

## HK 23 Elektromagnetische und Hadronische Sonden

Zeit: Dienstag 17:00–18:30

Raum: G

HK 23.1 Di 17:00 G

**Search for exotic pentaquark and hexaquark candidates in —**  
**•JOSEF POCHODZALLA** for the WA89 collaboration — Inst. für Kernphysik, Universität Mainz, 55099 Mainz

During the last years twelve experimental groups have reported evidence for a narrow baryonic resonance in the KN channel at a mass of about 1540 MeV/c<sup>2</sup>. We report on a high-statistics search for the  $\Theta(1540)^+$  resonance in the  $K_{Sp}$  decay channel, produced in  $\Sigma^-$ -nucleus collisions at 340 GeV/c. No evidence for this resonance was found in our sample of 13 million  $K_s^0 \rightarrow \pi^+\pi^-$  decays above background [1]. Already previously we have reported a null-result when searching for the exotic  $\Phi^{--}(1860)$  pentaquark state [2].

We also searched for the recently reported  $\Lambda p$  resonance at  $\simeq 2300\text{MeV}/c^2$ , using our sample of 12 million identified  $\Lambda$  decays. We found no indication of such a resonance.

In the diffractive region ( $x_F > 0.8$ ) we do however observe a broad ( $\Gamma \simeq 90\text{MeV}/c^2$ ) resonance-like structure in the  $K_{Sp}$  channel at a mass of  $\simeq 1750\text{MeV}/c^2$ , which is possibly related to known  $\Sigma^*$  resonances.

Work supported by BMBF under contract 06MZ177.

[1] WA89 collaboration, Phys. Rev. C 72, 055201 (2005)

[2] WA89 collaboration, Phys. Rev. C 70, 022201(R)

HK 23.2 Di 17:15 G

**Search for eta-mesic nuclei at COSY-11 —**  
**•JERZY SMYRSKI** for the COSY-11 collaboration — Jagellonian University, Kraków, Poland

The COSY-11 collaboration performed a measurement of the  $dp \rightarrow ^3H\pi^+$  and  $dp \rightarrow ^3He\pi^0$  cross sections near the eta production threshold. The experiments were conducted detecting  $^3He$  ejectiles and the  $^3H - \pi^+$  pairs during a slow ramping of the COSY deuteron beam. The momentum of the deuteron beam was varied continuously within each cycle from 3.099 GeV/c to 3.179 GeV/c, crossing the threshold for the  $dp \rightarrow ^3He\eta$  reaction at 3.139 GeV/c. Data samples with high statistics were collected on these channels and on other reactions measured in parallel, e.g.  $dp \rightarrow ^3He\eta$  and  $dp \rightarrow ppp\pi^-$ . Very clear signals were observed already online during the experiment. The determined excitation functions for the above mentioned reaction around the eta production threshold will be presented and discussed in context of the search for eta-mesic nuclei and eta-pion mixing effects.

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HK 23.3 Di 17:30 G

**Correlation femtoscopy for studying the  $\eta$  meson production mechanism —**  
**•PAWEŁ KLAJA** for the COSY-11 collaboration — Jagellonian University, Kraków, Poland

Recently the COSY-11 collaboration has taken high statistics data for the  $pp \rightarrow p\eta$  reaction [1]. These data are presently evaluated using the method, commonly referred to as correlation femtoscopy [2]. This technique, based on the correlation function of the two protons, permits to determine the size of the source from which protons are emitted.

We will present a comparison of experimental results extracted with theoretical predictions.

The experimental correlation function has been evaluated including the background subtraction and acceptance correction for the COSY-11 detection setup.

The analysis procedure will be introduced and the obtained results will be discussed in context of the investigation of the dynamics of the  $\eta$  meson production via the nucleon-nucleon interaction.

1. P. Moskal et al., Phys. Rev C 69 (2004) 025203.

2. R. Lednicki, NUCLEONIKA 49 (Sup. 2) (2004) S3.

Supported by FZ-Jülich and DAAD.

HK 23.4 Di 17:45 G

**Analysing power  $A_y$  for the  $\bar{p}p \rightarrow p\eta$  reaction at  $Q=10$  MeV —**  
**•RAFAL CZYZYKIEWICZ** for the COSY-11 collaboration — Jagellonian University, Kraków, Poland

A new set of analysing power data [1] for the  $\bar{p}p \rightarrow p\eta$  reaction at an excess energy of  $Q=10$  MeV, as measured by the COSY-11 collaboration, will be presented and confronted with theoretical calculations [2,3]. According to these recent results, along with the data of the hitherto performed measurements at the excess energy of  $Q=40$  MeV [4] it is for

the first time possible to set up the priorities to the above cited theoretical models, which are based on different assumptions concerning the excitation of the  $S_{11}(1535)$  resonance, leading to the creation of the  $\eta$  meson in the close-to-threshold proton-proton collisions.

[1] COSY-11: R. Czyżykiewicz et al., in preparation.

[2] K. Nakayama et al., Phys. Rev. C 65 (2002) 045210.

[3] G. Fäldt and C. Wilkin, Phys. Scripta 64 (2001) 427.

[4] COSY-11: P. Winter et al., Phys. Lett. B 544 (2002) 251; erratum-ibid. B 553 (2003) 339.

Supported by FZ-Jülich and DAAD.

HK 23.5 Di 18:00 G

**Pionic Hydrogen —**  
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 — <sup>1</sup>IKP, FZ Jülich, Germany — <sup>2</sup>Dept.of Mat.Sc., Univ. Ioannina, Greece — <sup>3</sup>Lab. Kastler-Brossel, Univ. P. et M.Curie, Paris — <sup>4</sup>Inst. Nucl. Res. (ATOMKI), Debrecen, Hungary — <sup>5</sup>Phys. Dept., Univ. Coimbra, Portugal — <sup>6</sup>SMI, Österr. Ak. der Wiss., Vienna, Austria — <sup>7</sup>PSI, Switzerland — <sup>8</sup>Phys. Dept., Univ. Aveiro, Portugal

The strong level shift and broadening in pionic hydrogen allow to determine fundamental quantities of the pion-nucleon interaction like the isospin scattering lengths  $a^\pm$  and the  $\pi N$  coupling constant. The new pionic hydrogen experiment performed at the Paul-Scherrer-Institut (PSI, Switzerland) uses a high-resolution crystal spectrometer and the cyclotron trap II and is aiming at a precision determination of the above-mentioned quantities at the per cent level by measuring  $\pi H$  K X-ray transitions. The experiment has been continued by 1) a study of muonic hydrogen in order to identify directly the acceleration of exotic hydrogen during the atomic cascade (Coulomb de-excitation) which hinders the direct extraction of the hadronic broadening from the line width, 2) a precise determination of the spectrometer response with X-rays from helium-like atoms produced in an electron cyclotron resonance ion trap, and 3) a high-statistics measurement of the  $\pi H(2p-1s)$  transition. First results from these experiments are presented.

HK 23.6 Di 18:15 G

**$\Lambda$ -Produktion an COSY-TOF - Einfluss von N\*-Resonanzen —**  
**•WOLFGANG SCHROEDER, WOLFGANG EYRICH, JENS GEORGI, MARTIN KRAPP, ALBERT LEHMANN, CECILIA PIZZOLOTTO, PETER SCHÖNMEIER und ANDREAS TEUFEL** für die COSY-TOF-Kollaboration — Physikalisches Institut, Universität Erlangen-Nürnberg

Die assoziierte Strangeness Produktion in elementaren nukleoninduzierten Reaktionen des Typs  $pp \rightarrow KYN$  wird mit dem Flugzeitspektrometer COSY-TOF exklusiv untersucht. Ein speziell optimiertes Startdetektorsystem dient zur Identifikation und vollständigen Rekonstruktion der Ereignisse einschließlich der verzögerten schwachen Zerfälle und erlaubt die Extraktion nahezu untergrundfreier Eventsamples. Das TOF-Spektrometer deckt für die untersuchte Strangeness Produktion von der Reaktionsschwelle bis zum COSY-Limit den vollen Phasenraum ab. Das erlaubt sowohl die Bestimmung von totalen und differentiellen Wirkungsquerschnitten als auch die Analyse von Dalitz-Plots. Das Hauptziel der Untersuchungen ist es, Einsicht in die Dynamik der Reaktion zu gewinnen. Der Reaktionskanal  $pp \rightarrow K+\Lambda p$  wurde detailliert mit hoher statistischer Genauigkeit bei mehreren Energien vermessen. Die Untersuchungen der Dalitz-Plots zeigen einen starken Einfluss von N\*-Resonanzen. Im Vortrag wird insbesondere die Energieabhängigkeit der Beiträge der verschiedenen Resonanzen und der  $p\Lambda$ -Endzustandswechselwirkung diskutiert. Gefördert durch BMBF und FZ-Jülich.