Excited QCD 2018

Report of Contributions

https://indico.cern.ch/e/685849

Contribution ID: **1** Type: **not specified**

Scalar mesons: fifty years of challenging the quark model

Monday, 12 March 2018 09:30 (30 minutes)

Five decades of work on the light scalar-meson nonet composed of $f_0(500)$, $f_0(980)$, $K_0^\star(800)$, and $a_0(980)$, as well as on other scalar mesons, will be briefly reviewed. The different phenomenological descriptions include tetraquark bound states, pure meson-meson models, unitarised effective chiral approaches, unitarised quark models, and lattice-QCD simulations. Also, the charmed-strange scalar meson $D_{s0}^\star(2317)$ is shown to be an excellent laboratory for studying the scalar-meson dynamics. Very recent lattice results are presented that confirm the dynamical quark-antiquark/meson-meson picture successfully modelled by us long ago.

Primary authors: Dr RUPP, George (CeFEMA/IST); Prof. VAN BEVEREN, Eef (Department of Physics, University of Coimbra)

Presenter: Dr RUPP, George (CeFEMA/IST)

Session Classification: Talks - Mon, Morning, 1st session

Contribution ID: **2** Type: **not specified**

Thermodynamic characterizations of exotic and missing states

Tuesday, 13 March 2018 18:30 (30 minutes)

Themal shifts and fluctuations at finite temperature below the deconfinement crossover from hadronic matter to the quark-gluon plasma provide a viable way to look for missing states with given quantum number in the hadronic spectrum. We study a realization of the hadron resonance gas (HRG) model in the light quark (uds) flavour sector of QCD to study the fluctuations of baryon number, charge and strangeness, and study from it the thermodynamics characterization of exotic states like the hybrids q-qbar-q from a comparison with lattice data. We find that the highest temperature of agreement between the lattice and the HRG seems to be ˜ 150 MeV [1].

This study is then extended to compute the correlation of these conserved quantities in the confined phase of QCD. We obtain general formulas for the correlators of currents of any spin at zero and finite temperature, and apply them within the HRG model to obtain the correlators in QCD. It is also emphasized an interesting duality between the correlators at zero temperature and large distances, and the fluctuations of integrated quantities at low temperatures.

References:
[1] A. Bazavov (HotQCD Collaboration) et al., Phys. Rev. D86 (2012) 034509.
[2] E. Megias, E. Ruiz Arriola and L.L. Salcedo, Phys. Rev. Lett. 109 (2012) 151601.
[3] E. Megias, E. Ruiz Arriola and L.L. Salcedo, AIP Conf. Proc. 1625 (2014) 73-79.
[4] E. Megias, E. Ruiz Arriola and L.L. Salcedo, Phys. Rev. D89 (2014) 076006.
[5] E. Megias, E. Ruiz Arriola and L.L. Salcedo, Nucl. Part. Phys. Proc. 258-259 (2015) 201-204.
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[8] E. Megias, E. Ruiz Arriola, L.L. Salcedo, Phys. Rev. D94 (2016) 9, 096010.
[9] E. Ruiz Arriola, W. Broniowski, L.L. Salcedo, E. Megias, arXiv:1612.07091[hep-ph].

Primary author: Dr MEGIAS, Eugenio (University of the Basque Country)

Co-authors: RUIZ ARRIOLA, Enrique (Universidad de Granada); Prof. SALCEDO, Lorenzo Luis (Universidad de Granada)

Presenter: Dr MEGIAS, Eugenio (University of the Basque Country)

Session Classification: Talks - Tue, Afternoon, 2nd session

Contribution ID: **3** Type: **not specified**

QCD phase diagram and magnetic fields

Sunday, 11 March 2018 20:30 (30 minutes)

The magnetized phase diagram for three-flavor quark matter is studied within the Polyakov extended Nambu–Jona-Lasinio model. The magnetic field induces multiple phase transitions for the quarks. The approximate chiral restoration is accomplished through several intermediate steps. We analyze the effect of the magnetic field on the spinodal and binodal regions of the phase transitions. Due to the various phase transitions that the quarks undergo, several critical endpoints emerge in the phase diagram. The isentropic trajectories around these CEPs are analyzed. A focusing effect is observed on the region towards the CEPs that are related with the strange quark phase transitions. Compared to the quark phase transitions, the deconfinement transition turns out to be less sensitive to the external magnetic field and the crossover nature is preserved over the whole phase diagram.

Primary author: FERREIRA, Márcio (CFisUC)

Co-authors: COSTA, Pedro (CFisUC, University of Coimbra); PROVIDÊNCIA, Constança (University of Coimbra)

Presenter: FERREIRA, Márcio (CFisUC)

Session Classification: Talks Sunday

Contribution ID: **4** Type: **not specified**

Accessing the topological susceptibility via the Gribov horizon

Wednesday, 14 March 2018 09:00 (30 minutes)

The topological susceptibility, χ^4, following the work of Witten and Veneziano, explains the η' mass, solving the $U(1)_A$ problem. A nonzero χ^4 is caused by the with Veneziano Ghost, an unphysical mass pole in topological current K_μ correlator. Recently, Kharzeev and Levin attempted to connect the Veneziano Ghost with confinement and so with Gribrov copies too. However, their result breaks the BRST symmetry. We analyze the topological susceptibility, in SU(3) and SU(2), using Pad{\' e} approximation tool and RGZ gluon propagator in MOM scheme.

Primary authors: FELIX, Caroline; Prof. DUDAL, David; Prof. GUIMARÃES, Marcelo (UERJ); Prof. SORELLA, Silvio (UERJ)

Presenter: FELIX, Caroline

Session Classification: Talks - Wed, Morning, 1st session

Contribution ID: **5** Type: **not specified**

Application of Hyperspherical Three-Body Variables to Lattice QCD Data: Is the Three-Quark Confining Potential Y-string or $\triangle$-string?

Sunday, 11 March 2018 20:00 (30 minutes)

We analyze the recent lattice QCD results by Koma & Koma (2017), as well as the old ones by Takahashi et al. (2002) in terms of hyper-spherical three-body coordinates with a view to an interpretation in terms of a string model, either Delta or Y-string. We show that the presently extant data does not fully support either the Delta, or the Y-string. We suggest specific new sets of lattice configurations, for future computations, that allow simple(r) discrimination between the two string potentials.

Primary author: DMITRASINOVIC, Veljko

Presenter: DMITRASINOVIC, Veljko

Session Classification: Talks Sunday

Contribution ID: **6** Type: **not specified**

Parton energy loss and charmonia suppression in heavy ion collisions

Monday, 12 March 2018 18:30 (30 minutes)

Understanding the energy loss of partons traversing the strongly interacting matter created in heavy ion collisions is one of key goals of the heavy ion physics program. After a brief introduction to the field and explaining connections of heavy ion physics and high-energy QCD physics, we present results of phenomenological analyses of various recent jet quenching data. The core of the model used in these analyses is based on the shift formalism which allows for an extraction of the magnitude of parton energy loss from the data with minimal assumptions on the underlying physics mechanisms. The model is capable of describing the full p_T, rapidity, and centrality dependence of the measured jet nuclear modification factor using three effective parameters. The analysis done using this simple model can explain the shape of the modification of fragmentation functions observed in the data as well as the relation between the magnitude of the nuclear modification factor of jets and charged particles. The analysis of recent data on splitting functions and fragmentation functions allows for further constrains on the role of coherence effects in the parton energy loss. Further, the analysis of charmonia suppression using this model points to a remarkable similarity between the quenching of light-quark-initiated jets and the prompt charmonia suppression. This may bring an insight into both the suppression mechanism and general aspects of charmonia formation which is still not well understood.

Primary author: SPOUSTA, Martin (Charles University)

Presenter: SPOUSTA, Martin (Charles University)

Session Classification: Talks - Mon, Afternoon, 2nd session

Contribution ID: **8** Type: **not specified**

A fresh look at the (non)-Abelian Landau-Khalatnikov-Fradkin transformations

Wednesday, 14 March 2018 10:00 (30 minutes)

The Landau-Khalatnikov-Fradkin transformations (LKFTs) allow to interpolate n-point functions between different gauges. We first offer an alternative derivation of these LKFTs for the gauge and fermions field in the Abelian (QED) case when working in the class of linear covariant gauges. Our derivation is based on the introduction of a gauge invariant transversal gauge field, which allows a natural generalization to the non-Abelian (QCD) case of the LKFTs. To our knowledge, within this rigorous formalism, this is the first construction of the LKFTs beyond QED. The renormalizability of our setup is guaranteed to all orders. We also offer a direct path integral derivation in the non-Abelian case, finding full consistency.

Primary authors: Mr DE MEERLEER, Tim (KULeuven); Prof. DUDAL, David (KULeuven); Prof. SORELLA, Silvio (UERJ); BASHIR, Adnan (University of Michoacan); Dr DALL'OLIO, Pietro

Presenter: Mr DE MEERLEER, Tim (KULeuven)

Session Classification: Talks - Wed, Morning, 1st session

Contribution ID: **9** Type: **not specified**

Search for the eta-mesic helium in non-mesonic decays

Sunday, 11 March 2018 19:30 (30 minutes)

The negatively charged pions and kaons can be trapped in the Coulomb potential of atomic nucleus forming so called mesonic atoms. It is also conceivable that
a neutral meson could be bound to a nucleus. In this case the binding is exclusively due to the strong interaction and hence such object can be referred to as a mesic nucleus. Here the most promising candidate is the η-mesic nucleus since the η-N interaction is strongly attractive. The existence of mesic nuclear matter was postulated thirty years ago, however, untill now it has not been confirmed experimentally. In this talk we will report on the status of the search for the eta-mesic nuclei and the studies of the interaction of the eta and eta-prime meson with nucleons. Such system in the form of the eta mesic-helium may be created for example in the deuteron-deuteron or proton-deuteron fusions. The talk will be focused on the status and perspectives of the search for the eta-mesic helium with the emphasis on new results from the studies of the non-mesonic decay channels. In addition we will report on new results on the analyzing power for the pp->ppeta reaction with more than an order of magnitude improved precision which shed new light on the proton-eta interaction as well as on the production mechanism of the eta meson in nucleon-nucleon collisions.
P. Adlarson et al.,Nucl. Phys. A 959, 102 (2017) 102
P. Adlarson et al.,Phys.Rev.Lett. 120 (2018) 022002

Primary author: MOSKAL, Pawel (Jagiellonian University)

Presenter: MOSKAL, Pawel (Jagiellonian University)

Session Classification: Talks Sunday

Contribution ID: **10** Type: **not specified**

Physics of ridge and hard processes in proton-lead and lead-lead collisions with the ATLAS Experiment

Wednesday, 14 March 2018 11:00 (30 minutes)

Correlations between two particles separated in pseudorapidity and azimuthal angles, phenomena often called ridge, are sensitive to collective multiparticle effects, and have shown striking similarities in results obtained from proton-proton, proton-lead and lead-lead collisions. This talk presents an overview of ATLAS measurements of azimuthal correlations in proton-proton and proton-lead collisions, with some comparisons to lead-lead data. A detailed study of the dependence of two-particle
correlations on the charged particle multiplicity, transverse momentum of the pair constituents and the pseudorapidity separation between particle pairs is presented. This talk presents also the latest results on the jet, quarkonia and heavy flavor production, measured in proton-lead and lead-lead collisions using ATLAS. Modifications of yields and properties of jets propagating trough the hot and dense medium created in lead-lead collisions should provide insight on the structure of the medium, as well as on the dynamics of the parton energy loss. Quarkonia play an equally important role in studying the hot and dense medium, as they are observed to have modified yields in both proton-lead and lead-lead collisions relative to proton-proton collisions.

Primary author: SPOUSTA, Martin (Charles University)

Presenter: SPOUSTA, Martin (Charles University)

Session Classification: Talks - Wed, Morning, 2nd session

Contribution ID: **11** Type: **not specified**

Recent Tests of QCD with the ATLAS Detector

Wednesday, 14 March 2018 11:30 (30 minutes)

The ATLAS Collaboration has a large program to study various aspects of Quantum Chromodynamics starting from non-perturbative effects over diffractive physics to high precision perturbative calculations. In this talk, we review the latest results on Bose-Einstein correlations measured with the ATLAS detector along with an analysis of the momentum difference between charged hadrons in high–energy proton–proton collisions. The latter allows the investigation of observables sensitive to the predictions of the quantized string model.
Going to higher energy scales, we present first measurements of jet substructure quantities at a hadron collider, calculated at next-to-next-to-leading-logarithm accuracy. In particular, the soft drop mass is measured in dijet events with the ATLAS detector at 13 TeV, unfolded to particle-level and compared to Monte Carlo simulations. Perturbative QCD at highest energies can be precisely tested with the measurement of particle jet production of which we present the latest results based on data collected at a center-of-mass energy of 8 TeV and 13 TeV.
In the absence of forward proton tagging, exclusive processes can be distinguished in the central part of the ATLAS detector exploiting the large rapidity gap in the central region and the absence of charged particles reconstructed in the inner tracking detector. This strategy has been exploited to study the exclusive production of dilepton pairs in the data taken at centre-of-mass energies of 7 TeV and the exclusive production of W pairs in the 8 TeV data. In this context, we also present the latest results on exclusive dimuon production at 13 TeV.

Primary author: CALLEA, Giuseppe (Universitá della Calabria and INFN)

Presenter: CALLEA, Giuseppe (Universitá della Calabria and INFN)

Session Classification: Talks - Wed, Morning, 2nd session

Contribution ID: **12** Type: **not specified**

On strangeness in NA61/SHINE

Wednesday, 14 March 2018 16:30 (30 minutes)

NA61/SHINE is a fixed target experiment at the CERN Super-Proton-Synchrotron. The main goals of the experiment are to discover the critical point of strongly interacting matter and to study the properties of the onset of deconfinement. In order to reach these goals, a study of hadron production properties is performed in nucleus-nucleus, proton-proton and proton-nucleus interactions as a function of collision energy and size of the colliding nuclei.
In this talk, I will review recent results on strangeness production in p+p, Be+Be and Ar+Sc collisions in the SPS energy range. Transverse mass spectra, rapidity spectra and mean multiplicities of kaons obtained with various analysis methods will be presented. An overview of statistical and dynamical models of strangeness production in the vicinity of phase transition will be presented as well. Predictions of the models will be compared with available results on heavy-ions collisions and, most importantly, with new results on intermediate mass systems.

Primary author: Mr LEWICKI, Maciej Piotr (University of Wroclaw (PL))

Presenter: Mr LEWICKI, Maciej Piotr (University of Wroclaw (PL))

Session Classification: Talks - Wed, Afternoon, 1st session

Contribution ID: **13** Type: **not specified**

Structure of hybrid static potential flux tubes in SU(2) Lattice Yang-Mills-theory

Tuesday, 13 March 2018 17:00 (30 minutes)

We study the structure of hybrid static potential flux tubes in SU(2) Lattice Yang-Mills-theory. To this end, we compute the square of the chromoelectric and chromomagnetic field strength components for different hybrid static potential quantum numbers. We find clear indications that the gluonic distribution is different compared to the ordinary static potential and present corresponding first results.

Primary author: MÜLLER, Lasse (ITP, Universität Frankfurt)

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

Presenter: MÜLLER, Lasse (ITP, Universität Frankfurt)

Session Classification: Talks - Tue, Afternoon, 1st session

Contribution ID: **14** Type: **not specified**

Exotics at Belle and perspectives at Belle II

Monday, 12 March 2018 09:00 (30 minutes)

The search for multi-quark states beyond the constituent quark model (CQM) has resulted in the discovery of many new exotic states, starting with the X(3872) discovery by Belle in 2003. Also in the sector of charm the CQM does not seem to describe properly all spectrum, despite of the theoretical expectations. These new forms of quark bounds clearly show that mesons and baryons are not the only possibilities to be considered. We report selected recent results on such states at Belle, with the perspectives in the hadron physics program at the Belle II experiment, which is right now in the phase-2 of its run-operation.

Primary author: PRENCIPE, Elisabetta (Forschungszentrum Juelich)

Presenter: PRENCIPE, Elisabetta (Forschungszentrum Juelich)

Session Classification: Talks - Mon, Morning, 1st session

Contribution ID: **15** Type: **not specified**

Different modes of elliptic and triangular flow in ultrarelativistic PbPb collisions from HYDJET model

Tuesday, 13 March 2018 18:00 (30 minutes)

Observed dependence of flow symmetry plane in ultra-relativistic heavy ion collisions on transverse momentum (p_T) and pseudorapidity η is attributed to lumpy hot-spots raised by the event-by-event fluctuations of the initial states. Studying different orthogonal modes of the same flow harmonic has been suggested as a promising way to explore this phenomena. Prediction of leading and sub-leading modes for elliptic and triangular flow for charged pions for PbPb collisions at the center-of-mass energy per nucleon pair of 2.76 TeV from HYDJET++ model are presented. Calculations are done by applying principal component analysis technique (PCA) on long range two-particle azimuthal correlations, requesting $|\Delta\eta| > 2$ gap in order to avoid non-flow effects. The results are shown as a function of transverse momentum (p_T) in a range $0.3 < p_T < 3.0$ GeV/c, pseudorapidity range $|\eta| < 2.4$, and in a various centrality classes, from ultra central events (0-0.2%) up to rather peripheral ones (50-60%). Obtained values are compared with real data measurement from CMS experiment. Rather good agreement between model and data is a step in a better understanding the initial-state fluctuations and dynamic of QGP expansion.

Primary author: STOJANOVIC, Milan (University of Belgrade (RS))

Co-authors: CIRKOVIC, Predrag; DEVETAK, Damir; DJORDJEVIC, Milos; MILOSEVIC, Jovan

Presenter: STOJANOVIC, Milan (University of Belgrade (RS))

Session Classification: Talks - Tue, Afternoon, 2nd session

Contribution ID: **16** Type: **not specified**

Arbitrary ω-Φ mixing form in the Gell-Mann-Okubo quadratic mass relation creates the same mixing angle θ value.

Tuesday, 13 March 2018 10:00 (30 minutes)

Algebraic solution of the four independent couples of physically acceptable ω-Φ mixing forms gives expressions for ω_8 and ω_0 as functions of the unknown mixing angle Θ and physical states ω, Φ. Substituting for expressions obtained in a such way for ω_8 repeatedly into Gell-Mann-Okubo quadratic mass formula, which yields $m^2_{\omega_8}$ as a combination of quadratic masses of $K^*(980)$ and $\rho^0(770)$ vector mesons, two incompatible values of the mixing angle are found.

Primary author: Prof. DUBNICKOVA, Anna Zuzana (Comenius University)

Presenter: Prof. DUBNICKOVA, Anna Zuzana (Comenius University)

Session Classification: Talks - Tue, Morning, 1st session

Contribution ID: **17** Type: **not specified**

Not all possible $\omega - \Phi$ mixing forms are physically acceptable.

Tuesday, 13 March 2018 09:30 (30 minutes)

Starting from the mass matrix in the ω_8, ω_0 space and subsequently by its diagonalization into physical vector meson states $\omega(782)$,$\Phi(1020)$ by means of the orthogonal matrix in the most general form, all eight possible forms of the ω-Φ mixing are derived. Taking into account the quark structure of the ω_8, ω_0 states and exploiting the ideal mixing angle value $\Theta = 35.3^0$ it is demonstrated that only four of them are physically acceptable, as only they are in conformity with experimentally observed decays of the $\omega(782)$ and $\Phi(1020)$ vector mesons.

Primary author: Prof. DUBNICKA, Stanislav (Inst.of Physics, SAS)

Presenter: Prof. DUBNICKA, Stanislav (Inst.of Physics, SAS)

Session Classification: Talks - Tue, Morning, 1st session

Contribution ID: **18** Type: **not specified**

The PANDA Experiment at FAIR

Wednesday, 14 March 2018 19:00 (30 minutes)

The PANDA experiment, a core project of the future Facility for Antiproton and Ion Research (FAIR) at GSI in Darmstadt, will investigate antiproton proton annihilations with the aim to explore fundamental questions in the nonperturbative regime of QCD. The multi-purpose detector is currently under construction and ensures in combination with an intense and high quality antiproton beam in the
momentum range between 1.5 and 15 GeV/c the investigation of a rich physics field and in particular of resonances in the charmonium and open charm region.
The talk will give an overview of the PANDA experiment and the most important aspects of the physics program.

Primary author: Dr KOPF, Bertram (Ruhr-Uni Bochum)

Presenter: Dr KOPF, Bertram (Ruhr-Uni Bochum)

Session Classification: Talks - Wed, Afternoon, 2nd session

Contribution ID: **19** Type: **not specified**

Dynamical Hadrons

Monday, 12 March 2018 11:30 (30 minutes)

In this talk I will briefly review the theory of resonances dynamically generated from hadron-hadron scattering, sometimes referred to as “molecules”. I will give some classical examples of meson-meson and meson-baryon systems, as well as a few examples of different approaches to describe the interaction between hadrons. To conclude I will comment on a few recent works that suggest some of the five new narrow Ω_c states, recently discovered by the LHCb collaboration, can be interpreted as meson-baryon molecules.

Primary author: RODRIGUES DEBASTIANI, Vinicius (IFIC, University of Valencia)

Presenter: RODRIGUES DEBASTIANI, Vinicius (IFIC, University of Valencia)

Session Classification: Talks - Mon, Morning, 2nd session

Contribution ID: **20** Type: **not specified**

Cosmic Ray Extremely Distributed Observatory: a global network to probe contemporary physics mysteries

Monday, 12 March 2018 16:30 (30 minutes)

With the most recent advances in cosmic-ray physics, from both theoretical and experimental aspects, particles beyond the GZK cut-off (E > 10ˆ20 eV) have been detected by leading collaborations such as Pierre Auger Observatory and Telescope Array. Such observations raise many questions as to how such tremendous energies can be reached and what source can possibly produce them. Although at lower energies, bottom-up mechanisms such as Fermi acceleration in supernovae front shocks seem to be favoured, a number of top-down scenarios have been proposed to explain the existence of ultra-high energy cosmic-rays: the decay of super-massive long-lived particles produced in the early Universe may yield to a flux of ultra-high energy photons. Such photons might be presently interacting with (extra)galactic radiation and generate so called super-preshowers, an extended cosmic-ray shower with a spatial distribution that can be as wide as the Earth diameter and have a very peculiar signature. The Cosmic Ray Extremely Distributed Observatory (CREDO) mission is to find such events by means of a large network of detectors spread around the globe. Since the cost and feasibility of developing a new network might be beyond our reach, CREDO's strategy is to connect existing detectors and create a worldwide network of cosmic-ray observatories. Moreover, the educational potential of CREDO goes well beyond the scientific community: citizen-science constitutes an important pillar of our strategy. By helping our algorithms to recognize detection patterns and by using smartphones as individual cosmic-ray detectors, non-scientists can actively participate in scientific discoveries and unravel some of the deepest mysteries in physics. From space weather to earthquake prediction, the diversity of applications is one of the key aspect of CREDO's mission.

Primary author: Dr CHEMINANT, Kévin Almeida (Institute of Nuclear Physics PAS)

Presenter: Dr CHEMINANT, Kévin Almeida (Institute of Nuclear Physics PAS)

Session Classification: Talks - Mon, Afternoon, 1st session

Contribution ID: **21** Type: **not specified**

QCD phase diagram from the lattice

Tuesday, 13 March 2018 16:30 (30 minutes)

We present a phase diagram for SU(3) lattice gauge theory with 695 MeV dynamical staggered fermions, obtained from effective Polyakov line actions. The derivation is via the method of relative weights and the effective theories are solved at finite chemical potential by mean field theory. We find a phase transition line in the plane of temperature and chemical potential and compare it to analytical results.

Primary authors: HÖLLWIESER, Roman (Bergische Universität Wuppertal); Prof. GREENSITE, Jeff (San Francisco State University)

Presenter: HÖLLWIESER, Roman (Bergische Universität Wuppertal)

Session Classification: Talks - Tue, Afternoon, 1st session

Contribution ID: **22** Type: **not specified**

Heavy baryons in the chiral quark-soliton model: a possibility for exotica?

Tuesday, 13 March 2018 09:00 (30 minutes)

Models based on chiral symmetry predict the baryonic states with exotic quantum numbers (pentaquarks) that have relatively low masses and small widths. We shall briefly review both theoretical and experimental status of a possibility of exotica in the light sector. Next we shall show how to extend chiral models to baryons with one heavy quark and show that one may expect exotic states also in this case. Finally we shall try to interpret recently discovered by the LHCb collaboration five Omegaˆ*_c resonances in terms of regular and exotic excitations of the ground state Omega_c.

Primary author: PRASZALOWICZ, Michal (Jagiellonian University, Krakow)

Presenter: PRASZALOWICZ, Michal (Jagiellonian University, Krakow)

Session Classification: Talks - Tue, Morning, 1st session

Contribution ID: **23** Type: **not specified**

Newest results on XYZ states at BESIII

Monday, 12 March 2018 10:00 (30 minutes)

With about 12/fb collected XYZ data sets, BESIII continues the exploration of the exotic charmonium-like states. In these talk, recent results of the measurements of line-shape of e+ e- -> pi0 pi0 psi(3686), K K J/psi, and pi+ D0 D*-, as well as the J^P determination of Zc(3900) and observation of e+ e- -> phi chi_c1/2 at sqrt(s)=4.6 GeV will be presented.

Primary author: Dr NERLING, Frank (GU Frankfurt, GSI Darmstadt)

Co-author: BESIII COLLABORATION, on behalf of the (IHEP, Beijing)

Presenter: Dr NERLING, Frank (GU Frankfurt, GSI Darmstadt)

Session Classification: Talks - Mon, Morning, 1st session

Contribution ID: **24** Type: **not specified**

Kl3 Form Factors with the NA48/2 experiment and NA62 status

Wednesday, 14 March 2018 18:30 (30 minutes)

The NA48/2 experiment at CERN collected a very large sample of charged kaon decays into multiple final states. This data allow measurements related to QCD. We obtained our final measurement of the charged kaon semileptonic decays form factors based on 4.28 million Ke3 and 2.91 million Kmu3 selected decays, with the smallest uncertainty for Ke3 and a competitive result for Kmu3 and leading to the most precise combined Kl3 result coming from the Kaon sector that reduces the form factor uncertainty of |V_{us}|.
The NA62 experiment at CERN SPS is designed to measure the branching ratio of the K+ ->pi+nunu decay with 10% precision. K->pinunu is one of the theoretically cleanest meson decay where to look for indirect effects of new physics complementary to LHC searches. NA62 took data in 2015-2017; the analysis of a partial data set allows to reach the Standard Model sensitivity. The status of the experiments will be presented. Beyond the K->pinunu, the physics program of NA62 is quite wide. The search of a Dark Photon is one of this physics case. The prospects about this search will be presented.

Primary author: PIANDANI, Roberto (INFN Sezione di Pisa, Universita' e Scuola Normale Superiore, P)

Presenter: PIANDANI, Roberto (INFN Sezione di Pisa, Universita' e Scuola Normale Superiore, P)

Session Classification: Talks - Wed, Afternoon, 2nd session

Contribution ID: **25** Type: **not specified**

Low Energy Antikaon-nucleon/nuclei interaction studies by AMADEUS

Wednesday, 14 March 2018 18:00 (30 minutes)

The AMADEUS collaboration is performing experimental investigations in the sector of the low energy strangeness hadron physics.
The strategy consists of taking advantage of the monochromatic low-momentum negatively charged kaons produced by the DAΦNE collider,
investigating the K^- nuclear absorption proceses in the materials of the KLOE detector, used as an active target.
The K^- single and multi-nuclear absorption on H, ^{4}He, ^{9}Be and ^{12}C, both at-rest and in-flight (p_$K-$=100MeV), are studied with the aim to determine the nature of the controversial $\Lambda(1405)$, the non-resonant hyperon pion formation amplitude below the $\bar{K}$N threshold, the yield and cross sections of K^- multi-nucleon absorptions intimately connected to the antikaon multi-nucleon clusters properties and the K^- scattering cross sections on light nuclear targets.

Primary author: Dr PISCICCHIA, Kristian (Centro Fermi, LNF (INFN))

Presenter: Dr PISCICCHIA, Kristian (Centro Fermi, LNF (INFN))

Session Classification: Talks - Wed, Afternoon, 2nd session

Contribution ID: **26** Type: **not specified**

Overview of recent heavy flavor results at STAR

Wednesday, 14 March 2018 17:00 (30 minutes)

In ultrarelativistic heavy-ion collisions at RHIC, a new state of nuclear matter – strongly interacting Quark Gluon Plasma is created under extreme condotions. Owing to their large masses, heavy quarks are predominantly produced at early stages of collisions hence prove an exceptional probe for exploring properties of the hot and dense medium.
The Heavy Flavor Tracker and Muon Telescope Detector upgrades were completed in 2014 and have significantly improved STAR's capabilities in measuring both open and hidden heavy flavor hadrons in heavy-ion collisions. In this talk, recent heavy flavor measurements carried out at the STAR experiment will be discussed.

Primary author: FEDERIC, Pavol (Acad. of Sciences of the Czech Rep. (CZ))

Presenter: FEDERIC, Pavol (Acad. of Sciences of the Czech Rep. (CZ))

Session Classification: Talks - Wed, Afternoon, 1st session

Contribution ID: **27** Type: **not specified**

The large-Nc masses of light mesons from QCD sum rules and the scalar sigma-meson

Monday, 12 March 2018 11:00 (30 minutes)

We will discuss a calculation of large-Nc masses of light mesons from the QCD sum rules. Two methods based on the use of linear radial Regge trajectories will be presented. We put a special emphasis on the appearance of pole near 0.5 GeV in the scalar isoscalar channel which emerges in both methods and presumably corresponds to the sigma-meson.

Primary authors: AFONIN, Sergey (Saint Petersburg State University); Mr SOLOMKO, Timofey (St. Petersburg State University)

Presenter: AFONIN, Sergey (Saint Petersburg State University)

Session Classification: Talks - Mon, Morning, 2nd session

Contribution ID: **28** Type: **not specified**

New HERA results on perturbative QCD

Sunday, 11 March 2018 19:00 (30 minutes)

The H1 and ZEUS collaborations continue to produce final precision measurements of QCD physics. To achieve high precision measurements, data from both experiments have been combined leading to significantly reduced experimental uncertainties. The two collaborations recently obtained results on combination and QCD analysis of beauty and charm production cross section measurements in deep inelastic ep scattering. Also, new results on the first determination of alpha_s from DIS jet data at NNLO from the H1 collaboration and studies of prompt photon production from the ZEUS collaboration are presented.

Primary author: Dr RAICEVIC, Natasa (University of Montenegro)

Presenter: Dr RAICEVIC, Natasa (University of Montenegro)

Session Classification: Talks Sunday

Contribution ID: **29** Type: **not specified**

Bound state properties within the Functional Renormalisation Group

Monday, 12 March 2018 18:00 (30 minutes)

A fully Poincaré-covariant bound state equation derived from a Functional Renormalisation Group equation, the Wetterich equation, via dynamical hadronisation is solved within an effective gluon-decoupled low-energy QCD system, the Quark-Meson model, yielding fully dressed non-perturbative n-point functions for both fermionic and mesonic fields. The problem of analytically continuing the correlators to time-like momenta to get access to observables is discussed. Some preliminary results and comparison between this approach and the Dyson-Schwinger / Bethe-Salpeter equation one will be shown.

Primary authors: PARÍS-LÓPEZ, Jordi (Institut für Physik, University of Graz); ALKOFER, Reinhard (University of Graz)

Presenter: PARÍS-LÓPEZ, Jordi (Institut für Physik, University of Graz)

Session Classification: Talks - Mon, Afternoon, 2nd session

Contribution ID: **30** Type: **not specified**

Mass shift of charmonium states in $\bar{p}A$ collision

Tuesday, 13 March 2018 11:00 (30 minutes)

The masses of the low lying charmonium states, namely, the J/Ψ, $\Psi(3686)$, and $\Psi(3770)$ are shifted downwards due to the second order Stark effect. In $\bar{p}+$ Au collisions at $6-10$˜GeV we study their in\,-\,medium propagation. The time evolution of the spectral functions of these charmonium states is studied with a Boltzmann\,-\,Uehling\,-\,Uhlenbeck (BUU) type transport model. We show that their in\,-\,medium mass shift can be observed in the dilepton spectrum. Therefore, by observing the dileptonic decay channel of these low lying charmonium states, especially for $\Psi(3686)$, we can gain information about the magnitude of the gluon condensate in nuclear matter. This measurement could be performed at the upcoming PANDA experiment at FAIR.

Primary authors: WOLF, Gyorgy (Wigner FK); KOVACS, Peter (Wigner RCP); ZETENYI, Miklos (Wigner RCP, Budapest); LEE, Su Houng (Yonsei University); Mr BALASSA, Gabor (MTA Wigner FK)

Presenter: WOLF, Gyorgy (Wigner FK)

Session Classification: Talks - Tue, Morning, 2nd session

Contribution ID: **31** Type: **not specified**

What Gravitational Waves and Gamma-Ray Bursts teach us about their progenitors

Monday, 12 March 2018 17:00 (30 minutes)

The years 2015 and 2016 marked the start of gravitational wave (GW) astronomy with the discovery of gravitational waves originating from massive black hole mergers. Although searches were performed with a range of dedicated satellites for an electro-magnetic (EM) counter-part no such radiation was detected. As the sensitivity of the GW detectors increased the first detection of a GW produced by the merger of two neutron stars was detected in August 2017. This detection has implications for a wide range of different fields. Firstly the detection of an EM counter part to the GW signal confirmed the origin of Gamma-ray Bursts (GRBs), the brightest events in the universe since the big-bang, to be neutron star-neutron star mergers. It furthermore provided a wealth of information on the thus far poorly understood origin of the emission from GRBs which is being studied by a wide range of instruments such as Fermi-GBM and POLAR. Apart from constraining models on the EM radiation from GRBs it also provides information on the progenitors, the neutron stars, and the final state of the merger, the exact nature of which is not fully understood yet. In this talk the connection between GRBs and GWs will be discussed with an emphasis on the recent NS-NS merger event. The implications of this event on our understanding of both GRBs and of for example the NS equation of state of will be discussed and finally an outlook on future measurements will be given.

Primary author: Dr KOLE, Merlin (Universite de Geneve (CH))

Presenter: Dr KOLE, Merlin (Universite de Geneve (CH))

Session Classification: Talks - Mon, Afternoon, 1st session

Contribution ID: **32** Type: **not specified**

The center vortex model of the QCD-vacuum, successes and problems

Wednesday, 14 March 2018 09:30 (30 minutes)

The center vortex model is able to explain confinement, chiral symmetry breaking and the topological charge of QCD vacuum configurations. Maximal center gauge and center projection are very successful methods to detect center vortices. However, they are know to fail for smooth field configurations. We suggest to use the non-Abelian Stokes law to improve the detection of center vortex regions. Observables which could help to detect center vortices are discussed.

Primary author: Mr FABER, Manfried (Vienna University of Technology)

Presenter: Mr FABER, Manfried (Vienna University of Technology)

Session Classification: Talks - Wed, Morning, 1st session

Contribution ID: **34** Type: **not specified**

Hydrodynamics of QCD

Tuesday, 13 March 2018 19:00 (30 minutes)

I will review the use of hydrodynamics to model heavy-ion collisions at ultrarelativistic energies, and what such modeling has taught us about the properties of QCD matter.

Primary author: HUOVINEN, Pasi (University of Wroclaw)

Presenter: HUOVINEN, Pasi (University of Wroclaw)

Session Classification: Talks - Tue, Afternoon, 2nd session

Contribution ID: **37** Type: **not specified**

Decay mechanisms in bound state interaction kernels

Tuesday, 13 March 2018 11:30 (30 minutes)

We study decay channel effects in the spectrum of meson states using covariant Bethe-Salpeter equations (BSEs).. The main goal will be to develop BSE kernels that contain explicit decay mechanisms. This will be first explored in the meson sector where, for example, a kernel suitable to study the rho mesons should contain a ρ− > π + π decay mechanism. This will be tackled by including explicit pion degrees of freedom in addition to quarks and gluons

Primary author: MIRAMONTES LOPEZ, Angel Salvador (University of Graz)

Presenter: MIRAMONTES LOPEZ, Angel Salvador (University of Graz)

Session Classification: Talks - Tue, Morning, 2nd session

Contribution ID: **38** Type: **not specified**

Dynamics of relativistic spin-polarized fluid

Monday, 12 March 2018 19:00 (30 minutes)

We use recently formulated framework of perfect fluid hydrodynamics with spin to study space-time evolution of spin polarization in heavy-ion collisions. We consider various initial conditions for the hydrodynamic background and different forms of the spin tensor to study consequences of various physical assumptions for the time evolution of the system's polarization.

[1] W. Florkowski, B. Friman, A.Jaiswal, E. Speranza, arXiv:1705.00587
[2] W. Florkowski, B. Friman, A.Jaiswal, R.Ryblewski, E. Speranza, forthcoming

Primary author: Dr RYBLEWSKI, Radoslaw (Institute of Nuclear Physics PAN)

Presenter: Dr RYBLEWSKI, Radoslaw (Institute of Nuclear Physics PAN)

Session Classification: Talks - Mon, Afternoon, 2nd session

Contribution ID: **40** Type: **not specified**

Phase transitions of QCD and QCD-like theories from Dyson-Schwinger equations

Monday, 12 March 2018 12:00 (30 minutes)

QCD-like theories provide testing grounds for truncations of functional equations at non-zero density, since comparisons with lattice results are possible due to the absence of the sign problem. As a first step towards such a comparison, we determine for various theories the chiral and confinement/deconfinement transitions from the quark propagator Dyson-Schwinger equation by calculating the chiral and dual chiral condensates, respectively.

Primary author: CONTANT, Romain (University of Graz)

Presenter: CONTANT, Romain (University of Graz)

Session Classification: Talks - Mon, Morning, 2nd session