HK 2: Hadronenstruktur und -spektroskopie

Zeit: Montag 11:00–13:00 Raum: HSZ-105

Gruppenbericht HK 2.1 Mo 11:00 HSZ-105

Feasibilty to search for new charmonium(-like) reasonances in $B^{\pm} \to \chi_{c1}\pi^+\pi^-K^{\pm}$ decays at Belle. — •Elisabeth Panzenboeck[1,2], Ariane Frey[1], Kenkichi Miyabayashi[2] und Vishal Bhardwaj[2] — [1]Georg August Universitaet, Goettingen — [2]Nara Women's University, Nara, Japan

The Belle experiment, located at KEK in Japan, has accumulated high statistics B meson data thanks to the highest luminosity in the world provided by the KEKB asymmetric-energy e^+e^- collider. The huge amount of data, corresponding to 772M B meson pairs, brings the opportunity to search for yet unestablished charmonium as well as exotic charmonium-like states. The outcome of this attempt will provide important information to determine the proper degree of freedom to describe these heavy-flavored hadrons.

In order to search for a new X(3872) decay mode or a still unseen $\chi_{c1}(2P)$, $B^{\pm} \to \chi_{c1}(1P)\pi^+\pi^-K^{\pm}$ is a suitable decay process. Using Monte Carlo simulation datasets, the method of signal reconstruction and background estimation are to be presented.

HK 2.2 Mo 11:30 HSZ-105

Heavy-light mesons in unitarized chiral perturbation theory — •Michael Altenbuchinger[1], Lisheng Geng[1,2], and Wolfram Weise[1,3] — [1]Physik Department, TU München, D-85747 Garching — [2]School of Physics and Nuclear Energy Engineering, Beihang Univ., Beijing 100191, China — [3]ECT*, Villazzano (Trento), Italy

We analyze the scattering amplitude of D (D^*) mesons off pseudo-Goldstone bosons in the framework of unitarized chiral perturbation theory. The S-wave scattering lengths and their light-quark mass dependence are investigated, and consistency with recent lattice QCD computations is explored. Possible bound states and resonances are discussed. Finally, we apply our results for heavy-light meson scattering off pseudo-Goldstone bosons in particular to $\bar{B}K$ and $\bar{B}^*K$ systems.

Work supported in part by BMBF, the A.v. Humboldt foundation, GSI and the DFG Excellence Cluster "Origin and Structure of the Universe".

HK 2.3 Mo 11:45 HSZ-105

Observation of the rare decay $B^{\pm,0} \to J/\psi K^+K^-K^{\pm,0}$ at BaBar — •Elisabetta Prencipe — Institute for Nuclear Physics, Johannes Gutenberg-Universität Mainz

The experiment BaBar is an asymmetric e^+e^- collider which was located at SLAC (Stanford Linear Accelerator Center). In 9 year of data taking it collected 426 fb^{-1} integrated luminosity on-peak data at the energy in the center of mass of $\Upsilon(4S)$ (10.56 GeV), then few tens fb^{-1} data were collected even at the energy in the center of mass of $\Upsilon(3S)$ and $\Upsilon(2S)$. The goal of the BaBar project has been the measurement of the sides and the angles of the Unitarity Triangle; however, thanks to the high luminosity achieved, it became a good *charm*-factory for spectroscopy studies. The work here presented is the analysis of the rare decays $B^{\pm,0} \to J/\psi K^+K^-K^{\pm,0}$ and $B^0_d \to J/\psi\phi$, which are channels with hidden $s\bar{s}$ content. The goal of these analyses is the precise measurement of the Branching Fractions of these channels and the search for possible hybrid states in the invariant mass systems of $J/\psi\phi$ and $J/\psi K^0_s$. No evidence of a new resonant state was observed, but an interesting effect was investigated at the threshold of the invariant mass distributions $J/\psi\phi$ and $J/\psi K^0_S$. No evidence of signal for $B^0_d \to J/\psi\phi$ was found, in agreement with the theoretical predictions.

HK 2.4 Mo 12:00 HSZ-105

Pseudoscalar transition form factors at low and high energies — •Pere Masjuan — Institut für Kernphysik, Johannes Gutenberg Universtität Mainz

Pseudoscalar transition form factors are analyzed at low energies using the mathematical theory of Padé approximants. The theory provides a good and systematic description of the low-energy region in a model-independent way. At high energies, the form factor is described by the Pseudoscalar Distribution Amplitude. Considering different models for that Distribution Amplitude, both low- and high-energy regimes are match at some scale Q*. Using this description for the form factor, the impact on the hadronic light-by-light scattering contribution on the anomalous magnetic moment is also discussed.

HK 2.5 Mo 12:15 HSZ-105

A Partial-Wave Analysis of Centrally Produced Two-Pseudoscalar Final States in pp Reactions at COMPASS — •Alexander Austregesilo — Physik-Department E18, Technische Universität München

COMPASS is a fixed-target experiment at CERN SPS which investigates the structure and dynamics of hadrons. The experimental setup features a large acceptance and high momentum resolution spectrometer including particle identification and calorimetry and is therefore ideal to access a broad range of different final states. In 2008 and 2009, COMPASS collected a world-leading data set with a 190 GeV/c hadron beam impinging on either liquid hydrogen or nuclear (Pb, Ni) targets. Spin-exotic meson as well as glueball candidates formed in both diffractive dissociation and central production are presently studied.

The double-pomeron-exchange process is believed to provide a gluon-rich environment, where the production of mesons without valence quark content (glueballs) is enhanced. The lightest glueball candidates are expected in the scalar sector, which is studied in $\pi^+\pi^-$ and K^+K^- decay channels. We introduce a model to describe the selected data in terms of partial waves. The spin-parity decomposition is complicated by mathematical ambiguities inherent to two-pseudoscalar final states. We present preliminary resonance parameters extracted from fits to the data and compare the results to previous experiments.

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HK 2.6 Mo 12:30 HSZ-105

An Evolutionary Algorithm for Model Selection — •Karl Bicker[2], Suh-Urk Chung[1], Jan Friedrich[1], Boris Grube[1], Florian Haas[1], Bernhard Ketzer[1], Sebastian Neubert[1], Stephan Paul[1], and Dimitry Ryabchikov[1] — [1]Technische Universität München — [2]CERN, Geneva, Switzerland

When performing partial-wave analyses of multi-body final states, the choice of the fit model, i.e. the set of waves to be used in the fit, can significantly alter the results of the partial wave fit. Traditionally, the models were chosen based on physical arguments and by observing the changes in log-likelihood of the fits. To reduce possible bias in the model selection process, an evolutionary algorithm was developed based on a Bayesian goodness-of-fit criterion which takes into account the model complexity. Starting from systematically constructed pools of waves which contain significantly more waves than the typical fit model, the algorithm yields a model with an optimal log-likelihood and with a number of partial waves which is appropriate for the number of events in the data. Partial waves with small contributions to the total intensity are penalized and likely to be dropped during the selection process, as are models were excessive correlations between single waves occur. Due to the automated nature of the model selection, a much larger part of the model space can be explored than would be possible in a manual selection. In addition the method allows to assess the dependence of the fit result on the fit model which is an important contribution to the systematic uncertainty. This work is supported by BMBF, MLL München and the DFG Cluster of Excellence Exc153.

HK 2.7 Mo 12:45 HSZ-105

Messung der Strange-Quark-Beiträge zu den Vektor-Formfaktoren des Protons bei Q^2=0.1GeV/c^2 — •Boris Gläser — Institut für Kernphysik der Johannes Gutenberg-Universität Mainz, Deutschland

Die A4-Kollaboration untersucht die Strangeness-Beiträge zu der Vektor-Formfaktoren des Nukleons am Elektronenbeschleuniger MAMI der Johannes Gutenberg Universität-Mainz. Dies geschieht über die Messung der paritätsverletzenden Asymmetrie in der elastischen Streuung longitudinal polarisierter Elektronen an unpolarisierten Protonen mit Hilfe eines 1022 kanaligen PbF2-Kalorimeters. Das Kalorimeter ist rotierbar gelagert, um Messungen sowohl unter Vorwärts- als auch unter Rückwärtsstreuwinkeln zu ermöglichen. Hält man hierbei den Impulsübertrag konstant, können der seltsame elektrische und der seltsame magnetische Formfaktor unabhängig voneinander bestimmt werden.

Der Beitrag stellt den neuesten Datenpunkt, aufgenommen unter Rückwärtsstreuwinkeln bei einem Impulsübertrag von 0.1 GeV/c^2 vor.