

## HK 2: Hadronenstruktur und -spektroskopie

Zeit: Montag 14:00–16:00

Raum: RW 2

**Gruppenbericht**

HK 2.1 Mo 14:00 RW 2  
**Near-threshold pion production in diproton reactions with polarized beams and target at ANKE-COSY** — ●SERGEY DYMOV for the ANKE-Collaboration — Physikalisches Institut II, Universität Erlangen-Nürnberg, 91058 Erlangen, Germany — Laboratory of Nuclear Problems, Joint Institute for Nuclear Research, 141980 Dubna, Russia

An extensive experimental program for the near-threshold pion production in diproton reactions is undertaken at the ANKE-COSY spectrometer (Jülich). The program is aiming at isolating of the four-nucleon-pion contact interaction term appearing in the  $\chi PT$  expansions of these processes. This will establish links between the pion production and other low energy phenomena within the  $\chi PT$  approach.

The first step in the program was to measure the differential cross-section and the vector analysing power in the  $pp \rightarrow \{pp\}_s \pi^0$  and  $pn \rightarrow \{pp\}_s \pi^-$  processes in the full angular range. These data allowed for partial wave analysis applying Watson's theorem. To make the analysis more robust and independent of the uncertainties of the relative normalization, the spin correlation coefficients  $A_{x,x}$  and  $A_{y,y}$  in the  $pn \rightarrow \{pp\}_s \pi^-$  process were measured in the following experiment. The first results of the data analysis will be presented and the further development of the program discussed.

This work is supported by the COSY-FFE program.

HK 2.2 Mo 14:30 RW 2  
**Measurement of the spin correlation coefficients  $A_{x,x}$  and  $A_{y,y}$  in the  $pn \rightarrow \{pp\}_s \pi^-$  reaction near the threshold at ANKE-COSY.** — ●VERA SHMAKOVA for the ANKE-Collaboration — Institut für Kernphysik, Forschungszentrum Jülich, 52425 Jülich, Germany — DLNP, JINR, Joliot-Curie 6, 141980 Dubna, Moscow region, Russia

A kinematically complete double polarization measurement of the  $pn \rightarrow \{pp\}_s \pi^-$  process near the threshold has been performed recently at the ANKE-COSY spectrometer (Jülich). The experiment aimed to determine the spin correlation coefficients  $A_{x,x}$  and  $A_{y,y}$  in this process. These results will facilitate further development of  $\chi PT$  in this sector.

The transversely vector polarized deuteron beam and the hydrogen internal polarized ANKE target were used in the experiment. The  $pd \rightarrow d\pi^0$  process data were recorded concurrently and used for beam and target polarimetry. The first results of the data analysis will be presented.

Supported by the COSY-FFE program.

HK 2.3 Mo 14:45 RW 2  
**Effects of a spin-flavour dependent interaction on the baryon mass spectrum** — ●MICHAEL RONNIGER and BERNARD CH. METSCH — University Bonn, Germany

The effective quark interaction in a relativistically covariant constituent quark model based on the Salpeter equation is supplemented by an extra phenomenological flavour dependent force in order to account for some discrepancies mainly in the description of excited negative parity  $\Delta$  resonances. Simultaneously an improved description of some other features of the light-flavoured baryon mass spectrum and of some electromagnetic form factors is obtained.

HK 2.4 Mo 15:00 RW 2  
**Excitation of the  $\Delta(1232)$  isobar in deuteron charge exchange on hydrogen at 1.6, 1.8 and 2.3 GeV** — ●DAVID MCHEDLISHVILI for the ANKE-Collaboration — Institut für Kernphysik, Forschungszentrum Jülich, D-52425 Jülich, Germany

Deuteron charge-exchange break-up  $\vec{d}p \rightarrow \{pp\}n$ , where the final  $\{pp\}$  diproton system is at very low excitation energy and hence in the  ${}^1S_0$  state, is a powerful tool to probe the spin-flip terms in the proton-neutron charge-exchange reaction. Recent measurements with the ANKE spectrometer at the COSY storage ring at 1.6, 1.8, and 2.3 GeV have extended this study into the pion-production regime in order to investigate the excitation of the  $\Delta(1232)$  isobar in the  $dp \rightarrow \{pp\}\Delta^0$  reaction. Values of the differential cross section and two deuteron tensor analysing powers,  $A_{x,x}$  and  $A_{y,y}$ , have been extracted in terms of the diproton production angle or  $\Delta^0$  invariant mass. These data can be interpreted in impulse approximation in terms of the spin-longitudinal or spin-transverse contributions to the elementary

$\vec{n}p \rightarrow \vec{p}\Delta^0$  process. However, the existence of the another contributory mechanism at low mass region will also be demonstrated. The presented results will be compared to those obtained with the SPES-4 spectrometer at Saclay at 2 GeV.

Supported by the COSY-FFE program.

HK 2.5 Mo 15:15 RW 2  
**Absolute measurement of the differential cross section for pp elastic scattering at ANKE-COSY** — ●DAVID CHILADZE for the ANKE-Collaboration — High Energy Physics Institute, Tbilisi State University, 0186 Tbilisi, Georgia — Institute für Kernphysik, Forschungszentrum Jülich, 52425 Jülich, Germany

Very little is known experimentally on proton-proton elastic scattering in the energy range from 1.6 to 2.8 GeV for centre-of-mass angles between about 10 and 30 degrees. The differential cross section data that do exist seem to fall systematically below the predictions of the SAID data analysis program. Measurements in this kinematical region are possible at the ANKE spectrometer, which is situated inside the COSY-Jülich storage ring. The fast proton that is scattered at small angles is registered in the Forward Detection system and the slow recoil proton emerging at large angles is measured in one of the Silicon Tracking Telescopes.

The ANKE collaboration and the COSY machine crew have jointly developed a very accurate method for determining the absolute luminosity in an experiment at an internal target position. The technique relies on measuring the energy losses due to the electromagnetic interactions of the beam as it passes repeatedly through the target and this can be done by studying the Schottky spectrum. This powerful technique allows one to measure the absolute differential cross section for elastic pp scattering with high precision.

Preliminary results from this experiments will be presented.

Supported by COSY-FFE and SRNSF.

HK 2.6 Mo 15:30 RW 2  
**Simulation and data analysis with the BGO-OD experiment\*** — ●THOMAS JUDE for the BGO-OD-Collaboration — Physikalisches Institut, Universität Bonn

The new BGO-OD experiment at the ELSA accelerator facility, Bonn, is approaching the end of the commissioning phase, with data taking expected in 2012. The experiment consists of the highly segmented BGO-Ball with a particle tracking spectrometer at forward angles. The BGO-Ball is ideal for the identification of multi-photon final states with accurate time and energy resolution. The forward spectrometer comprises of a magnetic field with a series of tracking detectors, drift chambers and time of flight walls, allowing precise momentum reconstruction of forward travelling particles.

Analysis and comparison of simulated and measured data will be presented. This includes particle momentum reconstruction with the BGO-Ball, and the tracking of particles and subsequent momenta reconstruction using the forward spectrometer. A new  $K^+$  identification method using the BGO-Ball will also be presented. The  $K^+$  is identified from the time delayed, weak decay within the BGO-Ball crystals. This greatly increases the acceptance region for strangeness and vector meson photoproduction channels.

\*Supported by DFG (SFB/TR-16).

HK 2.7 Mo 15:45 RW 2  
**Einfluss elastischer  $p\bar{p}$  Streuprozesse auf die inneren Spurdetektorsysteme bei PANDA\*** — ●THOMAS WÜRSCHIG für die PANDA-Kollaboration — Helmholtz-Institut fuer Strahlen- und Kernphysik, Rheinische Friedrich-Wilhelms-Universität Bonn, Nussallee 14-16, D-53115, Bonn, Germany

Das PANDA-Experiment an FAIR wird unter Verwendung sehr intensiver Antiprotonen-Strahlen und einem festen internen Target hoher räumlicher Dichte einzigartige Untersuchungen zum besseren Verständnis der starken Wechselwirkung und der Struktur von Hadronen ermöglichen. Die inneren Spurdetektorsysteme spielen eine wichtige Rolle im Rahmen des Gesamtdetektorkonzepts bei PANDA. Ein entscheidender Punkt zur Erfüllung der geforderten Detektor-Performance ist die Gewährleistung einer verlustfreie Messung bei einer sehr hohen Wechselwirkungsrate von bis zu  $2 \cdot 10^7/s$ . Auf Grund des hohen Wirkungsquerschnitts (20% bis 40% bzgl. des totalen  $p\bar{p}$

Wirkungsquerschnitts) ist eine genaue Untersuchung des elastischen Streuprozesses notwendig, um den Einfluss der dabei erzeugten langsamen Rückstoßprotonen abschätzen zu können. Im Vortrag werden die Ergebnisse umfangreicher Simulationen mit einem geeigneten Er-

eignisgenerator präsentiert. Dies beinhaltet auch die Evaluierung der generierten Teilchenverteilungen durch vorhandene experimentelle Daten.

\* gefördert durch BMBF