HK 9: Hadron Structure and Spectroscopy II

Zeit: Montag 16:30–18:30 Raum: S1/01 A5

Gruppenbericht HK 9.1 Mo 16:30 S1/01 A5

Hadron phenomenology with Dyson-Schwinger and Bethe-Salpeter equations — •Gernot Eichmann — JLU Giessen, Germany

I will give an overview of recent progress on hadron phenomenology within the Dyson-Schwinger/Bethe-Salpeter equation approach. This includes studies of nucleon resonances and transition form factors from the three-quark Faddeev equation as well as its quark-diquark approximation; a calculation of nucleon Compton scattering and nucleon polarizabilities from the quark level; and an investigation of tetraquarks using the four-quark Bethe-Salpeter equation.

HK 9.2 Mo 17:00 S1/01 A5

Central Production at COMPASS — •Alexander Austregesilo — Technische Universität München

COMPASS is a fixed-target experiment at the CERN SPS that studies the spectrum of light-quark hadrons. In 2009, it collected a unique dataset using a 190 GeV/c positive hadron beam impinging on a liquid-hydrogen target in order to measure the central exclusive production of light scalar mesons. One of the goals is the search for so-called glueballs, which are hypothetical meson-like objects without valence-quark content. We study the decay of neutral resonances by selecting centrally produced hadron pairs from the COMPASS dataset. The angular distributions of these two-pseudoscalar meson final states are decomposed in terms of partial waves, where particular attention is paid to the inherent mathematical ambiguities. The large dataset permits us to perform a detailed analysis in two-dimensional bins of the two squared four-momentum transfers carried by the exchange particles in the reaction. Possible parameterisations of the mass dependence of the partial-wave amplitudes in terms of resonances are also discussed.

Supported by BMBF, MLL and the Cluster of Excellence Exc153 "Origin and Structure of the Universe"

HK 9.3 Mo 17:15 S1/01 A5

Measurement of Charged Kaon Multiplicities at COMPASS — •Nicolas du Fresne von Hohenesche — For the COMPASS collaboration — Institut für Kernphysik, Johannes Gutenberg-Universität Mainz, Johann-Joachim-Becher-Weg 45, 55128 Mainz

Quark fragmentation functions (FF) $D_q^h(z, Q^2)$ describe final-state hadronisation of quarks q into hadrons h. The FFs can be extracted from hadron multiplicities produced in semi-inclusive deep inelastic scattering. The COMPASS collaboration has recently measured charged hadron multiplicities for identified pions and kaons using a 160 GeV/c muon beam impinging on an isoscalar target. The data cover a large kinematical range and provide an important input for global QCD analyses of world data at NLO, aiming at the determination of FFs in particular in the strange quark sector. The most recent results from COMPASS on kaon multiplicities will be presented.

Supported by BMBF

HK 9.4 Mo 17:30 S1/01 A5

First results on the longitudinal double spin asymmetry for identified hadrons from the 2011 COMPASS data — •Malte Wilfert — for the COMPASS collaboration — Institut für Kernphysik, Johannes Gutenberg-Universität Mainz, Johann-Joachim-Becher-Weg 45, 55128 Mainz

The COMPASS experiment at the M2 beamline of the CERN SPS has taken data with a polarised muon beam scattering off a polarised NH_3 target in 2011. The beam energy has been increased to 200 GeV as compared to 160 GeV in 2007. With the increased beam energy it is possible to reach higher values of Q^2 and lower values of x compared to our first measurement in 2007. We will present our results on the longitudinal double spin asymmetry for identified hadrons ($A_{1,p}^{\pi\pm}$, $A_{1,p}^{K\pm}$). The results will be compared to our previous results from 2007.

Supported by BMBF and GRK Symmetry Breaking

HK 9.5 Mo 17:45 S1/01 A5

Die Bestimmung der Strangeness-Formfaktoren des Nukleons bei niedrigem Impulsübertrag — •Boris Gläser[1], David Balaguer Rios[1], Sebastian Baunack[1,3], Luigi Capozza[1,2], Jürgen Diefenbach[1], Yoshio Imai[1], Jeong-Han Lee[1], Frank Maas[1,2,3], Maria Carmen Mora Espi[1,2], Ernst Schilling[1], Dietrich von Harrach[1] und Christoph Weinrich[1] — [1]Johannes Gutenberg-Universität Mainz — [2]Helmholtz-Institut Mainz — [3]PRISMA Cluster of Excellence Mainz

Die Bestimmung der Strange-Quark-Beiträge zu den Vektor-Formfaktoren des Nukleons gibt Aufschluß über die Verteilung der strange Quark-Antiquarkverteilungen im Nukleon. Zu diesem Zweck bedient sich die A4-Kollaboration der paritätsverletzenden Elektron-Proton-Streuung. Am Elektronenbeschleuniger MAMI der Johannes Gutenberg-Universität Mainz wurde die Asymmetrie in der elastischen Streuung longitudinal polarisierter Elektronen an unpolarisiertem Wasserstoff gemessen. Dies ermöglicht den exklusiven Nachweis von Seequarks.

Dieser Beitrag stellt die Messung der Asymmetrie bei einem Impulsübertrag von 0.1(GeV/c)^2 unter Rückwärtsstreuwinkeln vor. Die daraus resultierende Linearkombination für den seltsamen elektrischen und magnetischen Formfaktor des Protons wird mit den Welt-Datenpunkten anderer Kollaborationen bei gleichem Q^2 vorgestellt. Separierte Strangeness-Formfaktoren werden vorgestellt und diskutiert.

HK 9.6 Mo 18:00 S1/01 A5

Parity violation asymmetry in the inelastic electron-proton scattering at the A4 experiment — •Luigi Capozza[1,2], David Balaguer Ríos[2], Sebastian Baunack[2,3], Jürgen Diefenbach[2], Boris Gläser[1,2], Yoshio Imai[2], Eva-Maria Kabuss[2], Jeong-Han Lee[2], Frank Maas[1,2,3], Maria Carmen Mora Espí[1,2], Ernst Schilling[2], Dietrich von Harrach[2], and Christoph Weinrich[2] — [1]Helmholtz-Institut Mainz — [2]Institut für Kernphysik, Johannes Gutenberg-Universität Mainz — [3]PRISMA Cluster of Excellence, Johannes Gutenberg-Universität Mainz

The A4 experiment at the MAMI accelerator facility at Mainz studies the nucleon structure by measuring single spin asymmetries in the electron-proton scattering. The apparatus was designed for measuring asymmetries in the elastic scattering, separating elastic and inelastic events by measuring the energy of the scattered particles in an homogeneous PbF_2 electromagnetic calorimeter. However, also inelastic events have been recorded during the measurements and contain threshold pion production and $\Delta(1232)$ resonance excitation. In order to extract parity violation asymmetries from these data, background contributions to the energy spectrum need to be estimated in MC simulations. An update of the A4 MC containing the contribution of π^0 decay gammas from double-pion production will be presented.

HK 9.7 Mo 18:15 S1/01 A5

Pion-Photon Reaction in Pion-Nucleus Scattering at COMPASS — •Markus Krämer — Technische Universtität München, Garching, Germany

COMPASS is a fixed-target experiment at CERN, which uses muon and hadron beams produced at the SPS to address a wide variety of physics topics. An important aspect of the scientific program of COMPASS is the study of pion-photon interaction, which are accessible through the Primakoff reaction. In 2009 a two-weeks long period of data recording was dedicated for this study. Among the studied final states are exclusive $\pi^-\pi^0\pi^0$ events, which are analyzed to measure the cross section of radiative processes. For this purpose the contribution of radiative and strong processes are determined through a partial-wave decomposition.

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