HK 5: Hadron Structure and Spectroscopy II

Time: Monday 14:00–16:00 Location: H-ZO 30

Invited Group Report HK 5.1 Mo 14:00 H-ZO 30

The spin strucure of the nucleon — •Mauro Anselmino — University of Torino & INFN, Torino, Italy

The study of the spin structure of the nucleon has made impressive progress in the last years. In particular the transverse structure of the nucleon has received much attention, not only regarding spin but also the intrinsic motion of partons inside protons and neutrons and their space distribution. Spin and intrinsic, or orbital, motion might be strictly correlated. New data have been released, which have prompted new theoretical extraction of transverse spin dependent distribution and fragmentation functions. The measurement and understanding of transverse single spin asymmetries has much progressed as well. A review of the most recent new results is presented.

Invited Group Report HK 5.2 Mo 14:30 H-ZO 30

Recent results from the COMPASS experiment at CERN — •Fabienne Kunne for the COMPASS-Collaboration — IRFU CEA Saclay, France

COMPASS is a multipurpose fixed target experiment running at CERN, designed to scatter polarized muons as well as hadrons with energies of several hundred GeVs, on various targets, polarized or not. After having completed a program on nucleon spin physics (2002-2007), we are currently starting a program on light meson spectroscopy (2008-2009).

All recent results on spin physics will be discussed. They include measurements of the gluon polarization from both the open charm and the high pT channels, extraction of the strange quark polarization, measurement of the longitudinal polarization of lambda and anti lambda, and results on transversity among which the Collins and Sivers asymmetries on the proton. First results on meson spectroscopy will be shortly summarized and plans for the future will be presented.

HK 5.3 Mo 15:00 H-ZO 30

k_t-factorisation in the Drell-Yan process — •Fabian Eichstädt, Stefan Leupold, and Ulrich Mosel — Institut für Theoretische Physik, Universität Giessen, Germany

The transverse-momentum spectrum of Drell-Yan pairs still eludes a complete, K-factor free description, as does to some extent also the invariant-mass distribution. In this context we critically investigate factorisation of unintegrated parton distributions in the Drell-Yan process. We employ the full initial parton kinematics for the cross section instead of the usual collinear approach simply folded by a Gaussian for the transverse-momentum distribution. We find that the standard, x-independent Gaussian k_t-distribution for the initial partons does not coincide with the parton-model result for the double-differential Drell-Yan invariant mass distribution. It turns out that one is very sensitive to the low-x behaviour of the sea-quark parton distributions. We also suggest an alternative prescription which weakens this sensitivity and brings the results back to the parton-model results. We finally examine the consequences of the different k_t-distributions for the triple-differential Drell-Yan cross section.
Work supported by DFG.

HK 5.4 Mo 15:15 H-ZO 30

Transverse target spin asymmetries on a proton target at COMPASS — •Andreas Richter — for the COMPASS collaboration — Physikalisches Institut, Universität Erlangen-Nürnberg, 91058 Erlangen, Germany

COMPASS is a fixed target experiment at the CERN M2 external beamline using a 160 GeV/c polarised μ^+ beam. After the data taking in 2002-04 with a transversely polarised deuterium target, in 2007 COMPASS has taken data with a transversely polarised proton (NH_3) target. For getting a full description of the spin structure of the nucleon at leading twist at quark level it is necessary to know three quark distribution functions, namely the unpolarised distribution function $q(x)$, the helicity distribution function $\Delta q(x)$ and the transverse spin distribution function $\Delta_T q(x)$. One possible way to extract the transverse spin distribution function is the measurement of the Collins effect in semi-inclusive DIS on a transversely polarised target, describing the fragmentation of transversely polarised quarks in to spinless hadrons. Simultaneously the Sivers effect was studied, measuring the correlation of the transverse polarisation of a nucleon and the transverse momentum of an unpolarised quark. Results on the Collins and Sivers asymmetries will be presented and will be compared to COMPASS deuteron data. The work is supported by the BMBF.

HK 5.5 Mo 15:30 H-ZO 30

Deeply Virtual Compton Scattering on unpolarized hydrogen and deuterium targets at the HERMES experiment — •Dietmar Zeiler for the HERMES-Collaboration — Friedrich-Alexander-Universität Erlangen, Germany

In this presentation preliminary results on azimuthal asymmetries in leptoproduction of real photons on both unpolarized hydrogen and deuterium targets measured at the HERMES experiment will be discussed. The analysis includes the extraction of asymmetries originating from the interference of Deeply Virtual Compton Scattering (DVCS) and Bethe-Heitler amplitudes by simultaneously fitting data taken with different beam charges and helicities. Sizeable asymmetry amplitudes for the main moments of the beam-charge asymmetry and the beam-spin asymmetry for both targets have been found. The moments related to the squared DVCS amplitude are compatible with zero. All results have been compared to model calculations.

This project is funded by the BMBF, project no 06 ER 143.

HK 5.6 Mo 15:45 H-ZO 30

Dual parametrisation and Abel transform tomography for the DVCS amplitude. — •Alena Moiseeva — Institut fuer Theoretische Physik II, Ruhr-Universitaet Bochum, 44780 Bochum

We present a way to extract the maximum amount of information about Generalized Parton Distributions (GPDs) from amplitudes of hard exclusive processes. For investigation of the amplitudes we use the dual parametrization of GPDs, which provides us very handy and flexible tool to describe the amplitudes in terms of single function-so-called quintessence function. We show that relation between the quintessence function and the amplitude of the hard exclusive process corresponds to Abel transform tomography.