Excited QCD 2014

Report of Contributions

https://indico.cern.ch/e/exqcd2014

Contribution ID: **58** Type: **not specified**

The $\Sigma_{\pi N}$ Term, Chiral Multiplet Mixing and Hidden Strangeness in the Nucleon

Monday 3 February 2014 11:00 (30 minutes)

The nucleon Σ term's large "observed" value (> 55 MeV) has long been interpreted as a sign of hidden strangeness in the nucleon. We have calculated the $\Sigma_{\pi N}$ term on the basis of mixing of chiral multiplets, and using known constraints on the current quark masses m_u^0, m_d^0 and the flavor-singlet and isostriplet axial couplings. We show that the $[(1,1/2) \oplus (1/2,1)]$ chiral multiplet, that is necessary for the reproduction of the isotriplet axial coupling, makes a contribution enhanced by a factor of $\frac{19}{3} \simeq 6.33$, due to $SU_L(2) \times SU_R(2)$ algebra, that leads to $\Sigma_{\pi N} \geq \left(1 + \frac{16}{3}\sin^2\theta\right) \frac{3}{2}\left(m_u^0 + m_d^0\right) = 60$ MeV, in general accord with "experimental" values of $\Sigma_{\pi N}$. The chiral mixing angle θ is given by $\sin^2\theta = \frac{3}{8}\left(g_A^{(0)} + g_A^{(3)}\right)$, where $g_A^{(0)} = 0.33 \pm 0.08$, or 0.28 ± 0.16, and $g_A^{(3)} = 1.267$, are the flavor singlet and the isotriplet axial couplings, respectively. These results show there is no need for $q^4\bar{q}$ components, and in particular, no need for an $s\bar{s}$ component in the nucleon.

Primary author: DMITRASINOVIC, Veljko (Institute of Physics Belgrade)

Presenter: DMITRASINOVIC, Veljko (Institute of Physics Belgrade)

Contribution ID: **59** Type: **not specified**

Scalar photoproduction on the proton at CLAS and GlueX energies

Tuesday 4 February 2014 17:00 (30 minutes)

In this work we present the results of a theoretical analysis of the data on photoproduction of $f_0(980)$ meson in the laboratory photon energy between 3.0 and 3.8 GeV. A comparison is done to the measurements performed by the CLAS collaboration at JLab accelerator for the exclusive reaction $\gamma p \to p f_0(980)$. In the analysis the partial S-wave differential cross section is described by a model based on Regge approach with reggeized exchanges and distinct scenarios for the $f_0(980) \to V\gamma$ coupling are considered. It is shown that such a process can provide information on the resonance structure and production mechanism. We also present the results for GlueX energies.

Primary author: DA SILVA, Mario Luiz L (Universidade Federal de Pelotas)

Co-author: MACHADO, Magno (Universidade Federal do Pampa)

Presenter: DA SILVA, Mario Luiz L (Universidade Federal de Pelotas)

Contribution ID: **60** Type: **not specified**

The role of hadronization processes to determine the fragmentation functions

Thursday 6 February 2014 18:00 (30 minutes)

We are studying fragmentation functions (FFs) applying different hadronization processes and we are determining FFs from global analysis on single-inclusive electron-positron annihilation (SIA) and semi-inclusive deep inelastic scattering (SIDIS) data at NLO. We perform an improvement to the FFs of pion and kaon at next-to-leading order (NLO), including very recently single-inclusive electron-positron annihilation data from BABAR and Belle at Q = 10.54 GeV and Q = 10.52 GeV, respectively. Our main purpose is to show that imposing these new data in our analysis how much improve the fragmentation functions of pion and kaon at NLO.

Primary author: SOLEYMANINIA, Maryam (Semnan university)

Presenter: SOLEYMANINIA, Maryam (Semnan university)

Contribution ID: **61** Type: **not specified**

Charm production at HERA

Wednesday 5 February 2014 11:30 (30 minutes)

The copious production of charm quarks at HERA has yielded a detailed understanding of QCD dynamics, the only measure of the charm contribution to the proton structure, as well as measurements of the charm mass and the fragmentation parameters of charmed hadrons. Several measurements of charm production in deep inelastic scattering, using different decay modes, are presented, both new individual measurements from the H1 and ZEUS collaborations, as well as combined data. These provide a powerful vindication of the form of the gluon density in the proton derived from scaling violations of inclusive deep inelastic scattering data. A QCD fit to the charm data leads to a measurement of the charm mass and also provides precise predictions for e.g. W and Z production at the LHC. Additionally, fragmentation fractions to the ground state charm hadrons are compared to e+e- data and previous
HERA results. The data have a precision similar to that of the e+e- data and support the hypothesis that fragmentation is independent of the production process.

Primary author: KARSHON, Uri (Weizmann.Institute of Science)

Presenter: KARSHON, Uri (Weizmann.Institute of Science)

Contribution ID: **62** Type: **not specified**

The nature of diffractive production at HERA

Wednesday 5 February 2014 17:00 (30 minutes)

Data in which a proton is tagged along the beampipe after the primary interaction represents the cleanest way to measure diffraction. Data from both H1 and ZEUS collaborations on inclusive diffractive deep inelastic scattering, with a tagged proton, have been combined. Inclusive diffractive deep inelastic scattering can be considered as the exchange of a colourless object and is amenable to QCD fits in which the structure of this object, sometimes called a Pomeron, is determined. Given such processes are expected to factorise, such a Pomeron structure can be used to predict the rates of jet production in e.g. diffractive photoproduction. The comparison of jet data with the predictions of next-to-leading order QCD are discussed in the context of factorising breaking. Another way to study diffraction is through the production of vector mesons which is also characterised by a colourless exchange with the proton which in lowest order QCD is realised as a colourless gluon pair. Therefore consideration of the dependence of the J/psi cross section on the photon-proton centre-of-mass energy is related to the rise of the square of the gluon density towards low values of Bjorken x. Comparisons of HERA data with such theories and other data are presented.

Primary author: GACH, Grzegorz Pawel (AGH University of Science and Technology (PL))

Presenter: GACH, Grzegorz Pawel (AGH University of Science and Technology (PL))

Contribution ID: **63** Type: **not specified**

Recent results from HERA on the proton structure

Monday 3 February 2014 11:30 (30 minutes)

ew precision measurements of the double-differential inclusive neutral-current cross section, measured with the ZEUS detector at HERA at a centre-of-mass energy of 318 GeV in e+p and e-p collisions are shown. They span the kinematic domain of high momentum transfer Q^2>650 GeV^2 and high Bjorken-x~1.

Using the HERA data collected at three different centre-of-mass energies, both the collaborations H1 and ZEUS have updated their measurements of the longitudinal structure function F_L. The structure function is measured in the kinematic region of momentum transfer 1.5<Q^2<800 GeV^2 and Bjorken-x 3x10^-4 <x<0.03. The measurements are compared to predictions from the Standard model, based on a variety of parton density functions.

Primary author: RAICEVIC, Natasa (University of Montenegro)

Presenter: RAICEVIC, Natasa (University of Montenegro)

Contribution ID: **65** Type: **not specified**

Exotic Hadrons and Large Nc QCD

Tuesday 4 February 2014 11:00 (30 minutes)

Exotic hadrons are those which cannot be described in a naive quark model. This talk discusses possible insights the large Nc limit of QCD can give us about exotics. The focus will be on tetraquark states. One key feature of the analysis is the fact there is more than one way to extrapolate to the large Nc limit.

Primary author: COHEN, Thomas (University of Maryland)

Presenter: COHEN, Thomas (University of Maryland)

Contribution ID: **66** Type: **not specified**

Target mass and higher twist effects in polarized deep-inelastic scattering

Thursday 6 February 2014 18:30 (30 minutes)

We perform a fit to all available experimental data of polarized structure functions in the framework of perturbative QCD, at next-to-leading order (NLO)
approximation. We include target mass correction and higher twist effects on our fitting procedure and study their effects on physically interesting quantities. Nuclear polarized structure functions are described based on our fit result. Moreover, sum rules are derived and compared with available theoretical and experimental results.

Primary author: TAHERI MONFARED, Sara (Semnan University)

Presenter: TAHERI MONFARED, Sara (Semnan University)

Contribution ID: **67** Type: **not specified**

N =4 super Yang-Mills plasma

Wednesday 5 February 2014 09:30 (30 minutes)

Motivated by the AdS/CFT duality, we study the N=4 super Yang-Mills plasma in the regime of weak coupling and compare it to the QCD plasma. Collective excitations and collisional processes are discussed. Since the Keldysh-Schwinger approach is used, the collective excitations in both equilibrium and non-equilibrium plasma are under consideration. The dispersion relations of gluon, fermion, and scalar fields are found in the Hard Loop Approximation and the corresponding effective action is given. The binary collisional processes, which occur at the lowest nontrivial order of the coupling constant, are reviewed and then the transport properties of the plasma are discussed.

For more see: A. Czajka and St. Mrowczynski, Phys. Rev. D 86, 025017 (2012).

Primary author: MROWCZYNSKI, Stanislaw (National Center of Nuclear Reserach, Warsaw, Poland)

Co-author: CZAJKA, Alina (Jan Kochanowski University, Kielce, Poland)

Presenter: MROWCZYNSKI, Stanislaw (National Center of Nuclear Reserach, Warsaw, Poland)

Contribution ID: **68** Type: **not specified**

Ghosts in Nonequilibium Quark-Gluon Plasma

Wednesday 5 February 2014 10:00 (30 minutes)

The quark-gluon plasma at the early stage of relativistic heavy-ion collisions is out of equilibrium. The Keldysh-Schwinger formalism provides a natural framework to describe such a plasma, in particular when the plasma is weakly coupled and perturbative methods are applicable. However, a perturbative computation of various QCD characteristics requires Faddeev-Popov ghosts to cancel unphysical degrees which are present in a wide class of covariant gauges. The question thus arises how to introduce the ghosts for non-equilibrium QCD. Using the functional methods, we derive a relation analogous to the Slavnov-Taylor identity which expresses the ghost propagator of the Keldysh-Schwinger formalism through the gluon one. Then we show that the ghost propagator obtained in this way allows one to construct a gauge invariant perturbative expansion of various characteristics of non-equilibrium quark-gluon plasma.

Primary author: CZAJKA, Alina (UJK)

Co-author: MROWCZYNSKI, Stanislaw (UJK & NCBJ)

Presenter: CZAJKA, Alina (UJK)

Contribution ID: **69** Type: **not specified**

Understanding confinement via instanton-monopoles

Friday 7 February 2014 16:30 (30 minutes)

The problem of confinement is a long lasting problem in physics. Recently however there has been great progress in understanding confinement in a large class of locally 4D supersymmetric and non-supersymmetric theories with the help of instanton-monopoles. I will discuss how these can help us understand confinement in pure YM and QCD.

Primary author: SULEJMANPASIC, Tin (Regensburg U)

Presenter: SULEJMANPASIC, Tin (Regensburg U)

Contribution ID: **70** Type: **not specified**

Low x evolution equation for proton Green function

Tuesday 4 February 2014 18:30 (30 minutes)

The derivation, properties, and application of the low x evolution equation for proton Green function are discussed.

Primary author: GRABOVSKIY, Andrey (Budker Institute of Nuclear Physics (RU))

Presenter: GRABOVSKIY, Andrey (Budker Institute of Nuclear Physics (RU))

Contribution ID: **71** Type: **not specified**

Regge trajectory of the f0(500) resonance from a dispersive connection to its pole

Thursday 6 February 2014 09:00 (30 minutes)

Our results on obtaining the Regge trajectory of a resonance from its pole in a scattering process and from analytic constraints in the complex angular momentum plane will be presented. The method, suited for resonances that dominate an elastic scattering amplitude, has been applied to the rho(770) and the f0(500) resonances. Whereas for the former we obtain a linear Regge trajectory, characteristic of ordinary quark-antiquark states, for the latter we find a non-linear trajectory with a much smaller slope at the resonance mass. We also show that if a linear trajectory with a slope of typical size is imposed for the f0(500), the corresponding amplitude is at odds with the data.

Primary author: PELAEZ, Jose R. (Universidad COmplutense)

Co-authors: SZCZEPANIAK, Adam (Indiana University); LONDERGAN, J.Timothy (Indiana U); NEBREDA, Jennifer (Madrid U)

Presenter: PELAEZ, Jose R. (Universidad COmplutense)

Contribution ID: **73** Type: **not specified**

Dynamic Holographic QCD

Tuesday 4 February 2014 16:30 (30 minutes)

I present a simple AdS/QCD model in which the formation of the chiral condensate is dynamically determined. The gauge dynamics is input through the running of the quark bilinear's anomalous dimension, gamma. The condensate provides a dynamically generated infra-red wall in the computation of mesonic bound state masses and decay constants. As an example, I use the model, with perturbative computations of the running of gamma, to study SU(3) gauge theory with a continuous number of quark flavours, Nf. We follow the behaviour of the spectrum as we approach the conformal window through a walking gauge theory regime. The phase diagram of the theory is also computable in this model.

Primary author: EVANS, Nick (U)

Presenter: EVANS, Nick (U)

Contribution ID: **74** Type: **not specified**

Recent BaBar studies of conventional and exotic quarkonium states

Thursday 6 February 2014 11:00 (30 minutes)

The B factories provide a unique playground for the study of the properties of conventional and exotic quarkonium states,
We report on a variety of recent results obtained using the full data set collected with the BaBar detector at the PEPII e+e- collider.
In particular, we present measurements of the prompt production of J/psi or psi(2S) in association with a second charmonium state at a center-of-mass energy of 10.58 GeV, searches for exotic neutral and charged charmonium-like states, studies of charmonium production in two-photon fusion and initial state radiation processes,
as well as studies of radiative transitions between bottomonium states.

Primary author: WORMSER, Guy (LAL Orsay)

Presenter: WORMSER, Guy (LAL Orsay)

Contribution ID: **75** Type: **not specified**

Studying and removing effects of fixed topology

Thursday 6 February 2014 11:30 (30 minutes)

At small lattice spacing, or when using e.g. overlap fermions, lattice QCD simulations tend to become stuck in a single topological sector. Physical observables, e.g. hadron masses, then differ from their full QCD counterparts by 1/V corrections, where V is the space-time volume. These corrections can be calculated order by order using the saddle point method. We calculate all corrections proportional to 1/Vˆ2 and 1/Vˆ3 and test the resulting equations for several models: an analytically solvable quantum mechanical model, the Schwinger model, and pure SU(2) Yang Mills theory

Primary author: DROMARD, Arthur (Goethe University)

Co-author: WAGNER, Marc (Goethe University Frankfurt)

Presenter: DROMARD, Arthur (Goethe University)

Contribution ID: **76** Type: **not specified**

Vortices and chiral symmetry breaking

Monday 3 February 2014 18:00 (30 minutes)

We analyze the creation of near-zero modes from would-be zero modes of various topological charge contributions from classical center vortices in $SU(2)$ lattice gauge theory. We show that colorful spherical vortex and instanton configurations have very similar Dirac eigenmodes and also vortex intersections are able to give rise to a finite density of near-zero modes, leading to chiral symmetry breaking via the Banks-Casher formula. We discuss the influence of magnetic vortex fluxes on quarks and how center vortices may break chiral symmetry.

Primary author: FABER, Manfried (Vienna UT)

Presenter: FABER, Manfried (Vienna UT)

Contribution ID: **78** Type: **not specified**

Analytic solution to equations generalizing the Witten-Veneziano relation, and U(1)_A restoration

A set of equations generalizing the Witten-Veneziano relation is studied. We present an analytic solution thereof which gives results, such as eta and eta' masses and decay constants, in agreement with results previously obtained numerically. The analytic solution improves the understanding of the description of the eta-eta' complex. It also supports our approach to U(1)_A restoration, which links it to the chiral symmetry restoration.

Primary author: KLABUCAR, Dubravko (University of Zagreb, Physics Departrment)

Presenter: KLABUCAR, Dubravko (University of Zagreb, Physics Departrment)

Contribution ID: **79** Type: **not specified**

$a_0(980)$ as a dynamically generated resonance in the extended linear sigma model

Tuesday 4 February 2014 11:30 (30 minutes)

We study basic properties of scalar hadronic resonances within the so-called extended linear sigma model (eLSM), which is an effective model of QCD based on chiral symmetry and dilatation invariance. In particular, we focus on the mass and decay width of the isovector state $a_0(1450)$ and perform a numerical study of the propagator pole(s) on the unphysical Riemann sheets. Here, the $a_0(1450)$ is understood as a seed state explicitly included in the eLSM – this is in fact not true for the corresponding resonance below 1 GeV, the $a_0(980)$, which is sometimes interpreted as a kaonic (i.e., dynamically generated) bound state. In our work we want to clarify if the yet not included $a_0(980)$ can be found as a propagator pole generated by hadronic loop contributions. From such an investigation one could learn more about the general dependence of the eLSM – and effective field models in general – on strongly coupled hadronic intermediate states, possibly giving new insight into the low-energy regime, scalar resonances and both its theoretical description and physical interpretation.

Primary author: WOLKANOWSKI, Thomas (Johann Wolfgang Goethe-Universität)

Presenter: WOLKANOWSKI, Thomas (Johann Wolfgang Goethe-Universität)

Contribution ID: **80** Type: **not specified**

The PANDA experiment at FAIR

Tuesday 4 February 2014 09:30 (30 minutes)

The PANDA experiment is one of the key components of the future "Facility for Antiproton and Ion Research" at Darmstadt. Its goal is to study the features of the strong force in the transition region between perturbative and non-perturbative QCD. Therefore it utilizes the phase space cooled antiproton beam with a beam momentum between 1.5 GeV/c and 15 GeV/c to do precision measurements in the charmonium mass range.

The physics program of PANDA covers a wide field of different topics: charmonium and charmed/multi-strange baryon spectroscopy, the search for hybrids and glueballs as well as the study of electromagnetic processes, single and double hypernuclei and hadrons in nuclear matter.

To do these demanding measurements a complex experimental setup is needed using state-of-the-art detector technologies.

During this presentation an overview of the physics program as well as the experimental setup will be given.

Primary author: STOCKMANNS, Tobias (Forschungszentrum Jülich GmbH)

Presenter: STOCKMANNS, Tobias (Forschungszentrum Jülich GmbH)

Contribution ID: **81** Type: **not specified**

Recent KLOE results on hadronic physics

Monday 3 February 2014 10:00 (30 minutes)

KLOE collected most of the data in 2004-2006, whit 2.5 fb-1 of integrated luminosity at the peak of the ϕ resonance, and about 250 pb-1 off-peak, at 1 GeV center of mass energy.
Recent results obtained in light hadron physics concern the coupling of π0 and η mesons to photons, that are interesting for the effective theories based on Chiral Perturbation Theory, and for their extensions to the transition region from low energy non perturbative QCD to high energies where the perturbative QCD can be used.
We measured the time-like Transition Form Factors by detecting the Dalitz decays ϕ⟶η e+e− and ϕ⟶π0 e+e− , while the coupling of the η meson to space-like photon has been obtained from γ-γ interactions (e+e− ⟶ e+e− η).
These quantities are also interesting for the evaluation of the Light-by-Light scattering contribution to the anomalous magnetic moment of the muon.
With gamma-gamma interactions we detected also the π0 π0 final state to study the production of the σ(500) scalar meson.
Also a new measurement of η ⟶π+π−π0 Dalitz plot will be presented, of interest for the determination of fundamental parameters like the light quark masses.
The prospects for the new KLOE-2 data-taking aiming to collect 5 fb-1 in the next three years will be reviewed

Primary author: GAUZZI, Paolo (INFN)

Presenter: GAUZZI, Paolo (INFN)

Contribution ID: **82** Type: **not specified**

Exotic Hadron Spectroscopy

Tuesday 4 February 2014 10:00 (30 minutes)

Since ten years experiments have been observing a host of exotic states decaying into heavy quarkonia. The interpretation of most of them still remains uncertain and, in some cases, controversial, notwithstanding a considerable progress has been made on the quality of the experimental information available and a number of ideas and models have been put forward to explain the observations. In this talk we will expose the state-of-the-art of exotic spectroscopy, and will review the most promising theoretical interpretations.

Primary author: PILLONI, Alessandro (Sapienza U.)

Presenter: PILLONI, Alessandro (Sapienza U.)

Contribution ID: **84** Type: **not specified**

Infrared behaviour of propagators and running coupling in the conformal window of QCD

Friday 7 February 2014 11:30 (30 minutes)

Using the Dyson-Schwinger approach we investigate QCD with a relatively large number of quark flavors in the chiral limit.
A self-consistent treatment of the corresponding propagator equations enables us to study unquenching effects directly via the quark loop diagram in the gluon equation.
Above the critical number of fermion flavors the non-perturbative running coupling develops a plateau over a wide momentum range. Correspondingly, the propagators follow a power law behavior in this momentum range indicating conformal behavior.
Our value $N_f^{crit} = 4.5$ is strongly sensitive to the details of the quark-gluon vertex calling for more detailed investigations in future studies.

Primary author: HOPFER, Markus (University of Graz)

Co-authors: Prof. FISCHER, Christian (Justus-Liebig Universitaet Giessen); ALKOFER, Reinhard (U)

Presenter: HOPFER, Markus (University of Graz)

Contribution ID: **85** Type: **not specified**

Non-perturbative features of the three-gluon vertex in Landau gauge

Friday 7 February 2014 11:00 (30 minutes)

Self-consistent solutions for the three-gluon vertex in Landau gauge QCD using a Bose-symmetric truncation of Dyson-Schwinger equations are presented. A detailed discussion of the symmetry properties of the vertex and its basis decomposition is made, together with suitable fits for phenomenological applications. Increasing the number of light quark flavors leads to a qualitative change of the vertex properties in a way as expected for the conformal window.

Primary author: WILLIAMS, Richard (Karl Franzens University Graz)

Co-authors: EICHMANN, Gernot; VUJINOVIC, Milan (Karl-Franzens University, Graz); ALKOFER, Reinhard (U)

Presenter: VUJINOVIC, Milan (Karl-Franzens University, Graz)

Contribution ID: **86** Type: **not specified**

Why f0(500) must be narrower?

Thursday 6 February 2014 09:30 (30 minutes)

Recent works on the pion-pion scattering amplitudes done with use of one-subtracted dispersion relations [1] led to large modification of the f0(500) parameters, especially its width [2].
Immediately it led to long waited significant changes in the Particle Data Group Tables (Particle Listings and "Note on scalar mesons below 2 GeV" in [3]).
Such changes resulted in the need to redefine a number of amplitudes used in the theoretical and experimental works.
Sometimes, however, their authors doubt the necessity of introducing such changes and even question correctness of analyses confirming new parameters f0(500). Making example of reanalysis of such amplitudes and showing why dispersion relations with imposed crossing symmetry need narrower f0(500) one can easily once again prove the validity of the changes in the f0(500) parameters.

[1] "The Pion-pion scattering amplitude. IV: Improved analysis with once subtracted Roy-like equations up to 1100 MeV",
R. Garcia-Martin, R. Kaminski, J. R. Pelaez, J. Ruiz de Elvira and F.J. Yndurain, Phys. Rev. D83, 074004 (2011)

[2] "Precise determination of the f0(600) and f0(980) pole parameters from a dispersive data analysis"
R. Garcia-Martin, R. Kaminski, J.R. Pelaez, J. Ruiz de Elvira
Phys. Rev. Lett. 107 (2011) 072001

[3] J. Beringer et al. (Particle Data Group), Phys. Rev. D86, 010001 (2012).

Primary author: KAMINSKI, Robert (Institute of Nuclear Physics PAN)

Presenter: KAMINSKI, Robert (Institute of Nuclear Physics PAN)

Contribution ID: **87** Type: **not specified**

Approaching the chiral point in two-flavour lattice simulations

Thursday 6 February 2014 17:00 (30 minutes)

We investigate the behaviour of the pion decay constant and the pion mass in two-flavour lattice QCD, with the physical and chiral points as ultimate goal. Measurements come from the ensembles generated by the CLS initiative using the O(a)-improved Wilson formulation, with lattice spacing down to about 0.05 fermi and pion masses as low as 190 MeV. The applicability of SU(2) chiral perturbation theory is investigated, and various functional forms, and their range of validity, are compared. Among the studied observables are also some related to a third, heavier valence quark ("strange"), which enables examination of kaon-related observables.

Primary author: LOTTINI, Stefano (D)

Presenter: LOTTINI, Stefano (D)

Contribution ID: **88** Type: **not specified**

Magnetic Phenomena in holographic QCD

Wednesday 5 February 2014 16:30 (30 minutes)

I will review various effects connected to magnetic fields in the context of holographic QCD. These will include magnetic catalysis, new phases of matter and new phase transitions.

Primary author: LIFSCHYTZ, Gilad (University of Haifa at Oranim)

Presenter: LIFSCHYTZ, Gilad (University of Haifa at Oranim)

Contribution ID: **89** Type: **not specified**

Intriguing relations between the LECs of Wilson χ-PT and spectra of the Wilson Dirac operator

Friday 7 February 2014 17:00 (30 minutes)

We discuss the behavior of the spectral densities of the non-Hermitian Wilson Dirac operator and we derive interesting relations for the leading order physical and Wilson LECs of Wilson χ-PT. These relations can be used to determine the LECs from lattice simulations.

Primary author: ZAFEIROPOULOS, Savvas (Universite Blaise Pascal)

Co-authors: Prof. VERBAARSCHOT, Jacobus (Department of Physics and Astronomy, Stony Brook University); Dr KIEBURG, Mario (Fakultät für Physik-Universität Bielefeld)

Presenter: ZAFEIROPOULOS, Savvas (Universite Blaise Pascal)

Contribution ID: **90** Type: **not specified**

Hadron dynamics with vector mesons: matching theory and experiment to identify new resonances and their nature

Monday 3 February 2014 09:30 (30 minutes)

In this talk I shall address chiral dynamics and its extension to the vector sector with the local hidden gauge approach. I shall show how some resonances are dynamically generated in the approach from meson meson and meson baryon interactions. Then will address two very recent reactions, gamma p -> Kˆ0 Sigmaˆ+ , with its peculiar energy dependence close to the Kˆ*Lambda threshold, from where we deduce evidence of one of the baryon resonances predicited before, around 2030 MeV. Then I shall address the J/psi - > eta Kˆ* Kˆ*bar from where we find evidence of a h_1 resonance around 1830 MeV, also predicted from the vector vector interaction. Some short review of the status of the molecular states in the charm and beauty sectors will follow.

Primary author: OSET, Eulogio

Presenter: OSET, Eulogio

Contribution ID: **91** Type: **not specified**

Effects of divergent ghost loops on the Green's functions of QCD

Friday 7 February 2014 09:30 (30 minutes)

I discuss certain characteristic features encoded in some of the fundamental QCD Green's functions, whose origin can be traced back to the (Landau gauge) nonperturbative masslessness of the ghost field. Specifically, the ghost loops that contribute to these Green's functions display infrared divergences, akin to those encountered in the perturbative treatment, in contradistinction to the gluonic loops, whose perturbative divergences are tamed by the dynamical generation of an effective gluon mass. In d=4, the aforementioned divergences are logarithmic, thus causing a relatively mild impact, whereas in d=3 they are linear, giving rise to enhanced effects. In the case of the gluon propagator, these effects do not interfere with its finiteness, but make its first derivative diverge at the origin, and introduce a maximum in the region of infrared momenta. The three-gluon vertex is also affected, and the induced divergent behavior is clearly exposed in certain special kinematic configurations, usually considered in lattice simulations; the sign of the corresponding divergence is unambiguously determined.
The picture that emerges is finally compared to the available lattice data.

Primary author: BINOSI, Daniele (ECT* Fondazione Bruno Kessler)

Presenter: BINOSI, Daniele (ECT* Fondazione Bruno Kessler)

Contribution ID: **92** Type: **not specified**

Dense nuclear matter in neutron stars

Monday 3 February 2014 17:00 (30 minutes)

I will discuss recent measurements of neutron stars masses and radii and their implications for the equation of state of high density matter. I will focus in particular on the possible appearance of delta resonances, hyperons and strange quark matter and the dynamics of the formation process of such "exotic" degrees of freedom. Finally, I will present diffusion simulations of the cooling of newly formed strange stars.

Primary author: PAGLIARA, Giuseppe

Presenter: PAGLIARA, Giuseppe

Contribution ID: **93** Type: **not specified**

Low vs high-lying modes for hadron mass generation

Monday 3 February 2014 16:30 (30 minutes)

We study the effect of the chiral symmetry breaking low-lying modes of the Dirac operator and of the higher-lying modes on the hadron mass generation and on symmetries of hadrons in lattice QCD simulations.

Primary author: GLOZMAN, Leonid (Graz U)

Presenter: GLOZMAN, Leonid (Graz U)

Contribution ID: **94** Type: **not specified**

Applications of the Sakai-Sugimoto Model to Hadron Spectroscopy

Wednesday 5 February 2014 18:30 (30 minutes)

Some aspects of the Sakai-Sugimoto model, a holographic top-down approach capturing many features of quantum chromodynamics, are presented. Meson spectra, finite-temperature and finite-baryon-density effects are discussed. Furthermore, the description of glueballs within this framework is revisited and possible directions for future developments are discussed.

Primary author: BRÜNNER, Frederic (Vienna UT)

Co-authors: Prof. REBHAN, Anton (Vienna UT); PARGANLIJA, Denis

Presenter: BRÜNNER, Frederic (Vienna UT)

Contribution ID: **95** Type: **not specified**

Model-independent analysis of scenarios with vector-like quarks

Friday 7 February 2014 18:00 (30 minutes)

Vector-like quarks are predicted in various scenarios of new physics, and their peculiar signatures from both pair and single production have been already investigated in detail. However no signals of vector-like quarks have been detected so far, pushing limits on their masses above 600-700 GeV, depending on assumptions on their couplings. Experimental searches consider specific final states to pose bounds on the mass of a vector-like quark, usually assuming it is the only particle that contributes to the signal of new physics in that specific final state. However, realistic scenarios predict the existence of multiple vector-like quarks, possibly with similar masses. The reinterpretation of mass bounds from experimental searches is therefore not always straightforward. I will describe a method to perform a combined analysis of experimental searches, considering different final states, to determine the exclusion limit of scenarios where any number of vector-like quarks can contribute to the signal of new physics, as it is usually the case with realistic models of new physics.

Primary author: PANIZZI, Luca (University of Southampton)

Presenter: PANIZZI, Luca (University of Southampton)

Contribution ID: **96** Type: **not specified**

AdS/CFT and the axial sector of large-N Yang-Mills Theory

Wednesday 5 February 2014 18:00 (30 minutes)

In holographic models of large-N gauge theories, the pure-glue axial sector is described in terms of a massless pseudoscalar field, dual to the topological density operator. I will outline how this duality can be used to compute observables such as axial glueball masses and decay constants, as well as correlation functions and transport coefficients in the axial sector. I will focus especially on phenomenological holographic models, and discuss potential connections with observation and lattice results.

Primary author: NITTI, Francesco

Presenter: NITTI, Francesco

Contribution ID: **97** Type: **not specified**

Many-flavour QCD and the conformal window

Monday 3 February 2014 18:30 (30 minutes)

As the number of flavours in QCD is increased beyond some threshold, chiral symmetry is restored and long-distance physics becomes scale invariant. The region of parameter space in which this happens is called "conformal window". The phenomenology of theories in the conformal window or close to it is very different from real-world QCD, and clearly shows how rich gauge theories can be. As these theories are inherently non-perturbative, lattice simulation provide a unique setup to investigate them from first principles. In this talk I will review the main results and open questions in this field, the challenges ahead, and the techniques used.

Primary author: PATELLA, Agostino (CERN)

Presenter: PATELLA, Agostino (CERN)

Contribution ID: **98** Type: **not specified**

Probing nucleons with photons at the quark level

Friday 7 February 2014 10:00 (30 minutes)

I will review recent progress on nucleon form factor calculations and nucleon Compton scattering in the Dyson-Schwinger approach. By specifying a quark-gluon interaction kernel, the framework allows for a systematic calculation of hadron masses, form factors and nucleon-photon scattering processes from the quark-gluon level. I will present results for a variety of observables and discuss the current limitations and future directions of the approach.

Primary author: EICHMANN, Gernot

Presenter: EICHMANN, Gernot

Contribution ID: **99** Type: **not specified**

Hot SU(2) Glue around Deconfinement

Thursday 6 February 2014 16:30 (30 minutes)

We investigate on the lattice the properties of electric and magnetic gluon propagators for finite-temperature SU(2) theory around the deconfinement transition. Special care is taken to handle the very strong systematic effects that arise in the critical region.

Primary author: MENDES, Tereza (University of Sao Paulo)

Presenter: MENDES, Tereza (University of Sao Paulo)

Contribution ID: **100** Type: **not specified**

Light meson production in nucleon-nucleon reactions

Tuesday 4 February 2014 18:00 (30 minutes)

We study the production of mesons in nucleon-nucleon reactions at center-of-mass momenta of a few GeV using an $N_f = 2$ linear sigma model, extended by including the $N_f = 2$ multiplets of (pseudo-) scalar and (axial-) vector mesons and a doublet of the nucleon together with its chiral partner (the $N^*(1535)$ or $N^*(1650)$ resonance).

Primary author: TEILAB, Khaled (Frankfurt U)

Presenter: TEILAB, Khaled (Frankfurt U)

Contribution ID: **101** Type: **not specified**

The effect of polarized DIS hadronization pricess on the determination of polarized PDFs

We present our new determination of polarized PDFs of the nucleon at NLO accuracy performing a QCD fit on the global set of newest combined inclusive deep inelastic scattering (DIS) and the semi-inclusive polarized deep inelastic scattering (SIDIS) data. Considering SIDIS data, which comes from the hadronization of polarized DIS process, helps us to break SU(2) and SU(3) symmetry and light sea-quark decomposition happens. Our results are compared with the experimental data and the most precise theoretical models obtained by recent analyses. The latest COMPASS2010 SIDIS data, which were not available for the previous analyses, are employed in the current analysis and the effect of them is studied in detail.

Primary author: ARBABIFAR, Fatemeh (Semnan university)

Presenter: ARBABIFAR, Fatemeh (Semnan university)

Contribution ID: **102** Type: **not specified**

BESIII latest results

Thursday 6 February 2014 10:30 (30 minutes)

The latest result by BES III at BEPC are presented.

Primary author: MAGGIORA, Marco (Univ. + INFN)

Presenter: MAGGIORA, Marco (Univ. + INFN)

Contribution ID: **103** Type: **not specified**

The CBM heavy-quark program

Wednesday 5 February 2014 11:00 (30 minutes)

The Compressed Baryonic Matter (CBM) experiment at FAIR is designed to explore the QCD phase diagram in the region of high baryon densities and moderate temperatures. The key CBM observables include particles containing hidden charm –J/psi and Psi', open charm –D0, D+ , D* and Lambda_c, low-mass vector mesons decaying into leptons and multi-strange hyperons. Particularly demanding is the measurement of open charm particles with very low multiplicities, which is based on the real time selection of displaced vertices with an accuracy of about 50 μm. In the talk we discuss the problems of the detection of heavy-quark particles in fixed target experiments with relativistic heavy ion collisions.

Primary author: VASSILIEV, Iouri (GSI Helmholtzzentrum für Schwerionenforschung)

Presenter: VASSILIEV, Iouri (GSI Helmholtzzentrum für Schwerionenforschung)

Contribution ID: **104** Type: **not specified**

Higgs discovery status from ATLAS

Friday 7 February 2014 18:30 (30 minutes)

An overview of the Higgs boson search latest results in the ATLAS experiment at the LHC, after the discovery, is presented. The various decay channels in the context of the Standard Model and BSM searches are discussed. Latest results on the properties of the boson are given, with focus on the mass measurement, spin, parity and
production mechanisms.

Primary author: IORDANIDOU, Kalliopi (UOA (GR) / Brookhaven National Laboratory (US))

Presenter: IORDANIDOU, Kalliopi (UOA (GR) / Brookhaven National Laboratory (US))

Contribution ID: **107** Type: **not specified**

Heavy Ion ATLAS

Contribution ID: **108** Type: **not specified**

Chair

Presenter: COHEN, Thomas (University of Maryland)