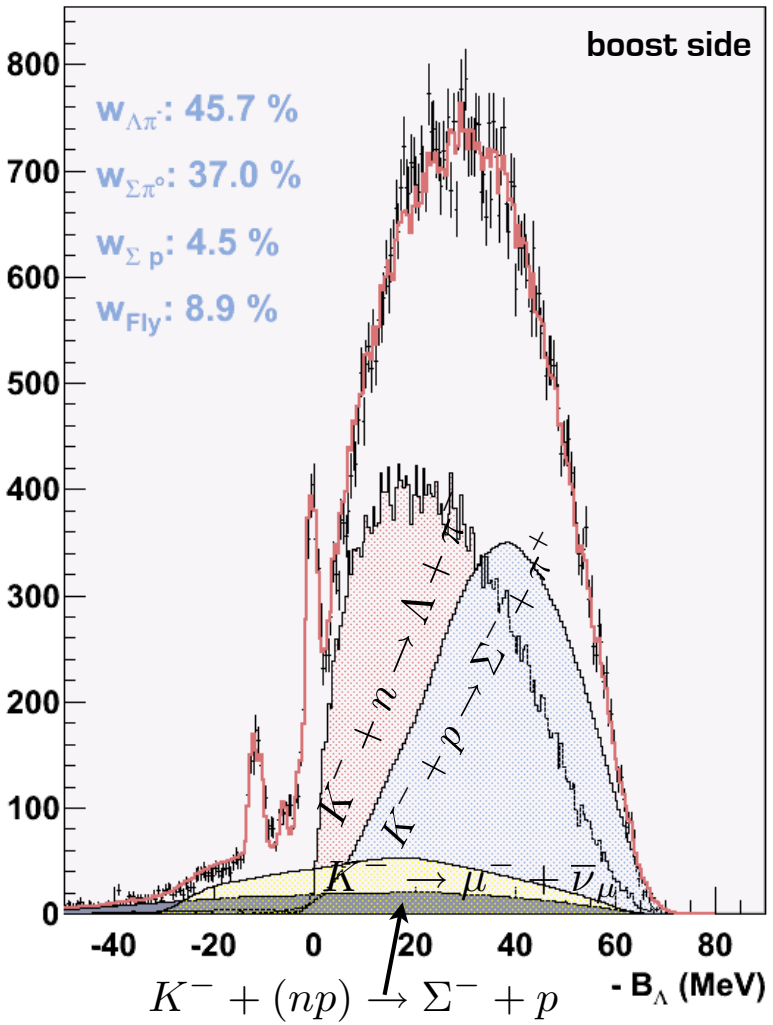
$$-B_\Lambda = m_{hyp} - (m_{^A_{Z-1n}} + m_\Lambda)$$

binding energy

1) fit the experimental distribution with the sum of N gaussians (for the signal) and 4 histograms for the background
   - the mean and the sigma of the gaussians are free to move around the input values

2) we repeat the fit with a more sophisticated fit tool fixing also the mean values and the sigma of the gaussians (*)

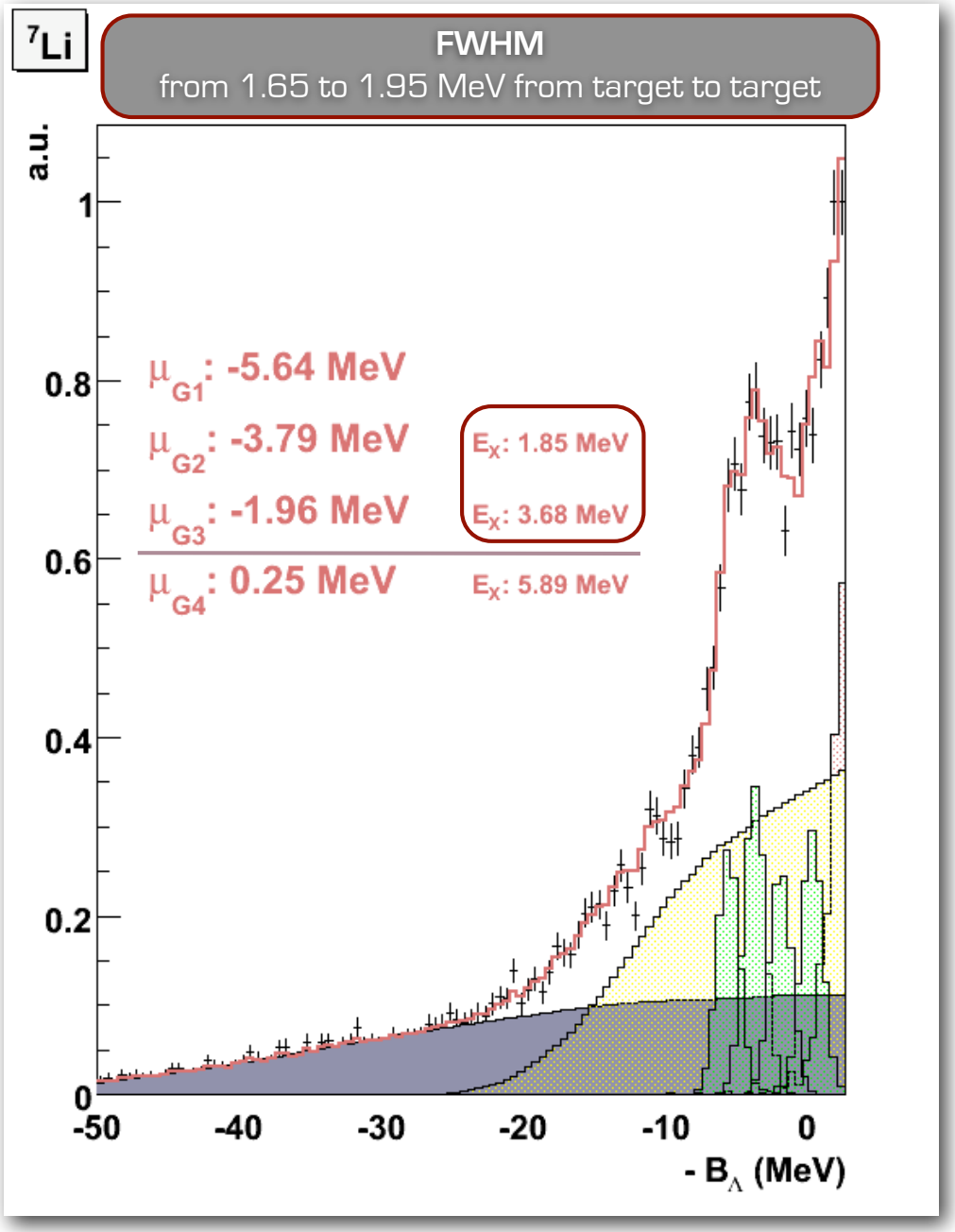




BACKGROUND IS UNDER CONTROL

*ROOT TFractionFitter

Fits MC fractions to data histogram (a la HMCMLL, see R. Barlow and C. Beeston, Comp. Phys. Comm. 77 (1993) 219-228, and http://www.hep.man.ac.uk/~roger/hfrac.f).



B_Λ energy measurements

- absolute scale of the energy known at the level of 0.2 MeV
- possible systematic of the fit of 0.2-0.3 MeV

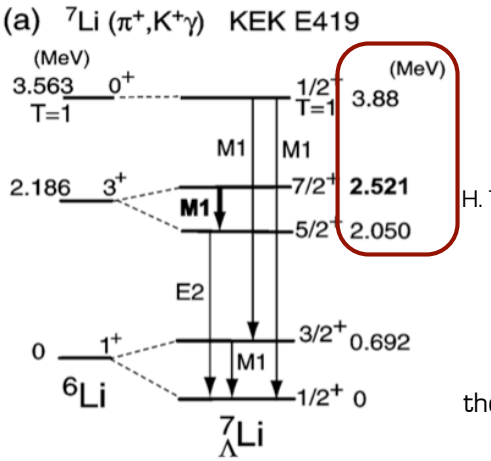
formation probability

capture Rate per stopped K^-

#1: 0.041 ± 0.006 ± 0.005 %
#2: 0.058 ± 0.008 ± 0.006 %
#3: 0.043 ± 0.006 ± 0.005 %
#4: 0.052 ± 0.007 ± 0.006 %

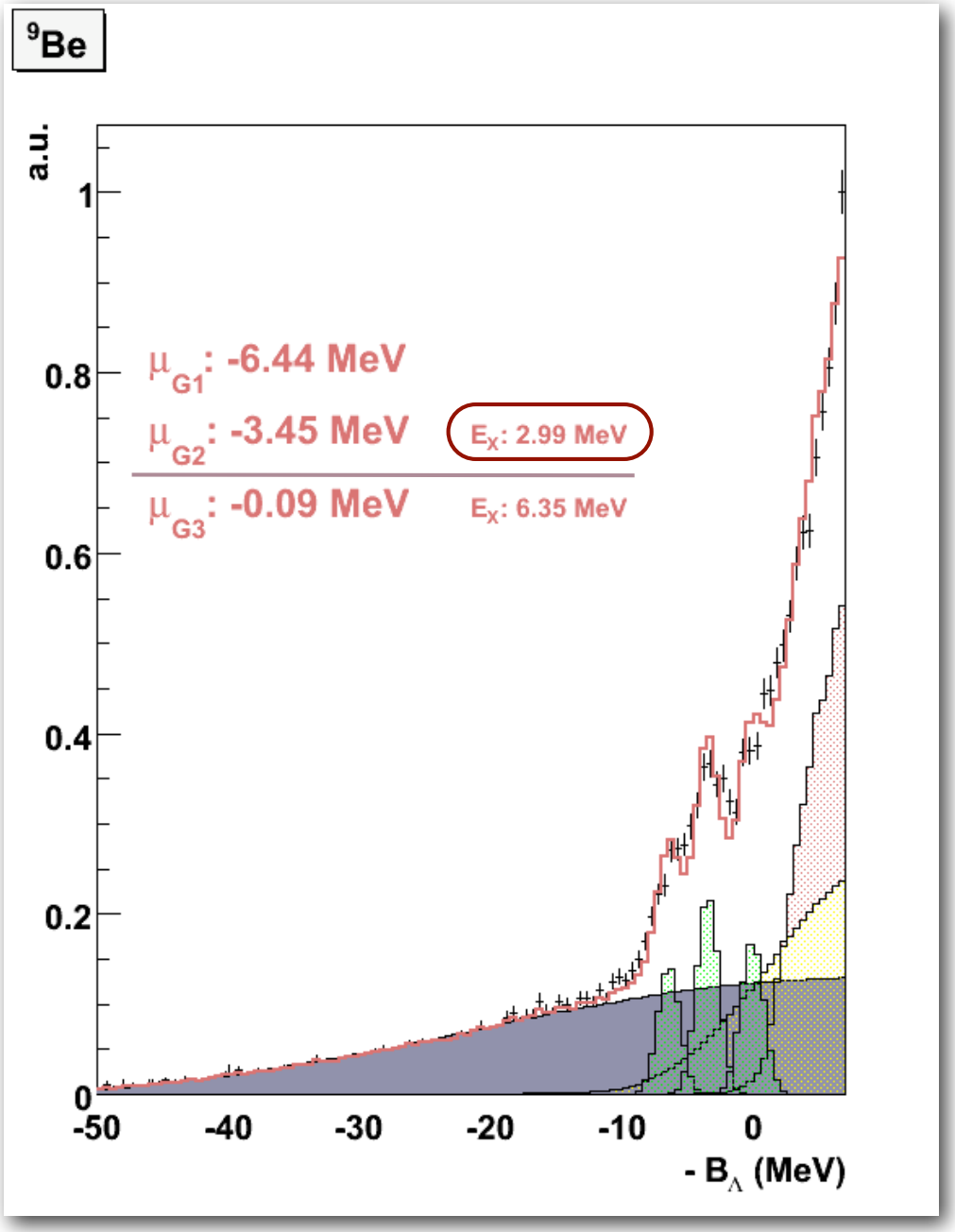
FIRST WORLD MEASUREMENT

Total in the bound region:
0.14 ± 0.01 ± 0.02 %



H. Tamura et al. Nucl. Phys. A **754** (2005) 58c

excitation energies are referred to the ground state B_Λ = -5.58 ± 0.03 MeV
[M. Juric et al. Nucl. Phys. B **52** (1973) 1]



formation probability

capture Rate per stopped K

#1: 0.022 ± 0.006 ± 0.002 %

#2: 0.036 ± 0.008 ± 0.004 %

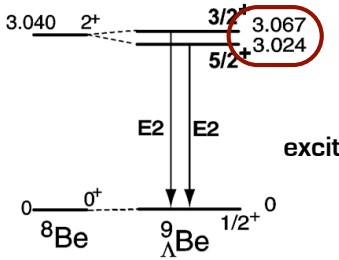
#3: 0.027 ± 0.006 ± 0.003 %

Total in the bound region:

0.058 ± 0.011 ± 0.006

FIRST WORLD MEASUREMENT

(b) ^{9}Be ($K^-,\pi^-\gamma$) BNL E930('98)

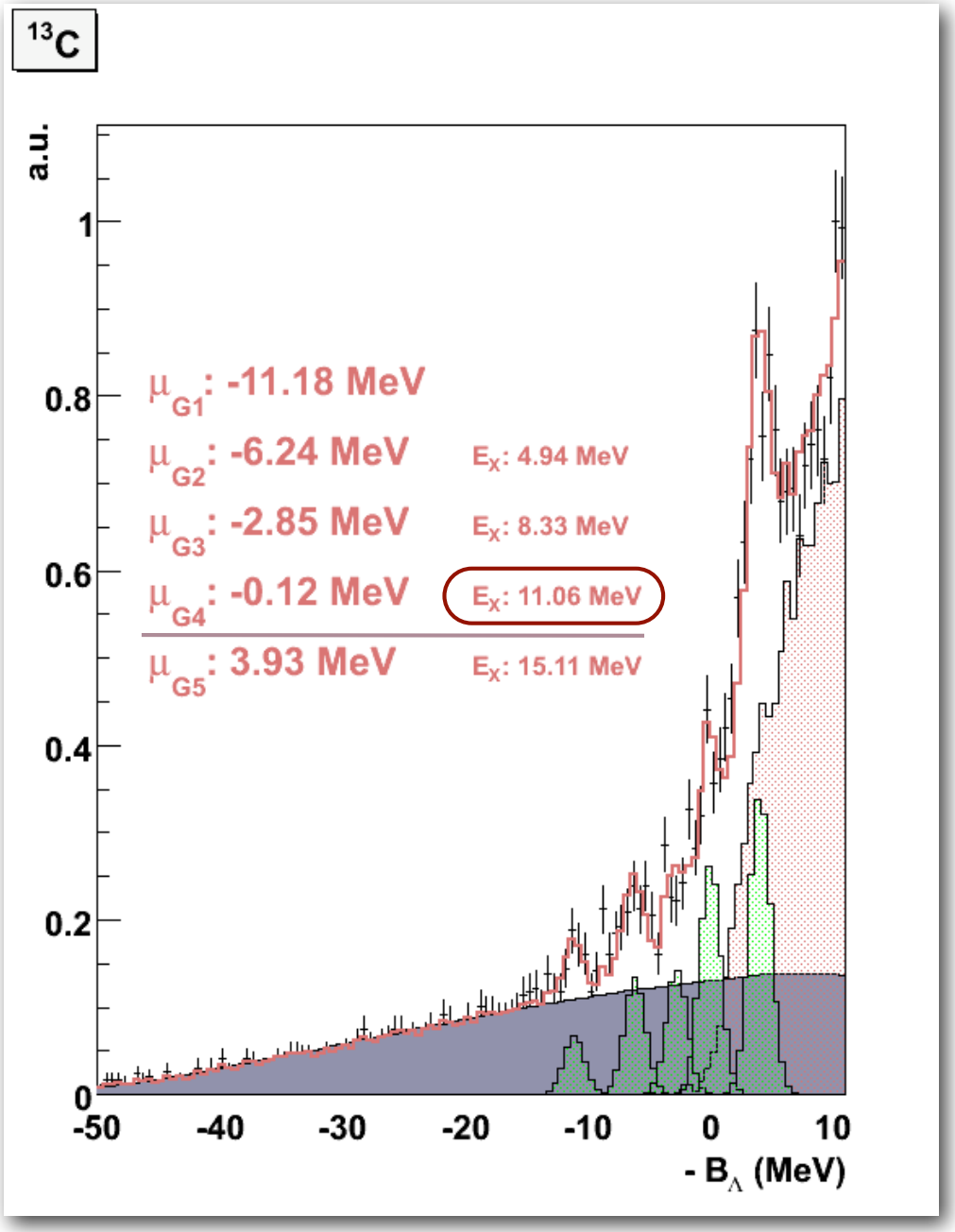


H. Tamura et al. Nucl. Phys. A **754** (2005) 58c

excitation energies are referred to the ground state

B_Λ = -6.61 ± 0.04 MeV

[M. Juric et al. Nucl. Phys. B **52** (1973) 1]



formation probability

capture Rate per stopped K

#1: 0.006 ± 0.001 ± 0.001 %
#2: 0.014 ± 0.002 ± 0.002 %
#3: 0.018 ± 0.002 ± 0.002 %
#4: 0.024 ± 0.003 ± 0.003 %
#5: 0.035 ± 0.005 ± 0.004 %

Total in the bound region:
0.062 ± 0.005 ± 0.008 %

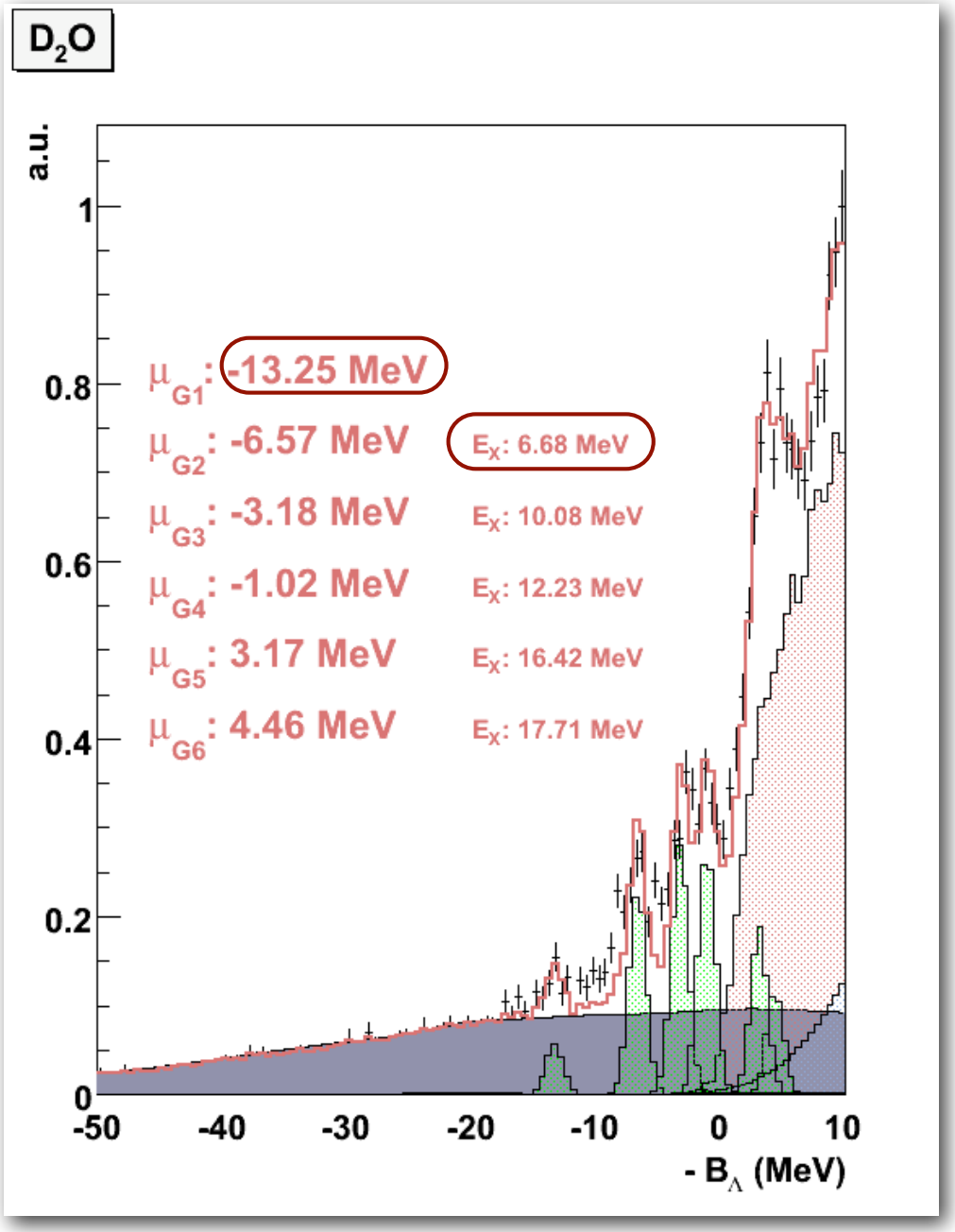
FIRST WORLD MEASUREMENT

PHYSICAL REVIEW C, VOLUME 65, 034607

$^{13}_{\Lambda}C$ hypernucleus studied with the $^{13}C(K^-,\pi^-\gamma)$ reaction

gion. The excitation energies of the $1/2^-$ and $3/2^-$ states were obtained as $10.982 \pm 0.031(\text{stat}) \pm 0.056(\text{syst})$ and $10.830 \pm 0.031(\text{stat}) \pm 0.056(\text{syst})$ MeV, respectively. The

excitation energies are referred to the ground state
B_Λ = -11.22 ± 0.08 MeV
[M. Juric et al. Nucl. Phys. B **52** (1973) 1]



O. Hashimoto, H. Tamura / Progress in Particle and Nuclear Physics 57 (2006) 564–653

(π^+, K^+)

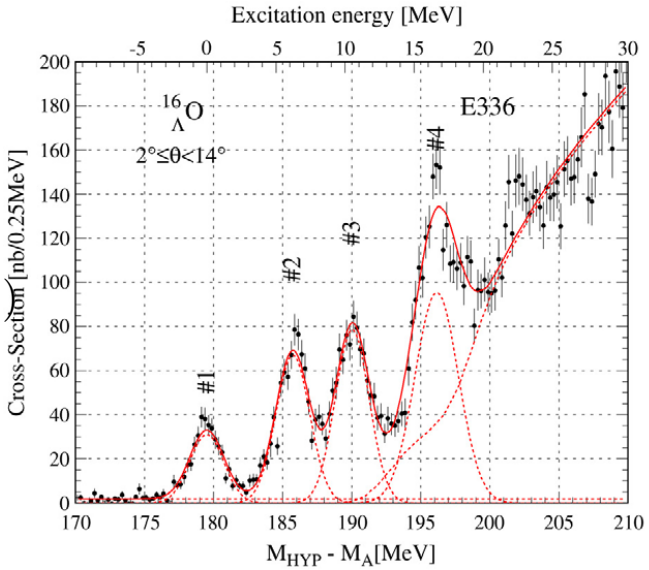
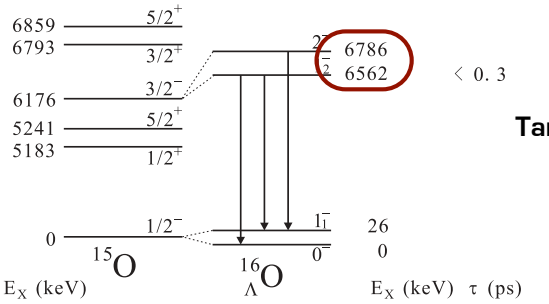


Table 11
Excitation energies and cross sections of $^{16}_{\Lambda}$O in the (π^+, K^+) reaction

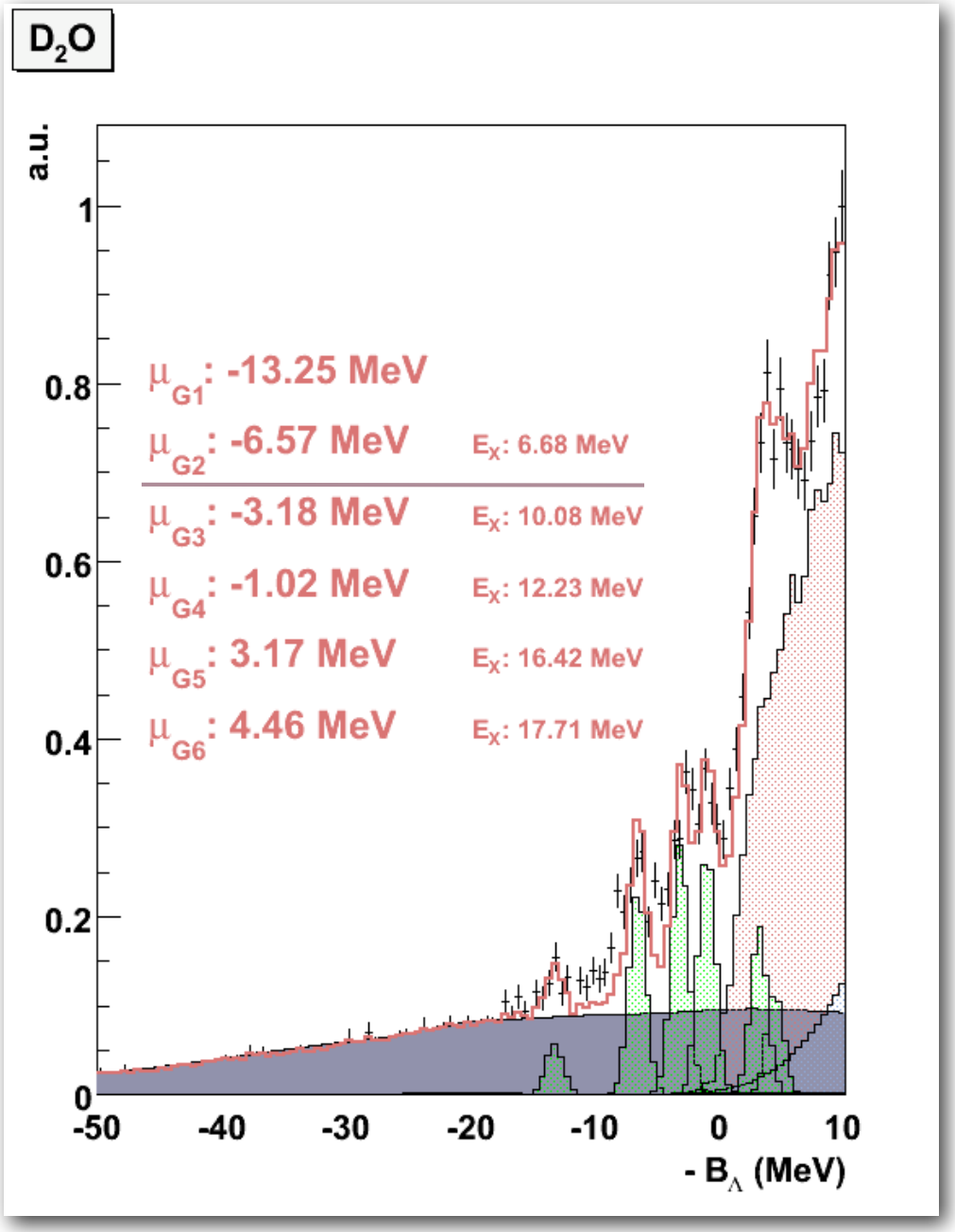
Peaks	B_Λ or E_X (MeV)	FWHM (MeV)	Cross sections $\sigma_{2°-14°}$ (μb)
# 1	$B_\Lambda = 12.42 \pm 0.05$	2.75 ± 0.05	0.41 ± 0.02
# 2	$E_X = 6.23 \pm 0.06$	2.75 ± 0.05	0.91 ± 0.03
# 3	$E_X = 10.57 \pm 0.06$	2.75 ± 0.05	1.05 ± 0.03
# 4	$E_X = 16.59 \pm 0.07$	3.13 ± 0.11	1.38 ± 0.06

PHYSICAL REVIEW C **77**, 054315 (2008)



WRONG value:
Tamura private comunication

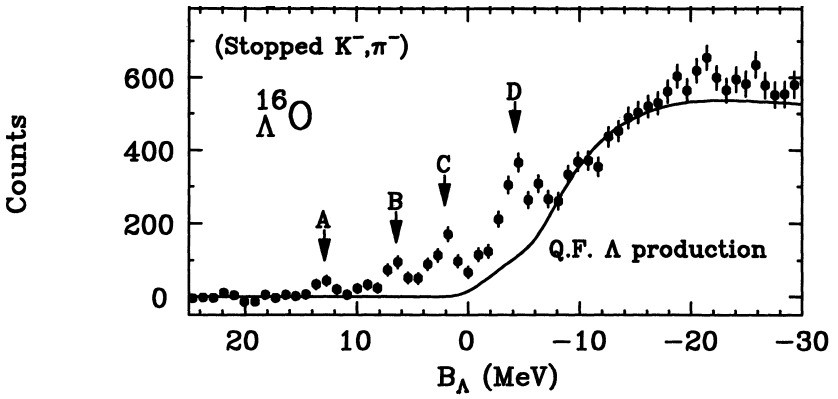
FIG. 16. Experimentally determined level scheme of $^{16}_{\Lambda}$O and observed γ-ray transitions. The corresponding level scheme of ^{15}O is also shown.



Progress of Theoretical Physics Supplement No. 117, 1994

Study of Λ-Hypernuclei with Stopped K^- Reaction

Hirokazu TAMURA, Ryugo S. HAYANO, Haruhiko OUTA* and Toshimitsu YAMAZAKI*



	Hypernuclear states peak	state	B_Λ(MeV)	Formation Probability per stopped K^-(%)	per $\Lambda\pi^-$(%)
$^{16}_{\Lambda}$O	A	$(p_{1/2})_n^{-1}(s_{1/2})_\Lambda$	12.9±0.4	0.013±0.004	0.37±0.13
	B	$(p_{3/2})_n^{-1}(s_{1/2})_\Lambda$	6.53±0.18	0.030±0.005	0.86±0.30
	C	$(p_{1/2})_n^{-1}(p_{1/2,3/2})_\Lambda$	2.08±0.18	0.056±0.008	2.0±0.7
	D	$(p_{3/2})_n^{-1}(p_{1/2,3/2})_\Lambda$	−4.23±0.09	0.112±0.014	3.2±1.1

formation probability

capture Rate per stopped K

#1: 0.006 ± 0.002 ± 0.001 %

#2: 0.021 ± 0.004 ± 0.002 %

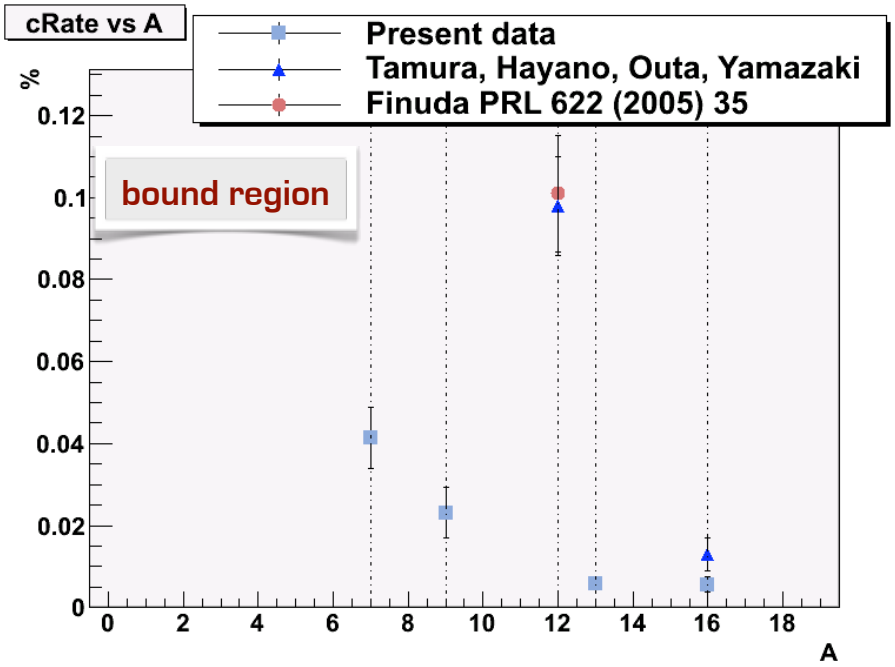
#3+4: 0.060 ± 0.014 ± 0.008 %

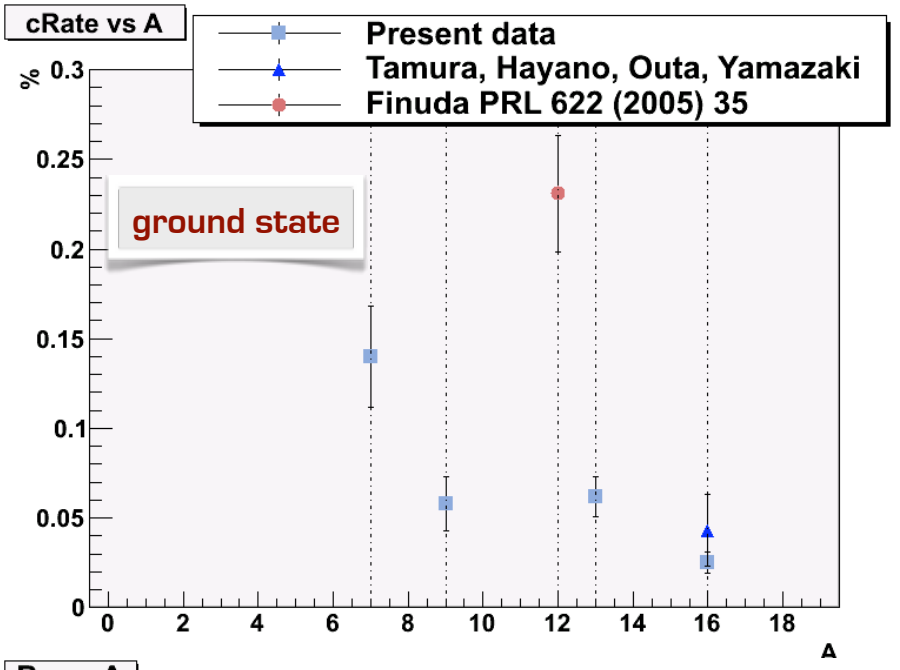
#5+6: 0.059 ± 0.013 ± 0.007 %

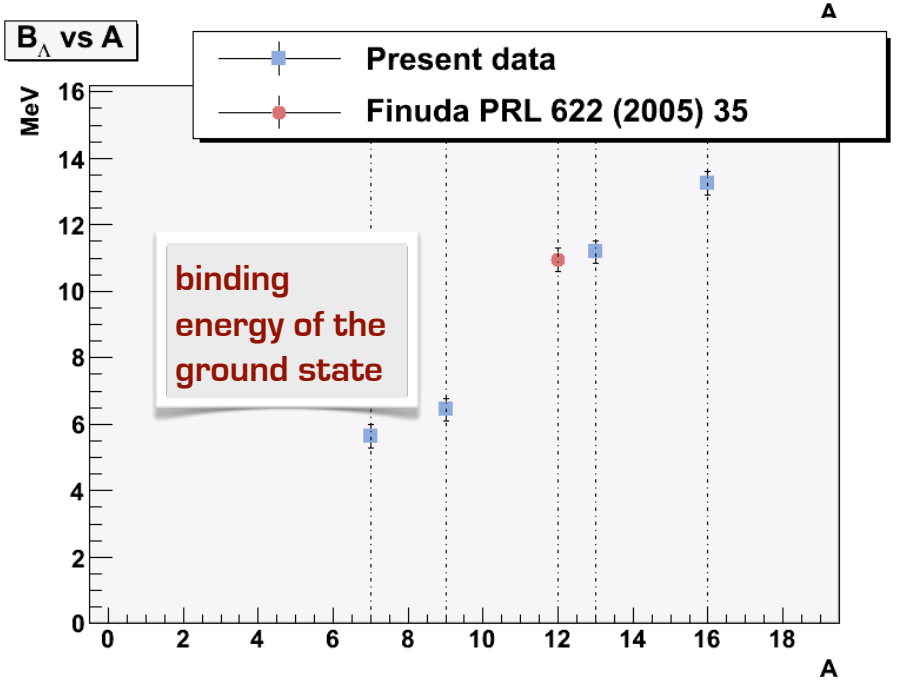
Total in the bound region:

0.027 ± 0.005 ± 0.003 %

CAPTURE RATE (PER STOPPED KAON) VS A







Λ-hypernuclear production in (K^-_{stop}, π) reactions

Vojtech Krejcirík[1,2], Ales Cieplý[1]

[1] Nuclear Physics Institute, AS CR, Rez [2] Faculty of Mathematics and Physics, Charles University, Prague

Hadronic Atoms and Kaonic Nuclei -
solved puzzles, open problems and future challenges
in theory and experiment

14 October 2009

2a

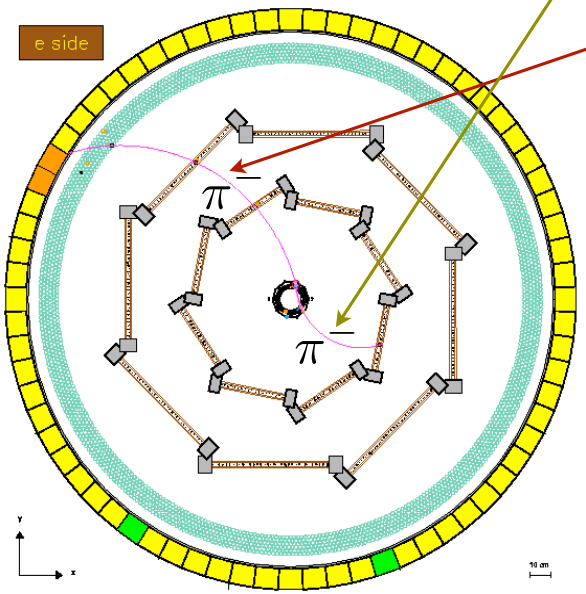
FINUDA

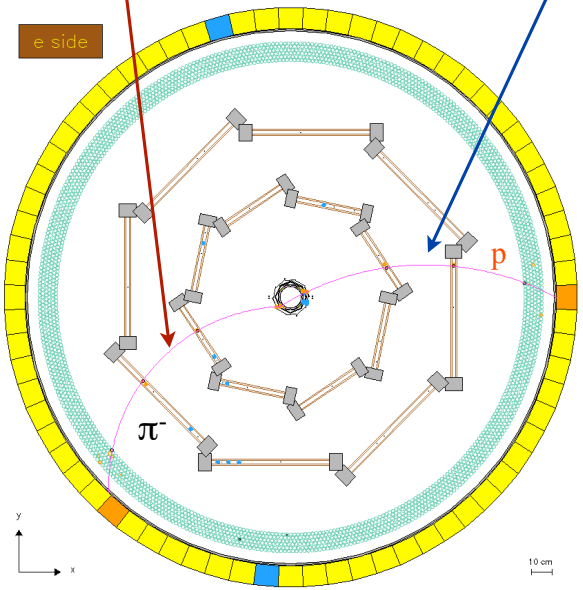
mesonic & non-mesonic weak decays

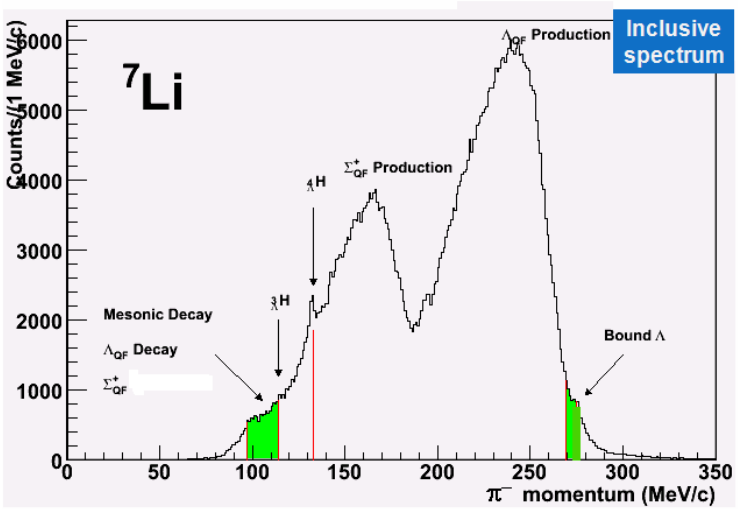
$$K^-_{stop} + {}^A Z \rightarrow {}^A_\Lambda Z + \pi^-$$

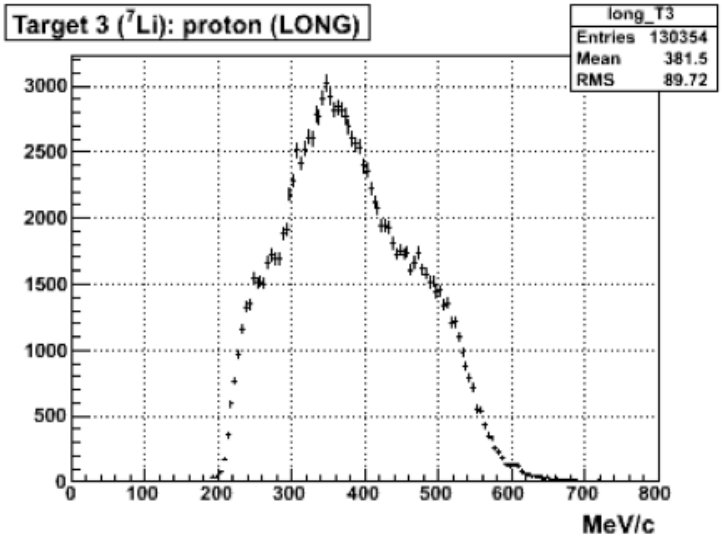
$${}^A_\Lambda Z \rightarrow {}^A (Z+1) + \pi^-$$

$${}^A_\Lambda Z \rightarrow {}^{A-2} (Z-1) + p + n$$

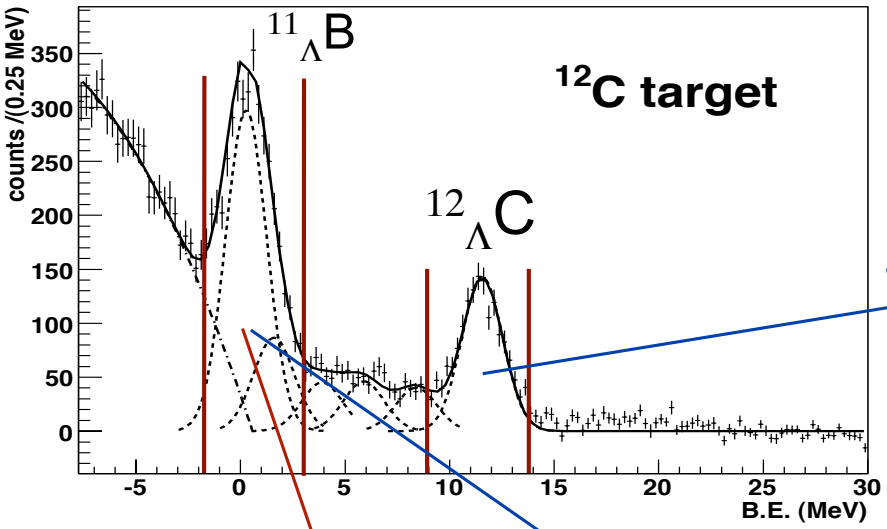


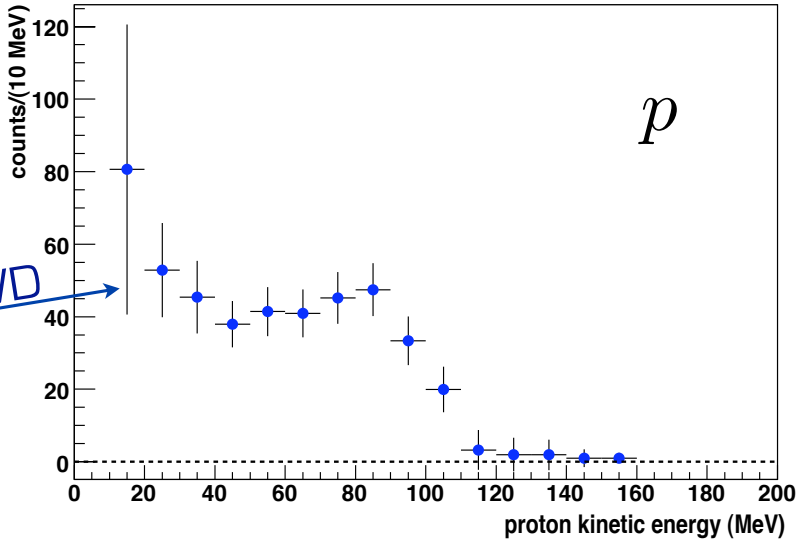






Inclusive production π spectra background subtracted

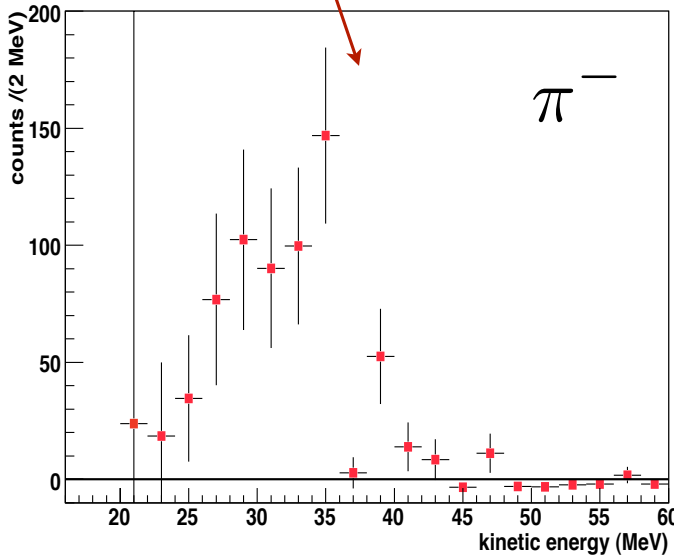


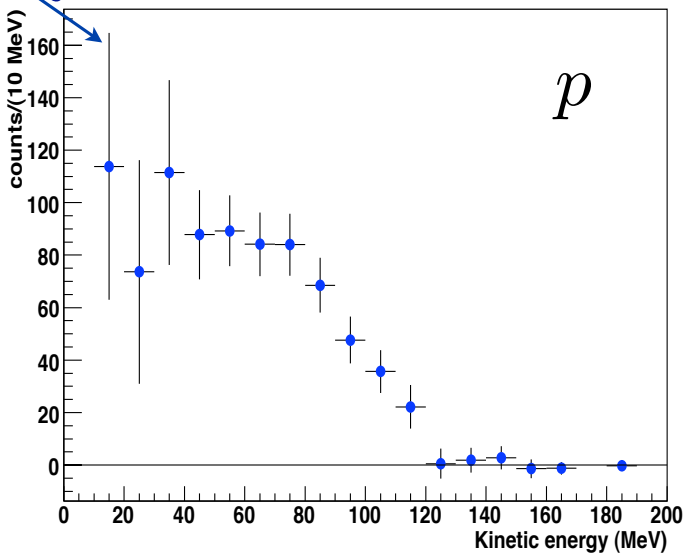


NMWD

MWD

NMWD

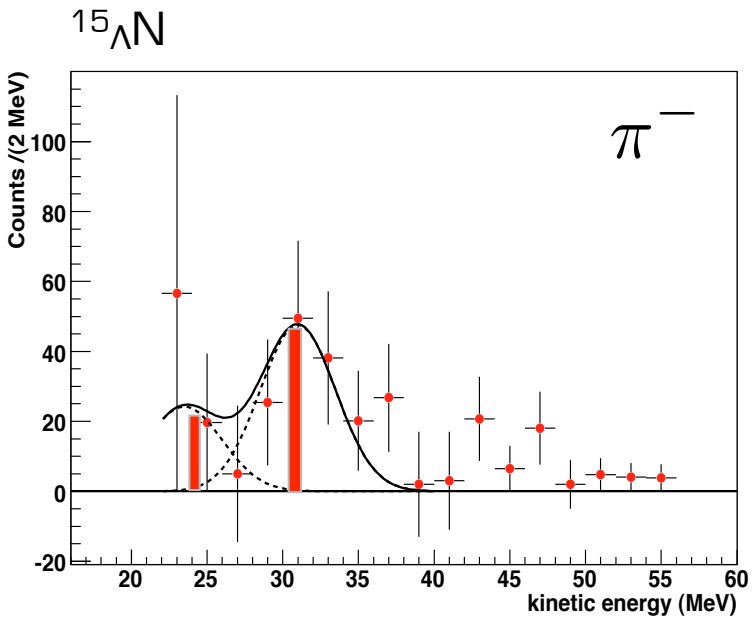


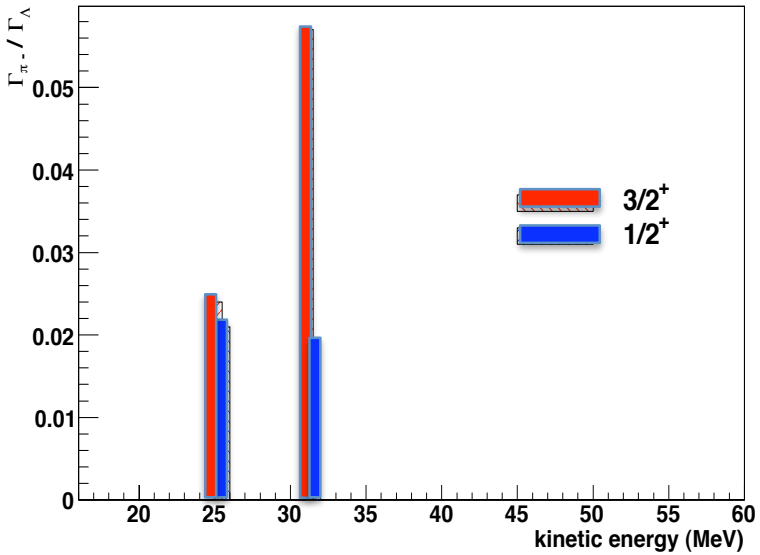


FINUDA Coll., PLB 681 (2009) 139

New results on mesonic weak decay of p-shell Λ-hypernuclei

decay π and p spectra background subtracted & acceptance corrected





FINUDA Coll., PLB 681 (2009) 139

New results on mesonic weak decay of p-shell Λ-hypernuclei

Correspondence with the calculated strenght functions
T. Motoba et al, Nucl. Phys. A 489 (**1988**) 683.
A. Gal, Nucl. Phys. A 828 (**2009**) 72.

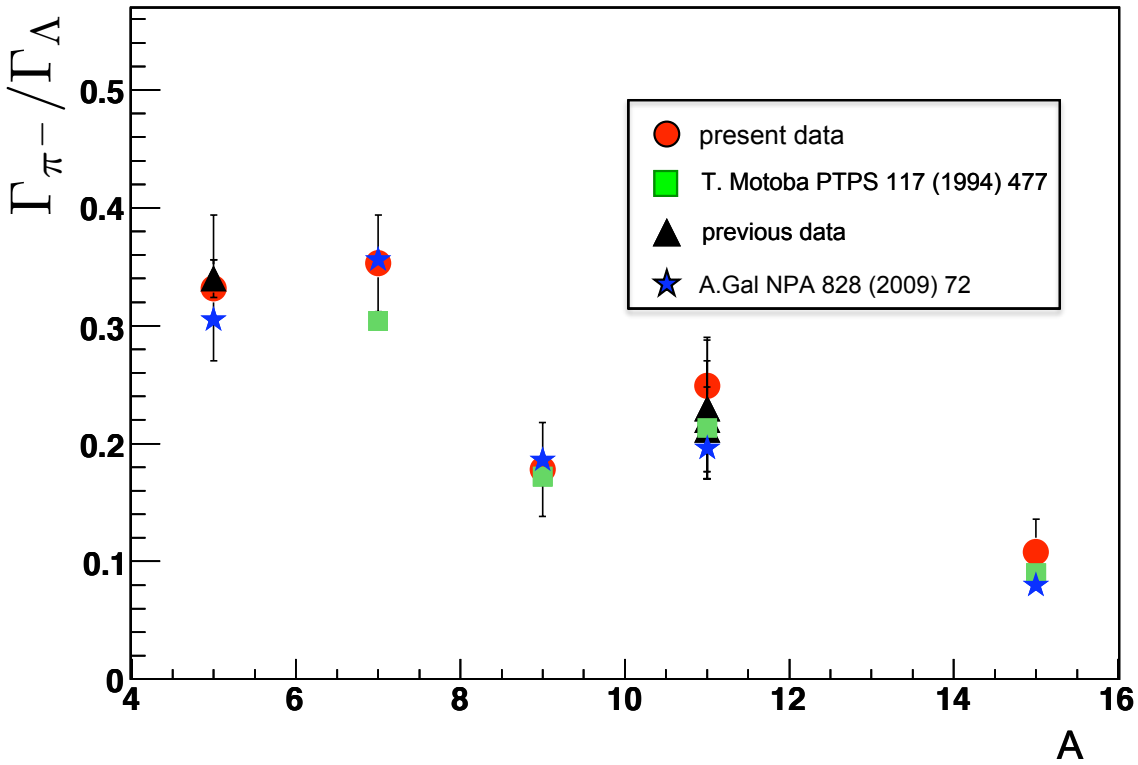
$^{15}_{\Lambda}N_{g.s}$ spin not known. $J^\pi(^{15}_{\Lambda}N_{g.s.}) = 3/2^+$
D.J.Millener, A.Gal, C.B.Dover Phys. Rev. C 31 (1985) 499.

Spin ordering not obtained from γ-rays of $^{16}_{\Lambda}$O
M.Ukai et al. Phys. Rev.C 77 (2008) 054315.

First experimental determination
$J^\pi(^{15}_{\Lambda}\mathbf{N}_{g.s.}) = 3/2^+$
from spectrum shape

and decay rate value

$$\Gamma_{\pi^-}/\Gamma_\Lambda = 0.108 \pm 0.038^{+0.014}_{-0.013}$$



Mesonic decay results

FINUDA Coll., PLB 681 (2009) 139

New results on mesonic weak decay of p-shell Λ-hypernuclei

MWD π spectra for $^{7}_{\Lambda}$Li, $^{9}_{\Lambda}$Be, $^{11}_{\Lambda}$B and $^{15}_{\Lambda}$N

spin-parity assignment confirmed for $^{7}_{\Lambda}$Li, $^{9}_{\Lambda}$Be, $^{11}_{\Lambda}$B g.s.

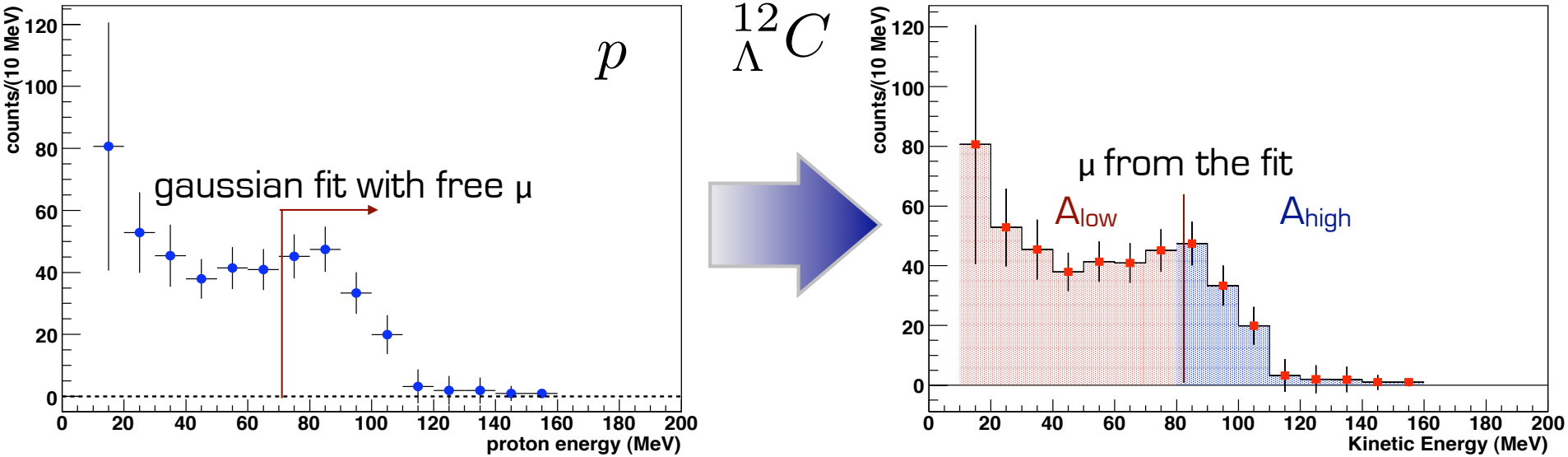
new spin-parity assignment for $^{15}_{\Lambda}$N, based on decay rate (and spectrum shape)

MWD decay rates calculated and compared with theoretical calculations and previous measurements

nuclear structure effects

FINUDA Coll., NPA 804 (2008) 151

Measurement of the proton spectra from non-mesonic weak decay of ΛHe5 ΛLi7 and ΛC12

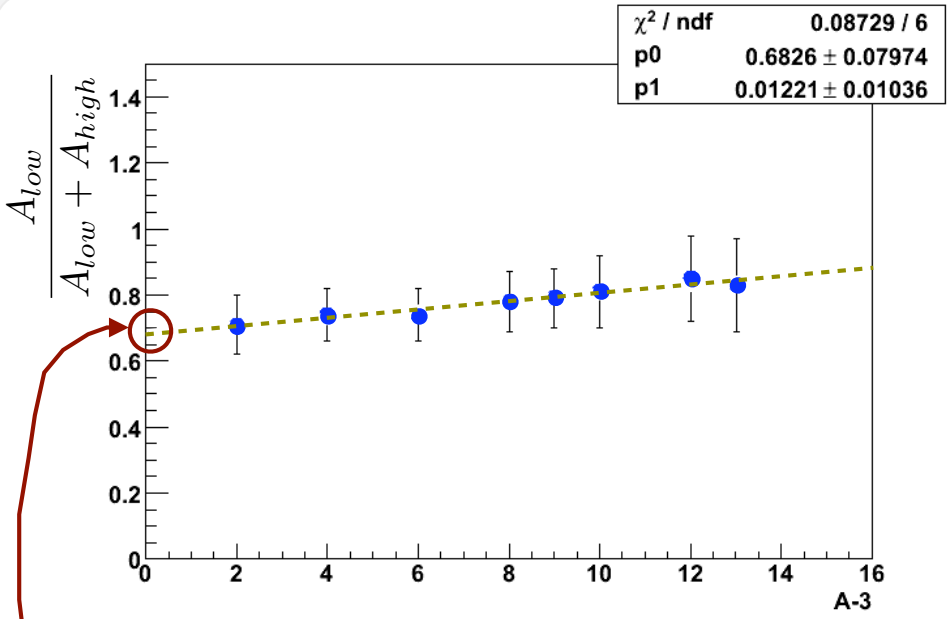


A_{low}: spectrum area below μ
1N + 2N + FSI

A_{high}: spectrum area above μ
1N + FSI
2N(>70 MeV) ~ 5% $2N_{tot}$

W.Alberico and G.Garbarino, Phys. Rev. 369 (2002) 1.
G,Garbarino, A.Parreno and A.Ramos, - Phys.Rev.Lett. 91 (2003) 112501.
G,Garbarino, A.Parreno and A.Ramos, - Phys.Rev. C 69 (2004) 054603.

$$\frac{A_{low}}{A_{low}+A_{high}} = \frac{0.5N(\Lambda p \to np) + N(\Lambda np \to nnp) + N^{FSI}}{N(\Lambda p \to np) + N(\Lambda np \to nnp) + N^{FSI}}$$



$$\frac{A_{low}}{A_{low}+A_{high}} = \frac{0.5N(\Lambda p \to np) + N(\Lambda np \to nnp) + N^{FSI}}{N(\Lambda p \to np) + N(\Lambda np \to nnp) + N^{FSI}}$$

$$\Gamma_2 = \Gamma_{np} + \Gamma_{pp} + \Gamma_{nn}$$

$$\Gamma_{np} : \Gamma_{pp} : \Gamma_{nn} = 0.83 : 0.12 : 0.04$$

E. Bauer and G.Garbarino, Nucl.Phys. A 828 (2009), 29.

$$\frac{N(\Lambda np \to nnp)}{N(\Lambda p \to np)} = \frac{\Gamma_{np}}{\Gamma_p} \approx \frac{\Gamma_2}{\Gamma_p}$$

Fit as a function of A-3
for → 0, FSI → 0

$$R = \lim_{(A-3)\to 0} \frac{A_{low}}{A_{low}+A_{high}} \approx \frac{0.5 + \Gamma_2/\Gamma_p}{1 + \Gamma_2/\Gamma_p} \qquad \frac{\Gamma_2}{\Gamma_p} = 0.56 \pm 0.11$$

$$\frac{\Gamma_2}{\Gamma_{NMWD}} = \frac{\Gamma_2/\Gamma_p}{\Gamma_n/\Gamma_p + 1 + \Gamma_2/\Gamma_p} = 0.27 \pm 0.06$$

Bhang et al., EPJ A33 (2007) 259.

2b

FINUDA

two body non-mesonic rare decays

Two-body non mesonic decay: large momentum transfer

Unlikely to occur → **rare events**

Expected branching ratios: at the level of 1.5% of all non-mesonic decays

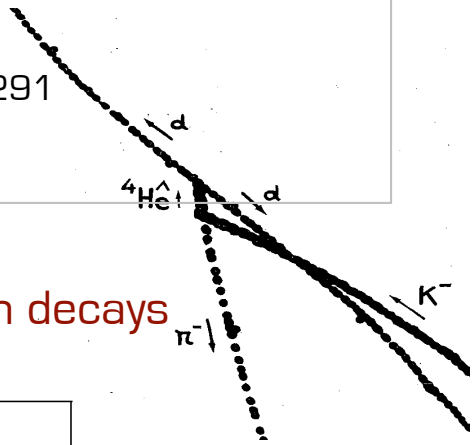
calculations for $^4_\Lambda$He→ nt, pt [Rayet Nuovo Cim. 42B (1968), 238]

Very few observations (**ONLY for $^4_\Lambda$He,** mainly from bubble chamber/emulsion experiments)

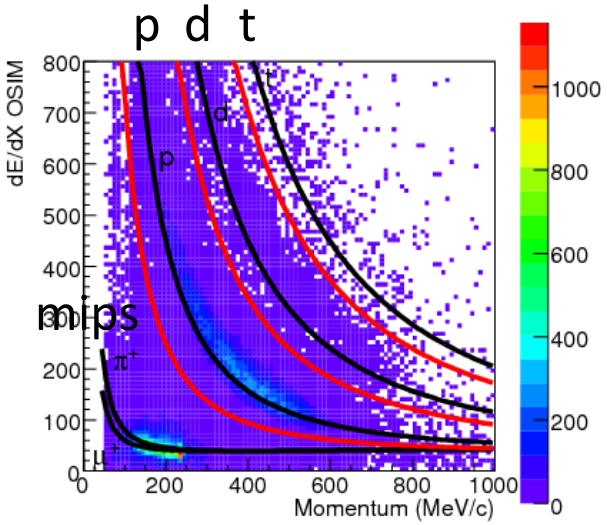
No $^4_\Lambda$He →pt

A few $^4_\Lambda$He → ^{3}He n Corenmans et al. (1968), unpublished- Block PRL 3(1959), 291

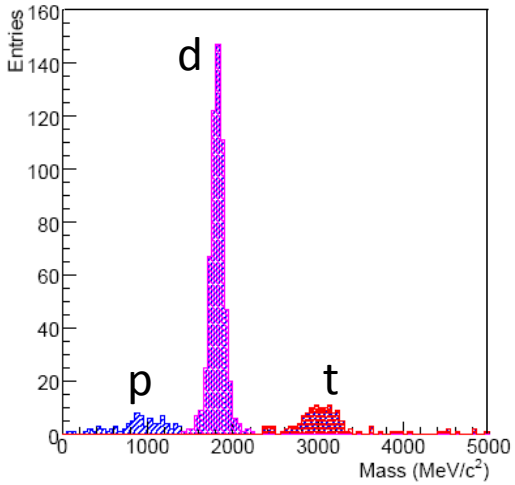
One $^4_\Lambda$He →dd event Block et al. (1960)



FINUDA ability to **identify** and track **p, d and t** has been used to study such decays



dE/dx p.id.



TOF p.id.

$^4_\Lambda$He hyperfragments (from all targets)

$^4_\Lambda$He → dd - d momentum: 570 MeV/c

Total probability (yield) per stopped K^-
Mean value: $(2.82 \pm 0.62)\ 10^{-5}/K^-_{stop}$
For ^{6}Li targets: $(5.22 \pm 1.90)\ 10^{-5}/K^-_{stop}$

➥based on the capture rate per K^- at rest measured for $^4_\Lambda$He in ^{4}He (Tamura et al.)

Γ_{dd} (^{6}Li) = (0.3 ± 0.1)% Γ_Λ

$^4_\Lambda$He → pt - p momentum: 508 MeV/c

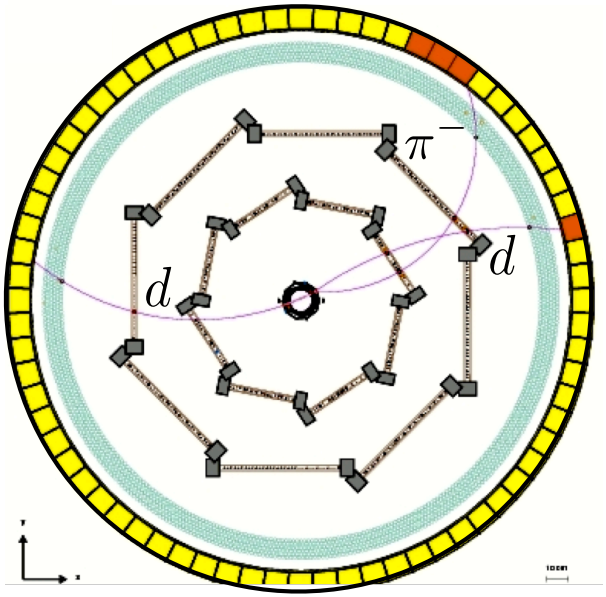
Total probability (yield) per stopped K^-
Mean value: $(5.42 \pm 3.43)\ 10^{-5}/K^-_{stop}$
For ^{6}Li targets: $(18.53 \pm 14.80)\ 10^{-5}/K^-_{stop}$

➥Under the above assumption

Γ_{pt} (^{6}Li) = (1.1 ± 0.9)% Γ_Λ:

$^4_\Lambda$He → dd 16 complete events + 43 semi-inclusive events with a missing π^-

$^4_\Lambda$He → pt 21 events selected with (unfortunately) high S/N ratio



dd/pt ratio: the **pt decay channel is the favoured one**

$^{5}_{\Lambda}$He hyperfragments (from ^{6}Li and ^{7}Li targets)

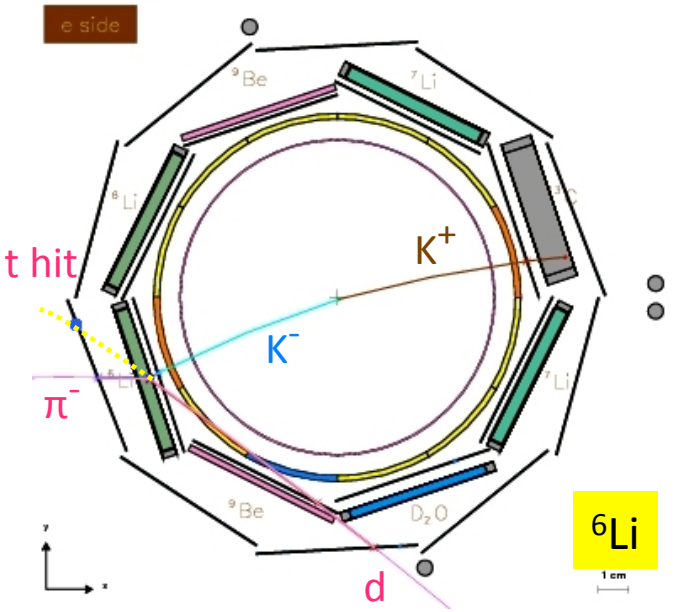
$^{5}_{\Lambda}$He → dt - d momentum: 597 MeV/c

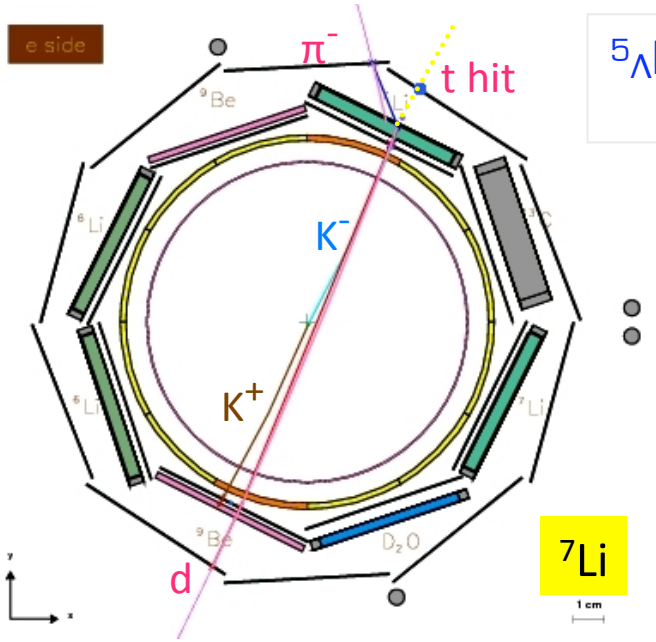
Total probability (yield) per stopped K^-

Mean value: $(1.23 \pm 0.60)\ 10^{-5}/K^-_{stop}$

➥ $\Gamma_{dt} = (0.29 \pm 0.15)\%\ \Gamma_{\Lambda}$

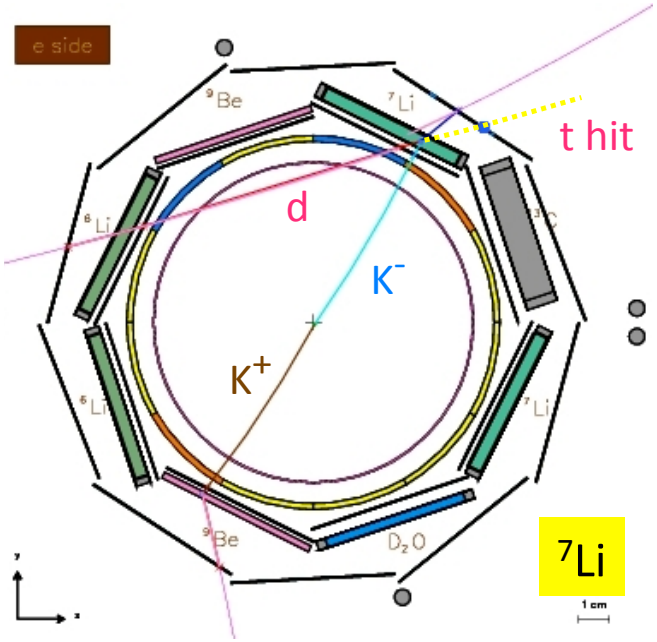
Agreement with theoretical expectations





$^{5}_{\Lambda}$He → dd 3 events

1x ^{6}Li, 2x ^{7}Li



FINUDA

K^- absorption by few nucleons

Study of hypernuclei and their decays:

One nucleon absorption (pion-emission)

$K^- N \rightarrow \pi Y$ elementary reaction

$K^- A \rightarrow \Lambda(\Sigma)\, \pi X$ nuclear reaction

Search for possible deeply bound kaon states:

Two nucleon absorption (no-pion emission)

$K^- (2N) \rightarrow N Y$ elementary reaction

$K^- A \rightarrow \Lambda(\Sigma)\, pX$, nuclear reaction

$K^- A \rightarrow \Lambda(\Sigma)\, nX$ nuclear reaction

FINUDA Coll., PRL 94 (2005) 212303

Evidence for a Kaon-Bound State K^-pp Produced in K^- Absorption Reactions at Rest

Three nucleon absorption (no-pion emission)

$K^- (3N) \rightarrow NN Y$ elementary reaction

$K^- A \rightarrow \Lambda(\Sigma)\, dX$ nuclear reaction

FINUDA Coll., PLB 654 (2007) 80

Correlated Λd pairs from the $K^-_{(stop)}A \rightarrow \Lambda d A'$ reaction

Four nucleon absorption (no-pion emission)

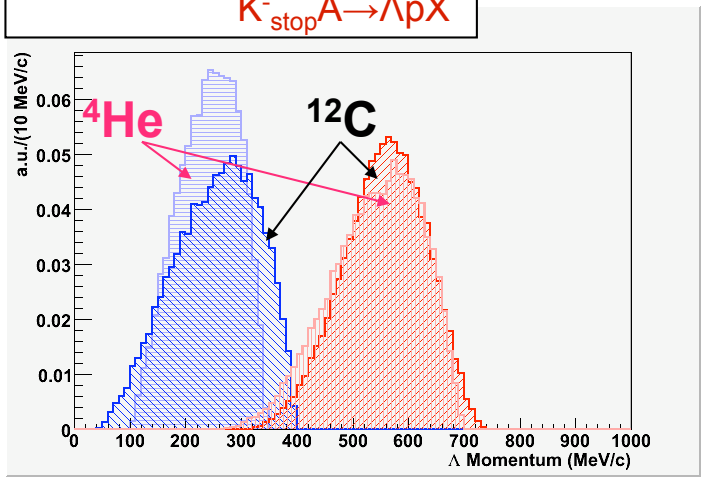
$K^- (4N) \rightarrow NNN Y$ elementary reaction

$K^- A \rightarrow \Lambda(\Sigma)\, tX$ nuclear reaction

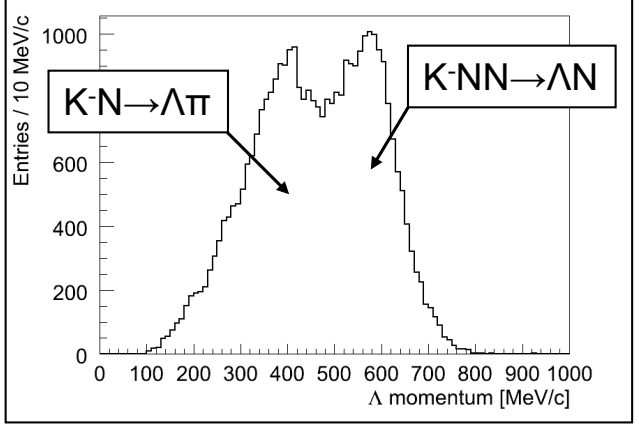
FINUDA Coll., PLB 669 (2008) 229

Correlated Λt pairs from the apsorption of K^- at rest in light nuclei

Simulations: $K^-_{stop}A \rightarrow \Lambda\pi X$, $K^-_{stop}A \rightarrow \Lambda pX$



FINUDA DATA: K^-_{stop} ^{6}Li → Λ X



FINUDA Coll., PLB 669 (2008) 229

Λp invariant mass study

B = 115^{+6}_{-5} (stat)$^{+3}_{-4}$ (sys) MeV
Γ = 67^{+14}_{-11}(stat)$^{+2}_{-3}$ (sys) MeV

A bump has been observed

Two nucleon absorption

$$K^- + (pp) \rightarrow \Lambda p$$

peak expected at 2.34 GeV

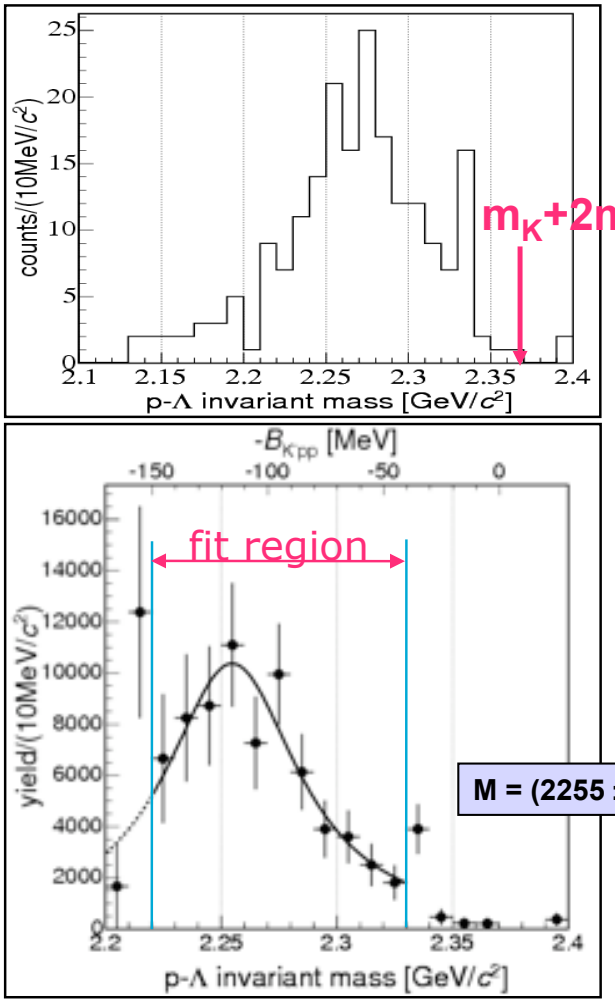
$$K^- + (pp) \rightarrow \Sigma^o p \rightarrow \Lambda\gamma p$$

74 MeV lower distribution, and broadened

Kaon nuclear bound state formation

$$K^- + (pp) \rightarrow X \rightarrow \Lambda p$$
$$K^- + (pp) \rightarrow X \rightarrow \Sigma^o p \rightarrow \Lambda\gamma p$$

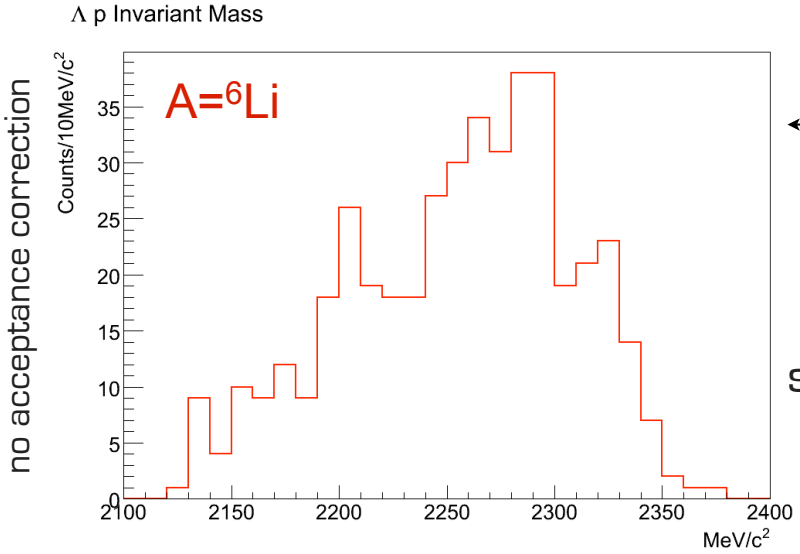
Alternative interpretations of the Λp bump were suggested in the meanwhile



FINUDA Coll., PRL 94 (2005) 212303
Evidence for a Kaon-Bound State K⁻pp Produced in K⁻ Absorption Reactions at Rest

2006 - 2007 Data Taking:

- 8x statistics on: ^{6}Li (^{7}Li, ^{9}Be)
- Improved tracking efficiency
- Extended range of the reconstructed momentum
- Improved selections (missing mass)
- Statistics large enough to study single target spectra

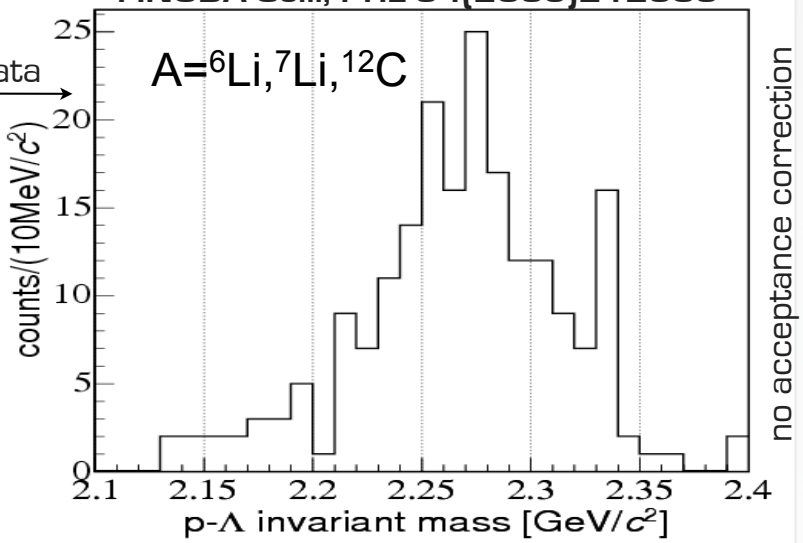


New data ⟷ Old data

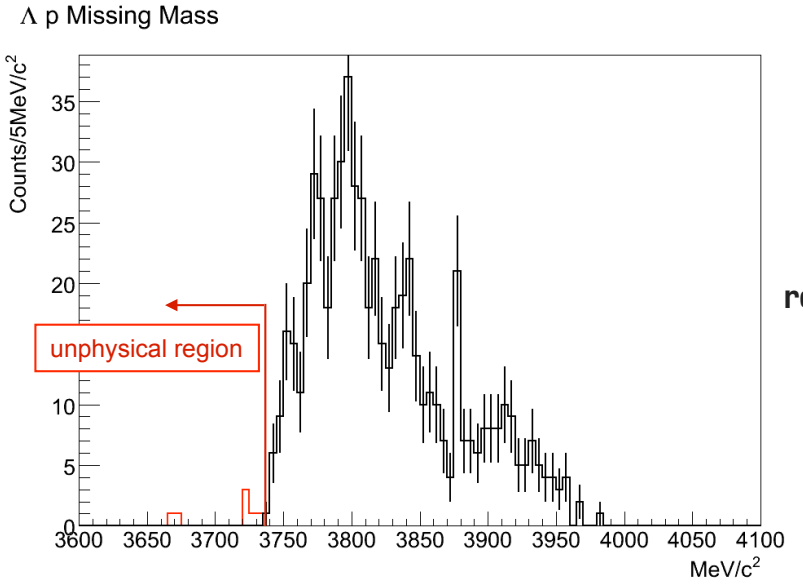
Same cuts applied

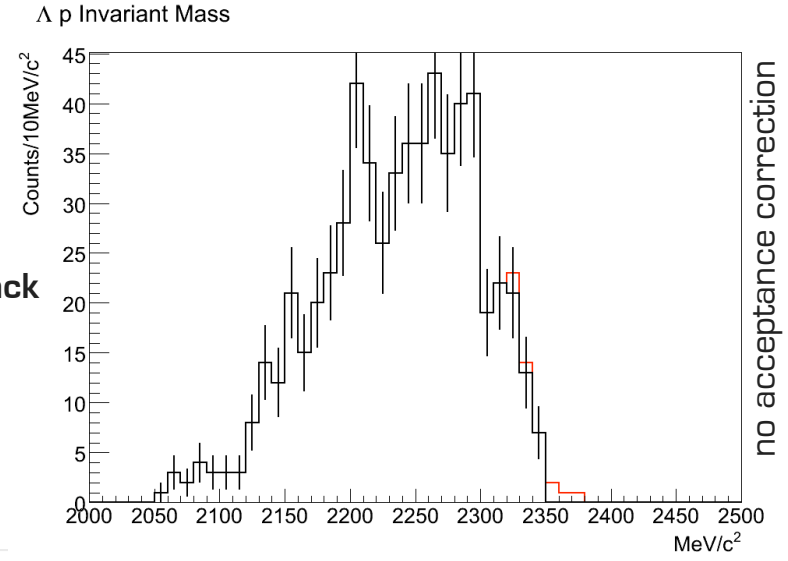
New invariant mass spectra is compatible with published one

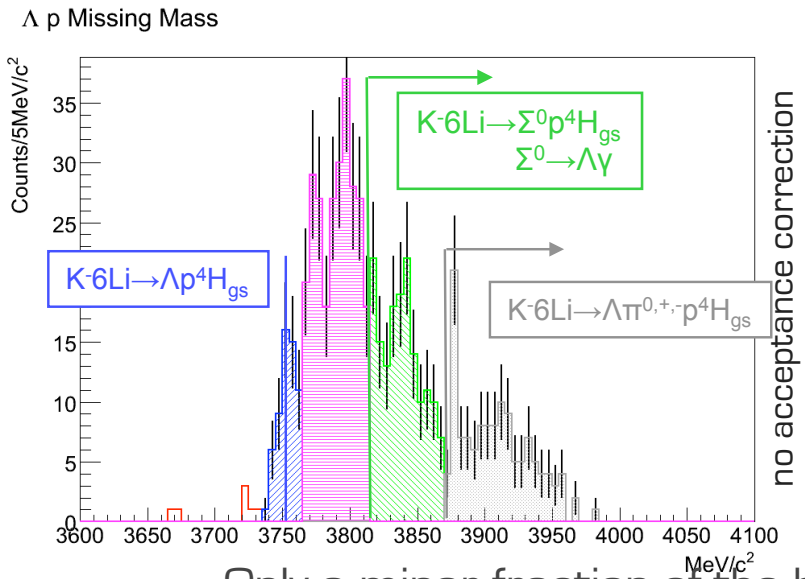
FINUDA Coll., PRL 94(2005)212303

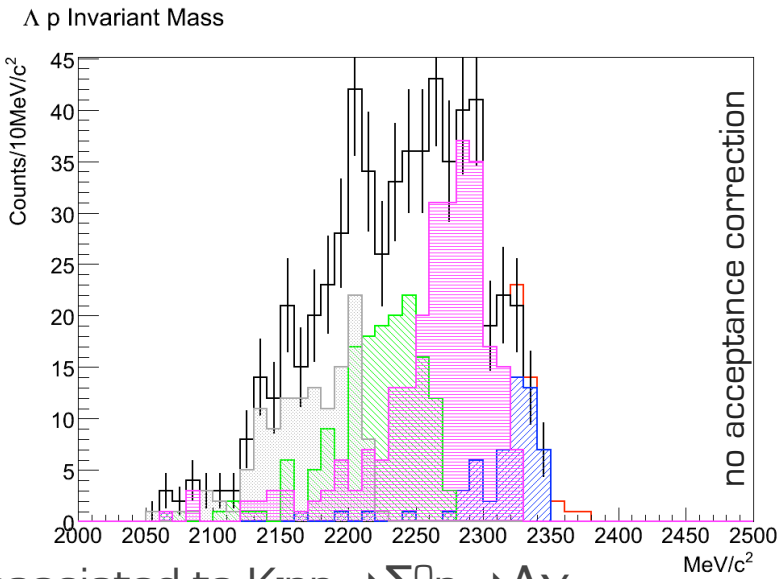


releasing back-to-back correlation cut









Only a minor fraction of the bump can be associated to K⁻pp→Σ⁰p→Λγ

the Missing Mass selection cannot exclude ΣN→ΛN conversion reactions,
but they are excluded due to a different ΛN angular correlation

Alternative interpretations of the Λp bump

~~QF-2NA K⁻pp→Λp followed by FSI (Magas et al.)~~
(from ~~back-to-back correlation~~)

- ~~Dominance of Σ⁰ production over Λ:~~
  ~~QF-2NA K⁻pp→Σ⁰p followed by Σ⁰ → Λγ decay~~

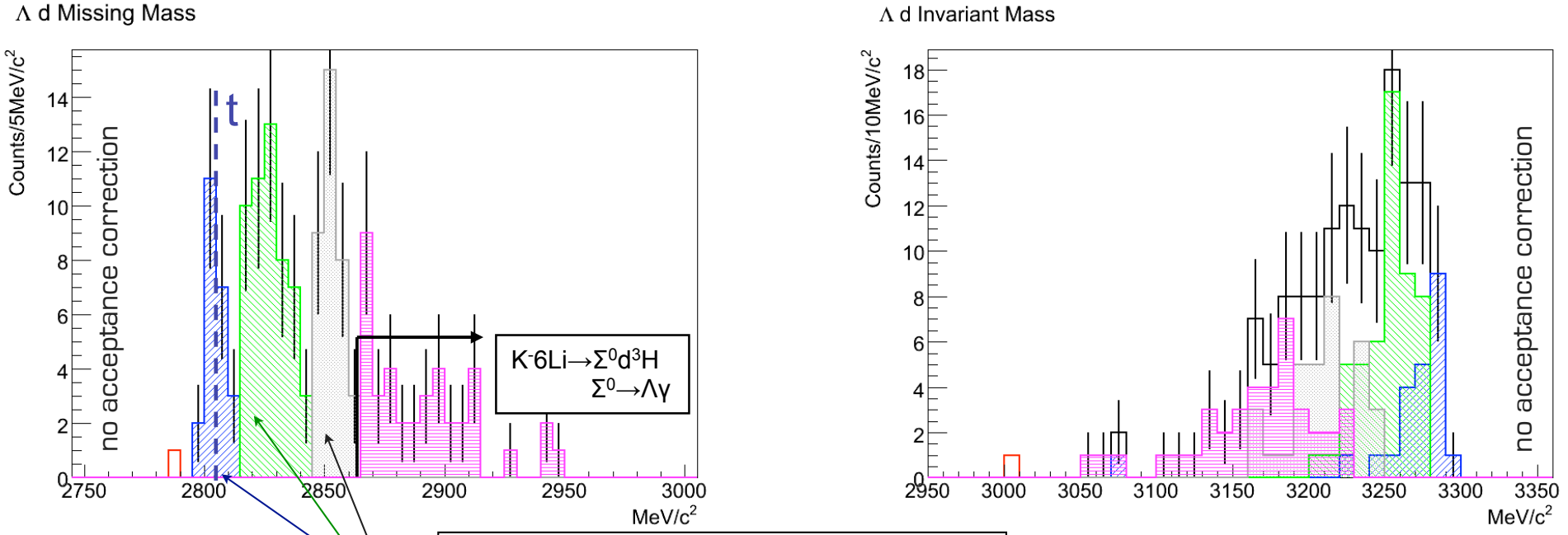
- ~~QF-2NA K⁻NN→ΣN followed by ΣN→ΛN conversion reaction~~

- Decay of heavier kaonic nuclei (Mares et al.)

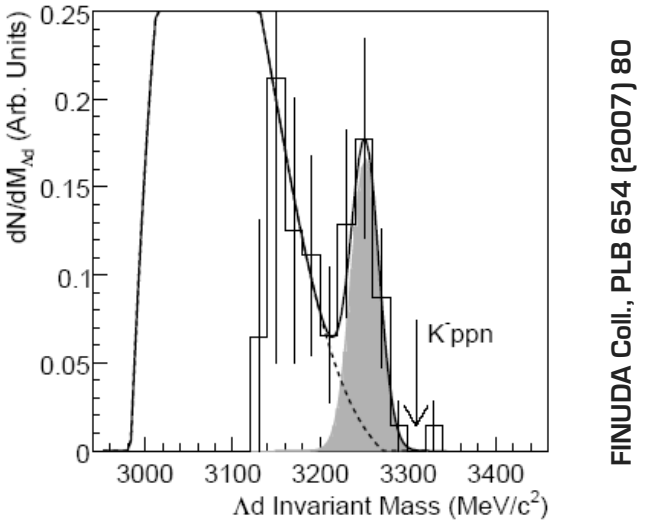
most of alternative explanations have been excluded

To explain all the observables
a realistic model is needed:
K⁻ dynamics (bound state)
and proton pair momenta

Λd invariant mass to measure K⁻ppn absorption



3 well defined states in missing mass with Λ d emitted back-to-back:
2805 ± 4 MeV/c² ⇒ QF-3NA: K⁻^{6}Li→Λdt
2824 ± 11 MeV/c²
2852 ± 6 MeV/c²



FINUDA Coll., PLB 654 (2007) 80

The Λd bump published is a superimposition of three different final states.

The QF-3NA is identified (K⁻6Li→Λdt).

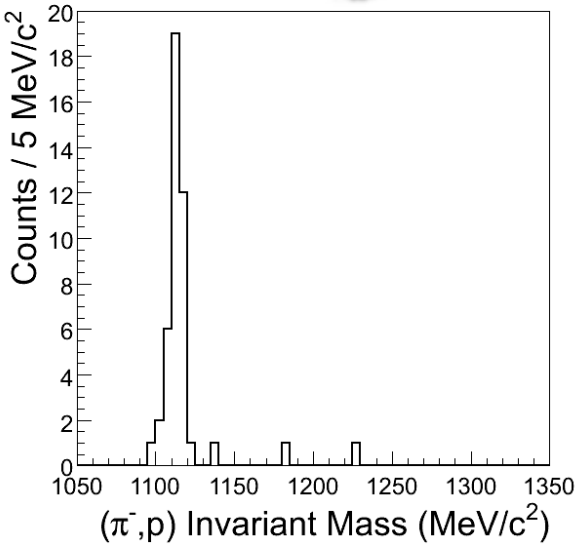
The nature of the other two states will soon be clarified.

The Σ^0 doesn't play a relevant role.

Λt invariant mass to measure K⁻ ppnn absorption (A = ^{6}Li,^{7}Li,^{9}Be)

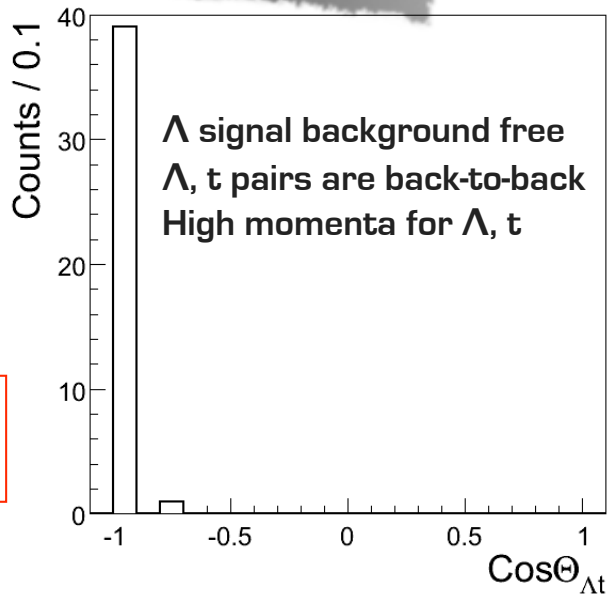
FINUDA Coll., PLB 669 (2008) 229

Correlated Λt pairs from the apsorption of K⁻ at rest in light nuclei



FINUDA thresholds:
Λ 140 MeV/c
t 430 MeV/c

Direct measurement of
K⁻ absorption on ^{4}He



Only one measurement existed so far, from bubble chamber: 3 events by kin fit

40 events observed in FINUDA - Capture rate: ~1x10^{-3}/K⁻

Conclusions

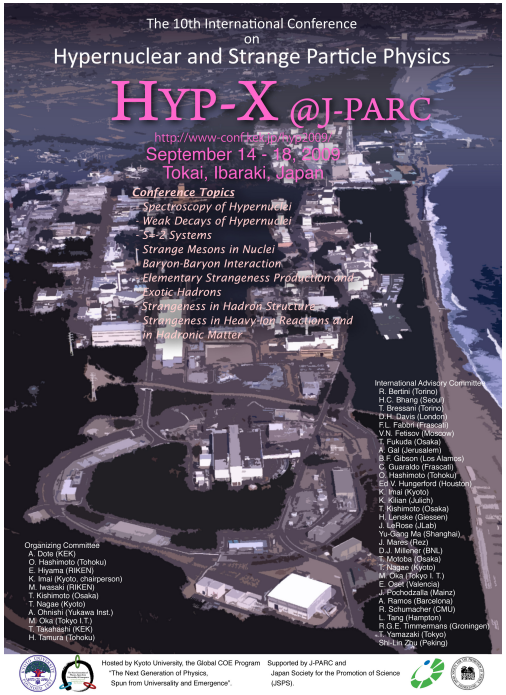
FINUDA is committed to complete its analysis on important topics such as:

- hypernuclear spectroscopy
- mesonic and non-mesonic weak
- non-mesonic rare decays
- K absorption with few nucleons
- ... others ...

- wide range of nuclear physics (wider than in the Proposal)

- limited by statistics

- FINUDA is exploiting the data collected in the 2 (short) data taking



FINUDA @ hypX

Recent results on mesonic and non-mesonic weak decays - *E. Botta (Plenary session)*

Recent results on K- absorption by few nucleons and the Bound Kaonic Nuclear State Puzzle
S. Piano (Plenary session)

FINUDA hypernuclear spectroscopy - *G. Bonomi (Parallel session)*

Study of two-body non mesonic decays of light hypernuclei with FINUDA
A. Filippi (Parallel session)

A study of the K-(stop) A -> Sigma (+-) pi)-+) A' reaction - *N. Grion (Parallel session)*

Inclusive proton spectra from stopped K- absorption in nuclei with FINUDA
P. Genova (Parallel session)

Summary talk - *T. Bressani (Plenary session)*

POSTERS:
Search for neutron rich hypernuclei with FINUDA - L. Benussi
Study of Λ production on different nuclei with FINUDA - P. Gianotti

FINUDA was the single experiment with the largest number of accepted contributions, and the largest community (excluding the organizer's one)