

HK 38: Hadronenstruktur und -spektroskopie

Zeit: Donnerstag 14:00–16:00

Raum: HZ 3

Gruppenbericht

HK 38.1 Do 14:00 HZ 3
selected charmonium and charmonium-like states at BESIII
 — ●YU-PING GUO for the BESIII-Collaboration — Institut für Kernphysik Johannes Gutenberg-Universität Mainz, Mainz, Germany

Using large data samples collected at $\psi(3686)$ peak and around the peaks of the vector charmonium resonances above 4.0 GeV, study of the charmonium (charmonium-like) states are performed at BESIII experiment.

Comparing to the charmonium states above the charm threshold, the states below the charm threshold are well understood, except the three spin-singlet states, η_c , h_c and $\eta_c(2S)$. With the data accumulated at the $\psi(3686)$ peak, the properties of these states are measured with high precision or at the first time. Based on the data samples taken above 4.0 GeV, the process of $\pi^+\pi^-h_c$ has been studied, the cross section line-shape will help us to understand the Y -states above the charm threshold. In addition, in the Dalitz study of the $\pi^+\pi^-h_c$ system, a charged charmonium-like state $Z_c(4020)$ has been observed, whose property is similar to the previous observed $Z_c(3900)$ in $\pi^+\pi^-J/\psi$ system.

HK 38.2 Do 14:30 HZ 3

Search for hybrids at BABAR: study of the rare decays B to J/psi K K K, and search for B0 to J/psi phi. — ●ELISABETTA PRENCIPE — FZJ Juelich, Leo Brandt Strasse - 52428 Juelich

We study the rare B meson decays B to J/psi K K K, B to J/psi phi K, and search for B0 to J/psi phi, using 468 millions of BBbar events collected at the Y(4S) resonance with the BABAR detector at the PEP-II e+e- asymmetric-energy storage ring. We perform a study of the decays B to J/psi K K K and B to J/psi phi K, obtaining new BR measurements. We also search for B0 to J/psi phi and derive an UL on the BR for this decay mode, according to predictions. We search for resonance production in the J/psi phi mass spectrum and obtain limits on the BR of the resonances claimed by the CDF Collaboration. We find that the distribution of events on the Dalitz plot is inconsistent with being uniform, although, in order to assess the presence of a resonant behavior, higher statistics and a full Dalitz plot analysis are needed.

HK 38.3 Do 14:45 HZ 3

Analyse des Reaktion $\bar{p}p \rightarrow \omega\pi^0\eta$ bei Crystal Barrel im Fluge
 — ●MARVIN RICHTER für die PANDA-Kollaboration — Institut für Experimentalphysik I, Ruhr-Universität Bochum, Deutschland

An der internationalen Teilchenbeschleunigeranlage FAIR am PANDA-Experiment, welche sich derzeit im Aufbau befindet, werden $\bar{p}p$ -Annihilationsprozesse mit Schwerpunktsenergien von bis zu 5,5 GeV untersucht. Die Spektroskopie der dabei entstehenden Hadronen setzt meist eine Partialwellenanalyse voraus.

Um ein besseres Verständnis über die $\bar{p}p$ -Annihilation in Bezug auf das PANDA-Experiment zu erlangen, werden Messdaten vom Crystal Barrel-Experiment, welche am Antiprotonenspeicherring LEAR am CERN im Jahre 1995 aufgenommen worden sind, analysiert.

In diesem Vortrag werden die Selektion der Reaktion $\bar{p}p \rightarrow \omega\pi^0\eta$ im Fluge vorgestellt und vorläufige Ergebnisse präsentiert.

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HK 38.4 Do 15:00 HZ 3

Spectroscopy of final states with neutral particles in COMPASS — ●SEBASTIAN UHL — Technische Universität München, Physik Department E18, 85748 Garching

To study the spectrum of light hadrons the COMPASS experiment at CERN has collected a huge data set with a negative pion beam impinging on a liquid hydrogen target. Resonances are diffractively produced at squared four-momentum transfers to the target between $0.1(\text{GeV}/c)^2$ and $1(\text{GeV}/c)^2$. The two-stage magnetic spectrometer with two electromagnetic calorimeters allows to study charged as well as semi-neutral final states, thus allowing an immediate consistency check between the flagship channel $\pi^-\pi^-\pi^+$ and its isospin partner $\pi^-\pi^0\pi^0$.

The decomposition of the three-pion mass spectra is done with the

help of a partial-wave analysis. Partial waves up to spin six are included in the first step of the analysis, where the spin-parity decomposition of the data is performed in bins of the three-pion mass and the squared four-momentum transfer t' . The binning in t' provides a handle to better separate the resonant and non-resonant parts of the intensity in the second stage of the analysis, the modeling of the mass dependence of the spin-density matrix in order to extract resonance parameters.

This work was supported by the BMBF, the DFG Cluster of Excellence “Origin and Structure of the Universe” (Exc 153), and the Maier-Leibnitz-Laboratorium der Universität und der Technischen Universität München.

HK 38.5 Do 15:15 HZ 3

Study of the $\pi^+\pi^-$ System in $\pi^-\pi^+\pi^-$ Final States at COMPASS — ●FABIAN KRINNER — Physik-Department, Technische Universität München, Bayern.

COMPASS, located at CERN’s Super Proton Synchrotron, is a multi-purpose fixed-target experiment for studying the structure and spectrum of light hadrons using muon and hadron beams on various targets. With its high acceptance and resolution, it has e.g. collected the world’s biggest data set of diffractively produced $\pi^-\pi^+\pi^-$ final states. This large amount of data allows not only for a very detailed partial-wave analysis of this particular final state, but also for a novel type of analysis which extracts the $\pi^+\pi^-$ -subsystem with the quantum numbers $I^G J^{PC} = 0^+0^{++}$ from the three-pion final state without any model input on its shape. This new study reveals correlations of the $f_0(980)$ with decays of the $\pi(1800)$, the $\pi_2(1880)$ as well as a new state, the $a_1(1420)$, which will be presented.

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

HK 38.6 Do 15:30 HZ 3

Resonance extraction from diffractively produced $\pi^-\pi^+\pi^-$ final states at COMPASS — ●STEPHAN SCHMEING¹ and COMPASS KOLLABORATION² — ¹TU München E18 — ²CERN

The COMPASS experiment studies the spectrum of hadrons and has acquired a large data sample of diffractively produced $\pi^-\pi^+\pi^-$ final states using a 190 GeV pion beam on a hydrogen target. The large amount of data allow to perform the partial-wave analysis in bins of the squared four-momentum transfer t' from the beam to the target. Surprisingly, the data exhibit a pronounced dependence of the partial-wave contents on t' .

Using a novel analysis method this effect is exploited in order to better separate resonant from non-resonant contributions in the partial waves. This makes it possible to extract resonance parameters with higher precision, for example for the long-debated $a_1(1260)$. In addition the t' -dependence contains important information about the different contributing production processes. We will present the first results of this new method in the $\pi^-p \rightarrow \pi^-\pi^+\pi^-p$ channel.

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

HK 38.7 Do 15:45 HZ 3

Scattering lengths of Nambu-Goldstone bosons off D mesons and dynamically generated heavy-light mesons — ●MICHAEL ALTENBUCHINGER¹, LISHENG GENG², and WOLFRAM WEISE^{1,3} — ¹Physik Department, TU München, D-85747 Garching — ²School of Physics and Nuclear Energy Engineering, Beihang Univ., Beijing 100191, China — ³ECT*, Villazzano (Trento), Italy

Recent lattice QCD simulations of the scattering lengths of Nambu-Goldstone bosons off the D mesons are studied using unitary chiral perturbation theory. We show that the lattice QCD data are better described in the covariant formulation than in the heavy-meson formulation. The $D_{s0}^*(2317)$ can be dynamically generated from the coupled-channels DK interaction without a priori assumption of its existence. A new renormalization scheme is proposed which manifestly satisfies chiral power counting rules and has well-defined behavior in the infinite heavy quark mass limit. Using this scheme we predict the heavy-quark spin and flavor symmetry counterparts of the $D_{s0}^*(2317)$.

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