HK 43: Hadronenstruktur und -spektroskopie VII

Zeit: Donnerstag 14:00–16:00 Raum: HG III

Gruppenbericht HK 43.1 Do 14:00 HG III

Hadronische Wirkungsquerschnittsmessungen bei BABAR — •Andreas Hafner, Achim Denig und Miriam Fritsch für die BABAR-Kollaboration — Institut für Kernphysik, Johannes Gutenberg-Universität Mainz

Die Messung des hadronischen Wirkunsquerschnittes in der e^+e^- Annihilation ist von entscheidender Bedeutung für eine verbesserte Standardmodellvorhersage des anomalen magnetischen Momentes des Myons a_μ. Mit Hilfe einer Dispersionsrelation ist es möglich, den hadronischen Anteil a_μ^{had} aus den gemessenen exklusiven Wirkungsquerschnitten der hadronischen Reaktionen zu bestimmen. Der Reaktionskanal $e^+e^- \to \pi^+\pi^-$ hat mit ca. 70% des Gesamtbeitrages zum Dispersionsintegral den größten Einfluss auf die Berechnung von a_μ.

Der BaBar-Detektor hat von 1999 – 2008 eine integrierte Luminosität von ca. 500 fb^{-1} am Elektron-Positron-Speicherring PEP-II aufgenommen. Mit Hilfe der ISR-Methode können bei BABAR hadronische Wirkunsquerschnitte im Energiebereich von der Schwelle bis 5 GeV vermessen werden. Die Messung des $\pi^+\pi^-$-Kanals und weiterer wichtiger Reaktionen hinsichtlich der Bestimmung der Myon-Anomalie werden vorgestellt.

Gruppenbericht HK 43.2 Do 14:30 HG III

Effects of charmed meson loops in charmonium physics — •Feng-Kun Guo[1], Christoph Hanhart[1,2], and Ulf-G. Meissner[1,2,3] — [1]Institut für Kernphysik and Jülich Center for Hadron Physics, Forschungszentrum Jülich, D-52425 Jülich, Germany — [2]Institute for Advanced Simulation, Forschungszentrum Jülich, D-52425 Jülich, Germany — [3]HISKP and Bethe Center for Theoretical Physics, Universität Bonn, D-53115 Bonn, Germany

We investigate the effects of the charmed meson loops in both the transitions and spectroscopy of the charmonia. Using the technique of the nonrelativistic effective field theory, we show that the virtual charmed meson loops can be significantly large in the pion (η) emitting transitions between charmonia. The $Y(4660)$ and its spin multiplet partner as the $\psi' f_0(980)$ and $\eta_c' f_0(980)$ bound states, which could be consequences of nonperturbative charmed meson loops, are also discussed.

HK 43.3 Do 15:00 HG III

Heavy quark potential and the quarkonium spectrum — •Alexander Laschka, Norbert Kaiser, and Wolfram Weise — Physik Department, Technische Universität München, D-85747 Garching, Germany

The heavy quark-antiquark potential plays an important role in QCD and can be studied with perturbative as well as with non-perturbative methods. The perturbative short-distance part of the potential in coordinate space is constructed via a subtracted Fourier transform, covering the momentum region where perturbative QCD is applicable. This potential is matched at intermediate distances to the long distance part from lattice QCD simulations. Furthermore we establish the relationship of the charm and bottom quark masses emerging in our potential approach to those of other mass schemes. In addition to the static potential, also quark mass dependent contributions and their effects on the quarkonium spectrum are discussed.

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HK 43.4 Do 15:15 HG III

Inclusive hadron spectroscopy in J/Psi and Psi(2S) — •Ingo Heller, Wolfgang Kühn, Jens Sören Lange, Yutie Liang, Björn Spruck, and Qiang Wang — II. Physikalisches Institut, Heinrich-Buff-Ring 14, 35390 Gießen

The upgraded BESIII detector at BEPCII in Beijing is a unique and powerful facility for studying physics in the energy range up to 4 GeV. BESIII has collected data from about 220M J/Ψ and 110M Ψ' events, which is the largest data sample in the world and even 4 times higher than CLEO-c, so it provides the possibility for precision results. It will also provide the potential for discovering phenomena that have been overlooked at previous facilities because of statistical limitations. The focus of this talk will be the inclusive hadron spectroscopy in J/Ψ and Ψ'. Focusing on π, η, η' and ω production, p_T dependences for these light hadrons in e^+e^--collisions will be presented.

HK 43.5 Do 15:30 HG III

Measurement of the J/Ψ - Nucleon dissociation cross section with PANDA — •Paul Buehler and Katalin Nikolics for the PANDA-Collaboration — Stefan Meyer Institute, Vienna, Austria

To understand the charmonium interaction with nuclear matter is important for the description of the photo- and hadro-production of charmonium and charmed hadrons on nuclear targets as well as for diagnostics of hadronic final states in heavy-ion collisions. The suppression of charmonium production in heavy ion collisions e.g. is proposed to be a signal for the formation of Quark-Gluon-Plasma (QGP). Investigating the absorption cross section of charmonium in nuclear matter should yield valuable information on this process. The first excited state of charmonium, J/Ψ, can be produced in antiproton-nucleus collisions which will be studied at the PANDA experiment. J/Ψ can be identified via its leptonic decay channels. Its interaction with nucleons in the nuclear environment, in particular the J/Ψ - nucleon dissociation cross section can be deduced from the measurement of its production as a function of the size of the target nucleus. Simulation studies including both the physics aspects of this process and the detector response to both signal and background are required in order to evaluate the scientific potential of the planned experiments. In this talk we discuss data analysis procedures for the determination of the J/Ψ - nucleon dissociation cross section which we tested with simulated data.

HK 43.6 Do 15:45 HG III

Monte Carlo performance study for the $\overline{\mathrm{P}}$ANDA MVD — •Simone Bianco[1,2], Elena Botta[1], Kai-Thomas Brinkmann[2], and Thomas Würschig[2] — [1]Università degli Studi di Torino — [2]HISKP - Universität Bonn

The Micro Vertex Detector is the innermost component of the $\overline{\mathrm{P}}$ANDA spectrometer. Therefore it is important to understand its influence on particles crossing it. The material budget introduced by active elements (the sensors) and the passive ones (frontend electronics, cooling, support structures, signal and supply cables) must be mapped and taken into account while simulating events in $\overline{\mathrm{P}}$ANDA. This work is showing the implementation of a detailed geometry where all the components of the MVD were introduced. This geometry was later on used to perform simulations in order to evaluate the effect of Coulomb multiple scatterings. Both the barrel part and the forward arm of the tracking system were analyzed. The final result of these simulations is a full scan with different particles (protons, muons, pions and electrons) of the track displacement introduced by the presence of the MVD using different initial momenta. The second part of the talk will address the solid angle coverage of the MVD. Using a dedicated tool a highly detailed definition of the sensors was introduced in the simulations. The coverage of the detector was studied as a function of the initial direction of the particles, their momentum, charge and mass. Both a qualitative and a quantitative analysis were realized.