

K⁻ multi-nucleon absorption processes in hadronic interaction studies by AMADEUS

Raffaele Del Grande*

INFN, Laboratori Nazionali di Frascati
Università degli Studi di Roma TOR VERGATA

On behalf of the AMADEUS collaboration

Anti-kaonic Matter At DaΦne: an Experiment with Unraveling Spectroscopy

54th International Winter Meeting
on Nuclear Physics, Bormio, Italy

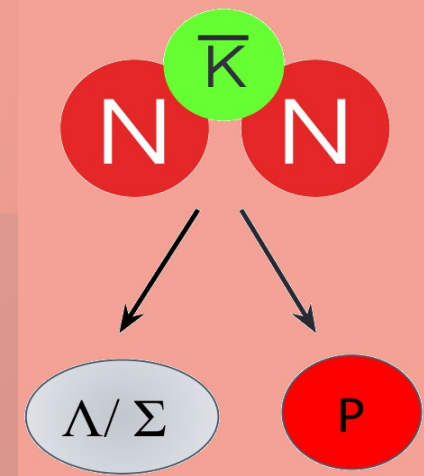
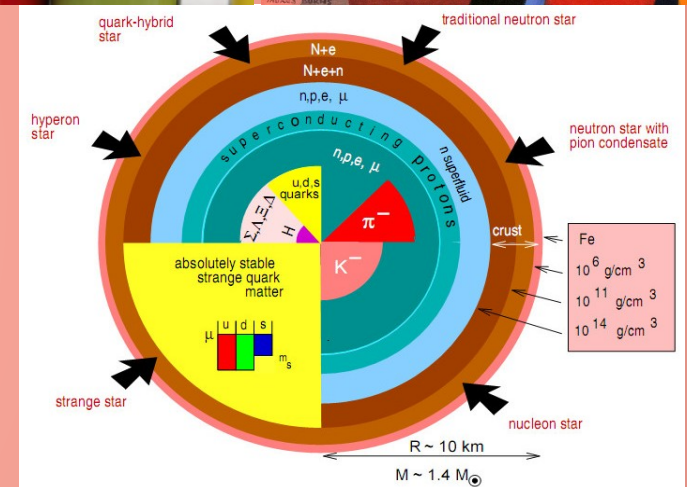
25 January 2016

*raffaele.delgrande@Inf.infn.it

K⁻ in Matter and Kaonic Bound State

K⁻ in nuclear matter:

- K⁻ - nucleon interaction is attractive: **how deep** can an antikaon be bound to a nucleus?
- Models for neutron stars with K⁻ condensate inside, depending on the strenght of the K⁻ - nucleon potential
- if $U_{\bar{K}N}$ is strongly attractive → possible K⁻ multi-N bound states



	Dote,Hyodo, Weise	Akaishi, Yamazaki	Barnea, Gal, Liverts	Ikeda, Sato	Ikeda, Kamano,Sato	Schevchenko ,Gal, Mares	Revai, Schevchenko	Maeda, Akaishi, Yamazaki
B (MeV)	17-23	48	16	60-95	9-16	50-70	32	51.5
Γ(MeV)	40-70	61	41	45-80	34-46	90-110	49	61

Search for the ppK^- bound state in $\Sigma^0 p$ channel

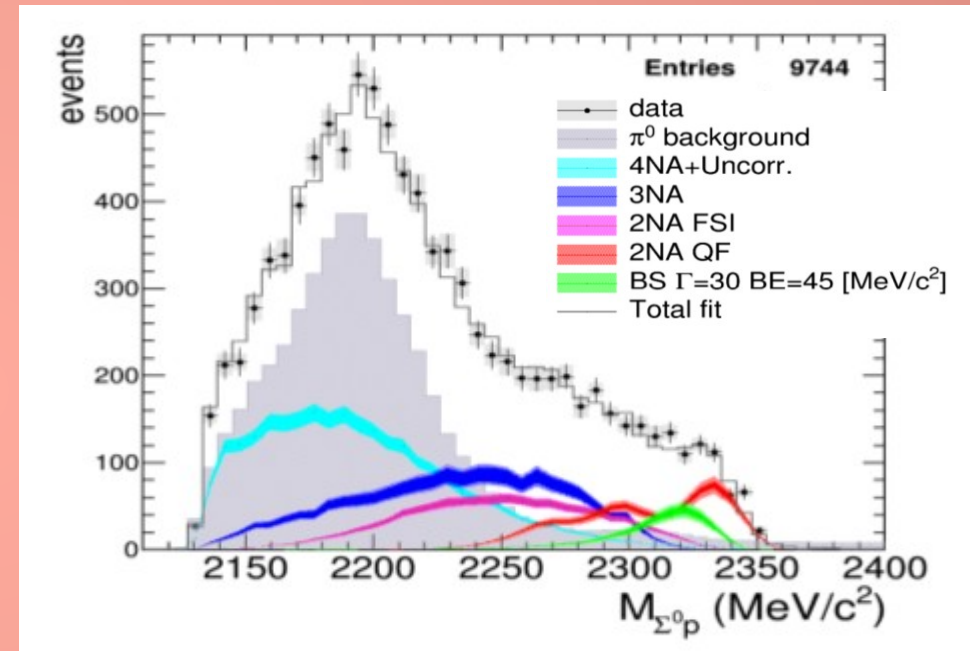
We performed the simultaneous fit for all the relevant physical quantities (p_p , p_{Σ^0} , $m_{\Sigma^0 p}$, $\cos\theta_{\Sigma^0 p}$) with and without the bound state (AMADEUS-KLOE2 collaboration).

Results:

- Bound State with B.E. $45 \text{ MeV}/c^2$ and width $30 \text{ MeV}/c^2$ gives the best fit ($\chi^2/\nu = 0.807$).

Significance:

1σ according to F-test.



- Obtention of the 2/3 NA yields for the first time:

	yield / $K_{stop}^- \cdot 10^{-2}$	$\sigma_{stat} \cdot 10^{-2}$	$\sigma_{syst} \cdot 10^{-2}$
2NA-QF	0.127	± 0.019	+0.004 -0.008
2NA-FSI	0.272	± 0.028	+0.022 -0.023
Tot 2NA	0.376	± 0.033	+0.023 -0.032
3NA	0.274	± 0.069	+0.044 -0.021
Tot 3 body	0.546	± 0.074	+0.048 -0.033
4NA + bkg.	0.773	± 0.053	+0.025 -0.076