

HK 38: Hadron Structure and Spectroscopy 8

Time: Tuesday 17:00–19:00

Location: T/SR25

Group Report HK 38.1 Tue 17:00 T/SR25
Light Meson Decays from Photon-Induced Reactions with CLAS — ●MICHAEL C. KUNKEL for the CLAS-Collaboration — Forschungszentrum Jülich

Photo-production experiments with the CEBAF Large Acceptance Spectrometer (CLAS) at the Thomas Jefferson National Laboratory produce data sets with unprecedented statistics of light mesons. With these data sets, measurements of transition form factors for η , ω , and η' via conversion decays are performed using a line shape analysis on the invariant mass of the final state dileptons. Tests of fundamental symmetries and information on the light quark mass difference are performed using a Dalitz plot analysis of the meson decay. In addition, the data allows for a search for dark matter, such as the heavy photon via conversion decays of light mesons and physics beyond the Standard Model is searched for via invisible decays of η mesons. An overview of the first results and future prospects will be given.

Group Report HK 38.2 Tue 17:30 T/SR25
Studies of η' (ω) mesons with the Crystal Ball/TAPS setup at MAMI — ●PATRIK ADLARSON for the A2-Collaboration — Institut für Kernphysik, Johannes Gutenberg Universität, Mainz, Germany

Precision studies of light meson decays are used to investigate a wide range of topics related to fundamental aspects of hadron physics. In particular, η' decays allow for tests of such diverse topics as $\pi\pi$ scattering lengths, the SU(3) singlet-octet mixing angle, quark mass differences and light-by-light contribution to the anomalous magnetic moment of the muon. Recently, a large statistics sample of η' (ω) mesons have been produced and collected with the Crystal Ball/TAPS setup at MAMI. An overview of the physics motivation, the experimental setup and preliminary results from the ongoing analyses are presented.

HK 38.3 Tue 18:00 T/SR25
Measuring the branching fraction of $\omega \rightarrow \eta\gamma$ with the Crystal Ball Experiment at MAMI — ●OLIVER STEFFEN and WOLFGANG GRADL for the A2-Collaboration — Institut für Kernphysik, Johannes Gutenberg-Universität Mainz, D-55099 Mainz

The Crystal Ball Collaboration uses energy tagged bremsstrahlung photons produced from the MAMI electron beam to study photo-induced reactions on nucleons and nuclei. The Crystal Ball/TAPS 4π calorimeter setup is optimized for the detection of neutral final states. Charged particles are identified and measured by the inner detector system.

A large data set of photoproduced η' and ω mesons has been obtained during recent data taking periods with the End Point Tagger ($E_\gamma = 1.4$ to 1.6 GeV) and the liquid hydrogen target.

We plan to use this data to measure the branching fraction of the $\omega \rightarrow \eta\gamma$ decay. Simulation studies for this decay have already started.

In this talk we will present the current status of the ongoing work

and discuss the next steps of the analysis.

HK 38.4 Tue 18:15 T/SR25
 η - η' Mixing in Large- N_c Chiral Perturbation Theory — ●PATRICIA BICKERT, PERE MASJUAN, and STEFAN SCHERER — Institut für Kernphysik, JGU, Mainz

We present a calculation of the η - η' mixing in the framework of large- N_c chiral perturbation theory. The results are obtained at next-to-next-to-leading order (NNLO) in a combined expansion in $1/N_c$, quark masses, and momenta. The numerical evaluation of masses and mixing angles is successively performed at leading order, NLO, and NNLO. We investigate the influence of unknown low-energy coupling constants on these quantities.

HK 38.5 Tue 18:30 T/SR25
Analysis of the radiative decay $J/\psi \rightarrow \gamma\omega\omega$ at BESIII — ●MALTE ALBRECHT — Institut für Experimentalphysik I, Ruhr-Universität Bochum

Gluonic bound states like glueballs or hybrids are predicted to be copiously produced in the radiative decays of J/ψ . Especially the radiative decays into two vector mesons, $J/\psi \rightarrow \gamma VV$, have been intensively studied, since pseudoscalar (0^-) enhancements have been observed in the $\rho\rho$, $\phi\phi$ and $\omega\omega$ final states with low statistics in the past.

In this talk we will show preliminary results of the analysis of the radiative decay $J/\psi \rightarrow \gamma\omega\omega$, using the world's largest data sample of $\approx 1.2 \cdot 10^9 J/\psi$ events collected with the Beijing Spectrometer III (BESIII) at the Beijing Electron-Positron Collider (BEPCII). The data selection, background analysis and preliminary results of a mass-independent partial wave analysis of the selected sample will be presented.

HK 38.6 Tue 18:45 T/SR25
Towards understanding the near-threshold antiproton-proton spectra from J/ψ and ψ' decays by the final-state interaction effects — ●XIANWEI KANG¹, JOHANN HAIDENBAUER², and ULF-G. MEISSNER^{1,2} — ¹Institute for Advanced Simulation and Jülich Center for Hadron Physics, Institute für Kernphysik, Forschungszentrum Jülich, Germany — ²Helmholtz-Institut für Strahlen- und Kernphysik and Bethe Center for Theoretical Physics, Universität Bonn

Utilizing the Jost-function approach, we analyze all the existing data for $p\bar{p}$ spectrum up to excess energy of 100 MeV from J/ψ , ψ' decays to γ , π , η or $\omega p\bar{p}$. For the potential used in this analysis, both the chiral potential constructed by us previously and the Jülich model A(OBE) have been considered. We have shown that the near-threshold spectrum can be described by our treatment of the final state interaction effect.