HK 3: Hadron Structure and Spectroscopy II

Time: Monday 16:30–17:30 Location: J-HS M

Group Report HK 3.1 Mon 16:30 J-HS M

Study of multiple $D_{(s)}$-resonant states at e^+e^- colliders. — •Elisabetta Prencipe[1], James Ritman[1], Jens Soeren Lange[2], Ashish Thampi[1], Dmytro Meleshko[3], and Taisiia Tysak[3] — [1]Forschungszentrum Juelich, Germany — [2]Justus-Liebig Univ. Giessen, Germany — [3]Taras Schevchenko National Univ. Kyiv, Ukraine

The systematic study of multiple D and D_s resonances with the BaBar and Belle full data sets will be presented. Too little has been done in this field, due to the limited available statistics.

We want to present preliminary results of our study for the $e^+e^- \to D_s^- D_{s0}^*(2317)^+ X$ and $e^+e^- \to DDDX_c$ processes, in the continuum. In the first analysis, the possibility to fix a better upper limit of the $D_{s0}^*(2317)^+$ width is shown, and confirmation of its spin parity; in the second, we are looking for hexaquark states, and -in case of signal - it would be the first time for the X(3872) to be observed in a different production mechanism than B meson decays, only.

HK 3.2 Mon 17:00 J-HS M

Investigation of Excited Ξ Baryon States in $\bar{p}p$ Collisions with $\overline{\mathrm{P}}$ANDA — •Jennifer Pütz, Albrecht Gillitzer, James Ritman, and Tobias Stockmanns — Forschungszentrum Jülich, Jülich, Deutschland

Understanding the excitation pattern of baryons is essential for a deeper insight into the mechanisms of QCD in the non-perturbative regime. Up to now, there is an ongoing worldwide effort on studies of the nucleon excitation spectrum, but our knowledge on excited states of double or triple strange baryons is still rather poor. Combining the antiproton-proton initial states and the capabilities of the detector, the $\overline{\mathrm{P}}$ANDA experiment is well-suited for a comprehensive baryon spectroscopy program in the multi-strange sector. A large fraction of the inelastic $\bar{\mathrm{p}}\mathrm{p}$ cross section is associated to final states with a baryon-antibaryon pair together with additional mesons, giving access to excited states both in the baryon and the antibaryon channel. This study focuses on excited Ξ states, in particular the $\Lambda\,\mathrm{K}^-$ or $\bar{\Lambda}\,\mathrm{K}^+$ decay of these states are investigated. A cross section in the order of μb, corresponding to production rates of $\sim 10^6$/d at a Luminosity $L = 10^{31}\,\mathrm{cm}^{-2}\,\mathrm{s}^{-1}$ (5% of the design value), are expected for final states containing a $\bar{\Xi}^+\Xi^-$ pair. MC studies to identify the $\bar{\Xi}^+\Lambda\mathrm{K}^-$ ($\Xi^-\bar{\Lambda}\mathrm{K}^+$) final state and resonant $\Xi^-(\bar{\Xi}^+)$ states with the $\overline{\mathrm{P}}$ANDA detector and strategies to determine the spin and parity quantum numbers of specific $\Xi^-(\bar{\Xi}^+)$ states will be presented.

HK 3.3 Mon 17:15 J-HS M

Low-energy constants from charmed baryons on QCD lattices — Yonggoo Heo[1], •Xiao-Yu Guo[2], and Matthias F.M. Lutz[2,3] — [1]Suranaree University of Technology, Nakhon Ratchasima, Thailand — [2]GSI Helmholtzzentrum für Schwerionenforschung GmbH, Darmstadt, Germany — [3]Technische Universität Darmstadt, Darmstadt, Germany

We study the light quark-mass dependence of charmed baryon masses as measured by various QCD lattice collaborations. A global fit to such data based on the chiral SU(3) Lagrangian is reported on. All low-energy constants that are relevant at next-to-next-to-next-to-leading order ($\mathrm{N^3LO}$) are determined from the lattice data sets where constraints from sum rules as they follow from large-N_c QCD at subleading order are considered. The expected hierarchy for the low-energy constants in the $1/N_c$ expansion is confirmed by our global fits to the lattice data. With our results the low-energy interaction of the Goldstone bosons with the charmed baryon ground states is well constrained and the path towards realistic coupled-channel computations in this sector of QCD is prepared.