

HK 42: Theorie

Zeit: Donnerstag 11:15–12:30

Raum: C

HK 42.1 Do 11:15 C

Moments of Generalized Parton Distribution Functions. —
 •MARINA DORATI¹ and THOMAS HEMMERT² — ¹Dip. Fisica Teorica, Università di Pavia, Pavia, Italia — ²Physik Dep. T39, Technische Universität München

We apply the formalism of covariant Baryon Chiral Perturbation Theory (BChPT) to the analysis of the moments of the Generalized Parton Distributions (GPDs) of the nucleon. We concentrate on the isovector $n = 1$ case and perform a $\mathcal{O}(p^4)$ calculation to obtain the vector $(A_{2,0}^v(q^2), B_{2,0}^v(q^2), C_{2,0}^v(q^2))$ [1] and axial vector $(\tilde{A}_{2,0}^v(q^2), \tilde{B}_{2,0}^v(q^2))$ [2] Generalized Form Factors at low q^2 . These results can be used for chiral extrapolations of lattice data for GPDs.

Of particular interest is the forward limit, where $A_{2,0}^v(q^2 = 0)$ corresponds to the averaged momentum fraction $\langle x \rangle_{u-d}$, while $\tilde{A}_{2,0}^v(q^2 = 0)$ is directly connected to its spin dependent analogue $\langle \Delta x \rangle_{u-d}$. Both quantities are known from phenomenology and lattice data for these moments are also available.

Work supported in part by BMBF and INFN.

[1] U.-G. Meißner, G. Schierholz, *Lattice QCD, Chiral Perturbation Theory and Hadron Phenomenology* Mini-proceedings of workshop at ECT*, Trento, Italy, October 2-6 2006, hep-ph/0611072.

M. Dorati, T.A. Gail, T.R. Hemmert, forthcoming.

[2] M. Dorati, T.R. Hemmert, forthcoming.

HK 42.2 Do 11:30 C

τ -Zerfall und die Struktur des a_1 — •MARKUS WAGNER und STEFAN LEUPOLD — Institut für Theoretische Physik, Universität Giessen, Germany

Wir untersuchen anhand der Daten für den τ -Zerfall die Struktur des a_1 . Wir beschreiben den τ -Zerfall in drei Pionen und ein Neutrino mit Hilfe einer gekoppelten-Kanal-Rechnung, basierend auf einem chiralen Lagrangian. Im Falle eines elementaren a_1 wird dieses explizit in den Lagrangian eingebaut und die entsprechenden Wechselwirkungen berücksichtigt. Ist das a_1 dynamisch erzeugt, wird dieses nicht explizit berücksichtigt und durch die Endzustandswechselwirkung selbst erzeugt. Die beiden Szenarien werden dann mit den Daten verglichen. Gefördert durch die DFG.

HK 42.3 Do 11:45 C

Collective Resonances in the Soliton Model Approach to Meson-Baryon Scattering and Pentaquark Widths —
 •HERBERT WEIGEL and HANS WALLISER — Fachbereich Physik, Universität Siegen, 57068 Siegen

The proper description of hadronic decays of baryon resonances has been a long standing problem in soliton models for baryons. Here we

present a solution to this problem in the three flavor Skyrme model that satisfies the large- N_C consistency conditions [1,2]. As an application we discuss hadronic pentaquark decays and show that predictions based on axial current matrix elements are erroneous [1,2]. This puts serious doubts on the predictions of very narrow pentaquark resonances (decay width of only a few MeV) in all chiral soliton models. Though not free of model dependences, our prediction for the width of the Θ^+ pentaquark in the Skyrme model is at about 50 MeV; *i.e.* a typical hadronic scale [1,2].

[1] H. Walliser and H. Weigel, Eur. Phys. J. **A26** (2005) 361.

[2] H. Weigel, hep-ph/0610123, Eur. Phys. J. **A** in print.

HK 42.4 Do 12:00 C

Hadronic spectrum in AdS/QCD with linear confinement —
 •MICHAEL BEYER¹ and TOBIAS FREDERICO² — ¹Institut für Physik, U. Rostock, Rostock — ²ITA, CTA, Sao Jose dos Campos, Brazil

We compute the spectrum of light mesons and baryons hadrons within QCD-AdS/CFT with string modes defined on $\text{AdS}_5 \times S^5$ space which has conformal behavior at short distances. The linear confinement of colorless states is modelled through the effective mass of the string fluctuations around the AdS background, which leads to conformal invariance breaking at large distances corresponding the infrared QCD scale. The effective mass includes the conformal dimension of the interpolating operator of the lowest hadron Fock component identifying the string mode and the corresponding orbital excitation. In the model, the hadronic mass squared scales with radial and orbital angular momentum excitations universally according to $M^2 \sim (N+L)$ incorporating the empirical observations. Supported by DAAD/CAPES. TF thanks FAPESP and CNPq for partial financial support.

HK 42.5 Do 12:15 C

Quarkonium spectra beyond one-gluon exchange — •JOHANNES EIGLSPERGER, WOLFRAM WEISE, and NORBERT KAISER — Institut für theoretische Physik (T39), TU München, Germany

We study the spectra of charmonium and bottomonium in an improved potential model. Besides the one-gluon exchange and a linear confinement potential we include systematically effects from two-gluon exchange ($\sim \alpha_s^2$) and the t-channel exchange of $q\bar{q}$ -bound states. We find that the empirical spectra of $c\bar{c}$ and $b\bar{b}$ can be well reproduced with parameters (quark masses m_c and m_b , strong coupling constant α_s and stringtension σ) consistent with lattice simulations and QCD-determinations. The two-gluon exchange together with the induced $q\bar{q}$ -interaction is essential in order to reproduce quantitatively the fine- and hyperfine-splittings.