Registrant ID : 8

Mr. ALEXANDRU, Dumitrescu

Title of oral presentation : Recent theoretical advances regarding the fine structure of the α-emission spectrum and its relation to nuclear structure properties

Abstract of oral presentation : We present a unified description of the structure and α-emission properties of even-even and odd-mass nuclei, the latter in the case of favored transitions. The low-energy spectrum relevant for α-emission, as well as the electromagnetic transitions between the states it comprises, are described within the framework of the Coherent State Model (CSM). The treatment of the α-emission process is based on an α–daughter interaction containing a monopole component, calculated through a double folding procedure with a M3Y interaction plus a repulsive core simulating the Pauli principle, and a quadrupole–quadrupole (QQ) interaction. The decaying states are identified with the lowest narrow outgoing resonances obtained through the coupled channels method. The α-branching ratios to the first excited state are reproduced by means of the QQ strength. Simultaneously, a reasonable agreement is obtained for the α-branching ratios to the second and third excited states. Several interesting α-clustering properties and their relation to nuclear deformation and electromagnetic transition strengths are pointed out.

Authors and Co-Authors : A. Dumitrescu, D.S. Delion

Presenter : A. Dumitrescu

Registrant ID : 10

Mr. APOSTOLOU, Alexandros

Title of oral presentation : Measurement of the spatial and energy-loss resolutions with a prototype Straw Tube Tracker (STT) for the PANDA experiment.

Abstract of oral presentation : The PANDA experiment is one of the pillars of the future Facility for Antiproton and Ion Research (FAIR) in Darmstadt, Germany. The PANDA physics program is focused on answering fundamental questions related to Quantum Chromodynamics (QCD), mostly in the non-perturbative energy regime, using antiproton collisions on proton and nuclear targets. The central Straw Tube Tracker (STT) will be the main tracking detector of the PANDA target spectrometer. The STT will reconstruct tracks induced by charged particles (with a spatial resolution of ~ 150 m transversal) and measure the corresponding particle momenta and specific energy-losses for particle identification (PID) with an energy resolution better than 10%.
The PID information from the STT is especially needed to separate protons,kaons and pions in the momentum region below 1 GeV/c. In this work, the results obtained so far with a prototype STT using the proton beam at COSY in the momentum range from 0.5 to 3.0 GeV/c are summarised and discussed.

Authors and Co-Authors : Alexandros Apostolou, Johan Messchendorp, Nasser Kalantar-Nayestanaki, James Ritman, Peter Wintz for the PANDA collaboration

Presenter : Alexandros Apostolou

Registrant ID : 67

Dr. BECEIRO NOVO, Saul

Title of oral presentation : Physics behind the NUSTAR project

Abstract of oral presentation : One of the main open questions in nuclear physics is the production of elements heavier than iron in stellar environments. This process depends on on the nuclear forces and symmetries in rare isotopes.
To further study the reactions involved, the project NUSTAR (Nuclear Structure, Astrophysics and Reactions) was proposed as one of the main components of FAIR. Such reactions will be studied with intensive secondary rare isotope beams selected with the Super-FRS (Fragment-Separator) and a series of complimentary detector set-ups. These experiments should clarify relevant details of the nuclear configuration of the abundance of heavy elements, new knowledge about the interior of neutron stars and other open astrophysical questions.

Authors and Co-Authors : Saul Beceiro-Novo for NUSTAR

Presenter : Saul Beceiro-Novo

Registrant ID : 44

Dr. BENDER, Markus

Title of oral presentation : Materials research at FAIR

Abstract of oral presentation : Materials research with energetic heavy ions mainly addresses structural changes of irradiated materials. Along its trajectory, each single ion can modify the target while being slowed down due to the deposition of energy. Subsequent ultrafast dynamical processes like excitation, ionization and transient melting end up in manifold material modifications from track formation over gas desorption to radiation damage. Hence, the FAIR facility not only will offer an interesting expansion of irradiation parameters, but also present materials research provides important results for the construction of FAIR components.
At CRYRING as well as at the BioMAT beamline in the APPA cave, new irradiation setups will be installed. CRYRING will offer similar beam energies as they are presently available at the UNILAC but in addition with access to highly charged ion beams. The choice of charge states is of importance for the research on surface phenomena such as sputtering and track formation at gracing incidence or on 2D materials. On the other hand, the BioMAT beam line offers higher energies and intensities as presently available at GSI. This allows penetrating larger experimental setups, which apply auxiliary extreme conditions to samples, whereby materials can be investigated coincidentally under high pressure, high temperature and radiation.
Fundamentally, several components and areas in the FAIR facility depend on high performance materials, pointing out the importance of materials research. Of highest relevance is the radiation hardness of used materials, especially in irradiation targets, collimators, and beam dumps. For that purpose the radiation hardness of several materials has been investigated using existing GSI beams. Besides gaining knowledge on the creation of radiation damage, several online monitoring techniques have successfully been developed. Another important aspect is the desorption of gas due to beam loss in the machine. This deteriorates the vacuum and can lead to beam intensity and lifetime limitation. Over the last years the processes of ion-induced desorption were successfully investigated and widely understood. Further, pre-treatment procedures for critical components have been developed to limit the amount of desorbed gas.

Authors and Co-Authors : M. Bender, D. Severin, M. Tomut, I. Alber, C. Trautmann

Presenter : M. Bender

Registrant ID : 12

Dr. CABANELAS, Pablo

Title of oral presentation : EnsarRoot: The framework for simulation and data analysis for ENSAR

Abstract of oral presentation : EnsarRoot is the simulation and analysis framework for the ENSAR and ENSAR2 (http://www.ensarfp7.eu/) projects, developed under the corresponding SiNuRSE and SATNuRSE Joint Research Actions. The aim is to provide the software infrastructure and examples to simplify the development of an analysis and simulation code for Nuclear Physics medium-size experiments in different international facilities and laboratories. It is based on the FairRoot framework which is common to many experiments at FAIR. EnsarRoot provides a common data structure based on ROOT trees as well as a detector geometry definition based on the ROOT Geometry Modeller. Moreover, Geant3 and Geant4 transport engines are supported in a way that does not depend on a particular Monte Carlo engine. The code includes examples of different kind of detectors commonly used in Nuclear Physics experiments, like calorimeters, scintillators, Si and Ge detectors, RPCs… and implements also specific event generators. Some Nuclear Physics experiments like SOFIA or E105, are included in the framework, as well as other important systems like Tragaldabas, an installation for the study of cosmic air showers located in Santiago de Compostela, Spain, or the nuclear reactions line and detection system of the Tandem accelerator of the CTN, Lisbon.

Authors and Co-Authors : P. Cabanelas, H. Álvarez-Pol and Y. González-Rozas

Presenter : P. Cabanelas

Registrant ID : 39

CHUDOBA, Vratislav

Title of oral presentation : The EXPERT project at the Super-FRS fragment separator

Abstract of oral presentation : The experiment EXPERT (EXotic Particle Emission and Radioactivity by Tracking) is a part of the physics program of the Super-FRS Experiment Collaboration [1,2] which will be the backbone facility of the NUSTAR Collaboration of the FAIR project for research with exotic nuclei. The Super-FRS will be used for production and transmission of separated isotopes to three experimental areas, and it can be also used as a stand-alone experimental device together with experiment-dedicated detectors.
The EXPERT experiments are aimed at studies of unknown exotic nuclear systems in the most-outer part of the nuclear landscape. One of the major goals of modern nuclear physics is to establish a map of nucleon-stable nuclei. However, nuclear systems beyond the drip-lines demonstrate individual states as well. The unbound nuclei can be studied in nuclear reactions either by invariant-mass method or, alternatively, by their decays in-flight when tracking trajectories of the decay fragments and reconstructing their decay vertices. Beyond the proton drip-line, proton radioactivity prevails, and few nuclides with two-proton (2p) emissions have been observed as well. Such 2p precursors allow for studies of 2p correlations in nuclei. Four- and six- proton precursors are also expected in the extremely proton-rich nuclei. Neutron (n) radioactivity has not been observed yet, mainly due to the fact that the drip line is reached only for light isotopes where only low angular-momentum orbitals are involved. Because of the n-n pairing interaction, some 2n-precursors are expected to be stable with respect to the 1n emission. Their decays should have much longer half-lives due to higher three-body centrifugal barriers.
The EXPERT experiments will use the first half of the Super-FRS as a radioactive beam separator and its second half as a high-resolution spectrometer. The exotic nuclei of interest are expected to decay in flight, and outgoing fragments (i.e., precursor-like decay products) will be tracked and then identified by the spectrometer part. For this purpose, the EXPERT working group will equip the Super-FRS focal planes with dedicated particle (charged particles and neutrons) and gamma-ray detectors. Complementarily, 2p-radioactivity will be studied by using the Optical Time-Projection Chamber (OTPC) placed at the final focus of the Super-FRS. These two detection schemes of EXPERT will utilize the same radioactive beam simultaneously, and they can together cover half-life ranges from 10-12 to 1 s. Essential feature of the EXPERT is that the listed individual detectors will provide correlated information on decay products, which promises a significant synergy effect in analysis of the obtained data. The fragment-correlation method for extraction of rich information on nuclear structure and nuclear reaction mechanism will be reported as well.

References

[1] J. Äystö et al., “Experimental program of the Super-FRS Collaboration at FAIR
and developments of related instrumentation”, Nucl. Inst. Meth. Phys. Res. B 376 (2016) 111

[2] Super-FRS Collaboration, “Scientific program of the Super-FRS collaboration : report of the collaboration to the FAIR management”, DOI:10.15120/GR-2014-4

Authors and Co-Authors : V. Chudoba for the EXPERT/Super-FRS_Experiment Collaboration

Presenter : V. Chudoba

Registrant ID : 71

Dr. CLEVEN, Martin

Title of oral presentation : Properties of open and hidden charm meson in pionic matter

Abstract of oral presentation : With various experiments studying heavy-ion collisions a demand exists in the hadron physics community for theoretical predictions of hadronic properties at temperatures and densities far from standard nuclear physics scenarios. In this work we will study the implications of light-quark mesonic matter at finite temperatures on the open and hidden charm mesons. We will apply a chiral unitary approach which accounts for coupled channels. The in-medium solution accounts for the change in self-energy that the mesons acquire from interacting with the surrounding light quark mesonic matter, most notably pions. Ultimately, the solutions to the corresponding Lippmann-Schwinger Equations will be used to calculate observables such as the spectral function or the pion-induced width.

Authors and Co-Authors : Martin Cleven, Volodymyr K. Magas, and Angels Ramos

Presenter : Martin Cleven

Registrant ID : 25

Mr. DOUMA, Christiaan

Title of oral presentation : Design of the NeuLAND VETO Detector

Abstract of oral presentation : NeuLAND is the neutron detector for the R3B experiment at the FAIR facility. It is a fully active detector
composed of plastic scintillator bars. Neutrons are detected by the production of charged particles in the scintillators through hadronic scattering. These charged particles are then detected by their scintillation light. Due to the highly granular design of NeuLAND, the primary neutron interaction points can be accurately reconstructed. These reconstructed points allow for kinematically complete reconstruction of reactions with relativistic heavy-ions beams, the goal of the R3B experiment. However, charged particles produced at the rest of the R3B setup provide a significant background. To distinguish the neutrons from the background, a VETO detector is placed in front of NeuLAND. This VETO detector is a single plane of thin plastic scintillator bars. It, therefore, provides a high detection efficiency for background particles, but a low efficiency for neutrons. Every signal in NeuLAND that is also detected by the VETO can then be given a negative trigger (VETO trigger) to prevent it from contributing to the background. In this contribution some results will be presented on the design of this VETO detector. Issues like the ideal distance to NeuLAND, required granularity and optimal thickness of the scintillator bars will be addressed. Different software solutions to decide which signals should be VETOed will also be discussed.

Authors and Co-Authors : C. A. Douma , J. Mayer, D. Kresan, N. Kalantar-Nayestanaki, K. Boretzky, C. Rigollet, I. Gasparic

Presenter : C. A. Douma

Registrant ID : 60

Mr. FARINELLI, Riccardo

Title of oral presentation : XYZ states at BESIII

Abstract of oral presentation : The BESIII Experiment at the Beijing Electron Positron Collider (BEPCII) gave a significant contribution to the charmonium-like states spectroscopy thanks to the large data sample in the center of mass energy region between 3.8 and 4.6 GeV. New and surprising resonant states have been discovered and their interpretation go beyond the traditional quark and anti-quark model paradigm of the charmonium, such as the two isospin triplet Z_c(3900) and Z_c(4020) that are electrically charged quarkonium-like states. In this talk, I will report recent studies on XYZ states made by BESIII and their connection, e.g. the radiative transition between them in the channel Y(4260)-->\gamma X(3872). Future perspectives for exotic states spectroscopy at BESIII will be also discussed.

Authors and Co-Authors : R. Farinelli, on the behalf of BESIII Collaboration

Presenter : R. Farinelli

Registrant ID : 30

Mr. FEIJOO ALIAU, Albert

Title of oral presentation : The NLO Chiral Lagrangian from the meson-baryon interaction in the S=-1 sector.

Abstract of oral presentation :
The precise SIDDHARTA value of the energy shift and width of kaonic hydrogen has awaken a renewed interest for the meson-baryon interaction in the S=-1 sector. Our study has been carried out based on a chiral SU(3) Lagrangian up to next-to-leading order (NLO) and implementing unitarization in coupled channels, since the presence of Lambda(1405) resonance makes not applicable a perturbative treatment of the Chiral Lagrangian in the energy region we are dealing with. The parameters of the model have been fitted to a large set of experimental K^- p scattering data in different two-body channels, to threshold branching ratios, and to the above cited data from SIDDHARTA . In contrast to other groups we take into consideration the K Cascade channels which are very important to obtain more reliable values of the fitting parameters, in particular the NLO coefficients. We have shown in [1,2] that the K^- p → K Cascade reactions are very sensitive to the NLO terms of the Lagrangian and also to the Born direct and cross diagrams. This fact is due to the null direct contribution of the Weimberg-Tomozawa (WT) term to the scattering amplitude of these particular reactions.
On the other hand, the K^- p → eta Lambda reaction has associated a pure isospin 0 (I=0) amplitude, and therefore, it constrains the relevance of the role played for each isospin component. In general, a good description in terms of the isospin decomposition is crucial to reproduce properly processes in which a single isospin component is filtered, such as for instance the (K_L)^- p --> K^+ Xi^0 reaction which could be measured at the proposed secondary K^0_L beam at Jlab and which is a pure I=1 process. Another interesting measurement is the Lambda_b → J/psi K Xi decay which filters I=0, as was studied in [3].

[1] A. Feijoo, V. K. Magas and A. Ramos, Phys. Rev. C 92 (2015) 015206.
[2] A. Ramos, A. Feijoo and V. K. Magas, Nucl. Phys. A 954 (2016) 58.
[3] A. Feijoo, V. K. Magas, A. Ramos and E. Oset, Phys. Rev. D 92 (2015) 076015.

Authors and Co-Authors : Àngels Ramos, Universitat de Barcelona
Volodymyr Magas, Universitat de Barcelona
Albert Feijoo, Universitat de Barcelona

Presenter : Albert Feijoo

Registrant ID : 50

Mr. FERNÁNDEZ-SOLER, Pedro

Title of oral presentation : Two-pole structure of the $D^\\ast_0(2400)$

Abstract of oral presentation : The Isospin $I=1/2$ and Strangeness $S=0$ sector interaction involving $D\pi$, $D\eta$ and $D_s\bar{K}$ channels in $J^P=0^+$ is studied in a unitarized chiral perturbation theory. We predict the volume dependence of the energy levels obtained when putting the interaction in a finite volume, obtaining a successful description of the results of a recent a LQCD calculation. We remark that no fit is done in this work since our parameters were fixed in a previous work, considering LQCD results involving light charmed pseudoscalar mesons in different (S,I) sectors. We find two poles in the energy region of the $D^\\ast_0(2400)$ resonance, and we study the evolution of the poles in the light-flavor SU(3) limit. This allows us to identify the lower pole as part of the same SU(3) multiplet as the $D^\\ast_{s0}(2317)$ state. The higher pole is close to the $D_s\bar{K}$ threshold, below, then we expect that it will provide a threshold enhancement in the $D_s\bar{K}$ mass distribution. We also predict partners in the bottom sector.

Authors and Co-Authors : Miguel Albaladejo, Pedro Fernandez-Soler, Feng-Kun Guo, Juan Nieves

Presenter : Pedro Fernández-Soler

Registrant ID : 23

Mr. GARCIA-MONTERO, Oscar

Title of oral presentation : Probing gluon saturation with next-to-leading order photon production at central rapidities in proton-nucleus collisions

Abstract of oral presentation : The cross section for photons emitted from quarks in proton-nucleus collisions at collider energies was obtained using the Color Glass Condensate framework, in the dense-dilute kinematics regime. We observe that the inclusive photon cross section is proportional to all-twist Wilson line correlators in the nucleus. These correlators also appear in quark-pair production; unlike the latter, photon production is insensitive to hadronization uncertainties and therefore more sensitive to multi-parton correlations in the gluon saturation regime of QCD.

Authors and Co-Authors : Sanjin Benic, Kenji Fukushima, Oscar Garcia-Montero, Raju Venugopalan

Presenter : Oscar Garcia-Montero

Registrant ID : 58

Ms. GUO, Rupan

Title of oral presentation : Charm physics at BESIII

Abstract of oral presentation : The BESIII Experiment at the Beijing Electron Positron Collider (BEPCII) accumulated the world's largest e+e- collision samples at 3.773, 4.009, 4.18 GeV. Based on analyses of D(s)+ to l+v, D0 to K(pi)-e+v, D+ to anti-K0(pi0)e+v, D+ to K^0_Le+v, D+ to K-pi+e+v and D+ to omega e+v, we report the determinations of CKM matrix elements |Vcs(d)|,the D(s)+ decay constants, the form factors of D semi-leptonic decays. These are important to calibrate the LQCD calculations of decay constant and form factors and to test the CKM unitarity. Using the quantum correlation property of D0D0-bar production, we determine the parameters of the strong phase difference and D0D0-bar mixing.

Authors and Co-Authors : BESIII Collaboration

Presenter : Rupan Guo for BESIII Collaboration

Registrant ID : 31

Mrs. HRTANKOVA, Jaroslava

Title of oral presentation : Calculations of antiproton-nucleus quasi-bound states based on the Paris $\bar{N}$N potential

Abstract of oral presentation : This contribution deals with our recent study of antiproton-nucleus quasi bound states [1] using the latest version of the Paris $\bar{N}N$ potential [2]. We construct the $\bar{p}$-nucleus optical potential based on the related S- and P-wave scattering amplitudes. The free amplitudes are modified by multiple scattering approach in order to account for Pauli correlations in the medium [3]. We discuss the energy dependence of the optical potential and evaluate the corresponding $\bar{p}$ binding energies and widths in selected nuclei by solving the Dirac equation. Next, we study the effect of the P-wave interaction and the implications for the antiproton-nucleus quasi-bound states.

References:

[1] J. Hrtankova, J. Mares, Proceedings of 12th International Conference on Low Energy Antiproton Physics (LEAP 2016), submitted to JPS Conference Proceedings.

[2] B. El-Bennich, M. Lacombe, B. Loiseau and S. Wycech, Phys. Rev. C 79 (2009) 054001.

[3] T. Wass, M. Rho and W. Weise, Nucl. Phys. A 617 (1997) 449.

Authors and Co-Authors : Jaroslava Hrtankova, Jiri Mares

Presenter : Jaroslava Hrtankova

Registrant ID : 4

Mr. HWANG, Sungmin

Title of oral presentation : Next-to-leading order corrections to the heavy quark potentials in the effective string theory

Abstract of oral presentation : We present the calculation of the next-to-leading order in the heavy quark-antiquark potentials within the framework of the effective string theory (EST). Elaborate arguments for employing the full effective field theory power counting as well as simplifying and reducing the number of dimensionful parameters of the EST in light of the symmetries are discussed. In the end, its implications in comparison to the lattice simulations are also discussed.

Authors and Co-Authors : Nora Brambilla, TUM
Sungmin Hwang, TUM
Antonio Vairo, TUM

Presenter : Sungmin Hwang, TUM

Registrant ID : 11

INGHIRAMI, Gabriele

Title of oral presentation : Magneto-hydrodynamic simulations of Heavy Ion Collisions with ECHO-QGP

Abstract of oral presentation : We present first results from 3+1 dimensional magneto-hydrodynamic simulations for RHIC and LHC energies. This approach allows to explore a multitude of interesting effects that are predicted when considering QCD matter in the presence of strong magnetic fields. Prominent among these effects, are the chiral magnetic effect, a shift of the deconfinement temperature and changes in the values of the light mesons masses. Hydrodynamic models, which in recent years have quite well reproduced many features of the experimental data, have been used also to study the influence of the magnetic field on the evolution of the Quark-Gluon Plasma. Nevertheless, so far the time evolution of the magnetic field itself has been treated separately from the evolution of the fluid. Therefore, there are still large uncertainties in the magnitude of the reachable magnetic field and its time evolution. We addressed this issue by consistently taking into account the interplay between the dynamics of the fluid and the magnetic field within the newly developed RMHD version of the ECHO-QGP code. We will show the results of several tests to validate its reliability. Then, we will present first applications to the study of heavy ion collisions.

Authors and Co-Authors : Gabriele Inghirami, Luca Del Zanna, Andrea Beraudo, Mohsen Haddadi Moghaddam, Francesco Becattini, Marcus Bleicher

Presenter : Gabriele Inghirami

Registrant ID : 66

Mr. KALWEIT, Alexander

Title of oral presentation : Overview of (ultra-)relativistic heavy-ion physics from SIS18 to LHC energies

Abstract of oral presentation : The current status of the field of (ultra-)relativistic heavy-ion physics from SIS18 to LHC energies is reviewed. In the collision of (ultra-)relativisitc heavy-ions, a dense and hot QCD medium is created which gives rise to interesting phenomena that can be described by many-body QCD and thermodynamic approaches. An overview of the recent key experimental results and their theoretical interpretation is given.

Authors and Co-Authors : Alexander Kalweit

Presenter : Alexander Kalweit

Registrant ID : 54

KORNAKOV, Georgy

Title of oral presentation : Measurements and understanding of properties of hot and dense nuclear matter with HADES

Abstract of oral presentation : Heavy ion collisions at few GeV per nucleon energy range create matter with densities several times larger that the ground density and heated to temperatures of 90 MeV. At such conditions the fundamental properties of the particles might be modified. Promising observables are the rare (multi-) strange particles and dileptons. The High Acceptance DiElectron Spectrometer was designed to measure rare and penetrating probes. It is a fix target experiment located at GSI, Darmstadt, Germany. The key measurements related to the in-medium properties of hadrons will be presented in this talk. The comparison of various observables obtained in elementary and heavy collisions show striking differences pointing to the fact that hot and dense matter is created already at low energies. In this contribution main emphasis will be put on most recent results on dileptons, strangeness and short-lived resonance production in Au+Au collisions at sqrt(Snn) = 2.42 GeV. Moreover, future experiments and upgrades of the apparatus will be discussed.

Authors and Co-Authors : Georgy Kornakov for the Hades Collaboration

Presenter : Georgy Kornakov

Registrant ID : 64

Dr. KRASSNIGG, Andreas

Title of oral presentation : Fundamental approaches to hadron spectroscopy

Abstract of oral presentation : In modern theoretical strong-interaction physics we face the challenge to investigate and describe hadrons based on the elementary degrees of freedom of Quantum Chromodynamics (QCD), a non-abelian gauge theory. QCD holds many interesting phenomena for us to study, some of which are accessible through perturbation theory. Central aspects of QCD like confinement and dynamical chiral symmetry breaking, however, necessitate the use of nonperturbative techniques. In fact, those are necessary already on the level of spectroscopic studies. I will present an overview of fundamental approaches to hadron spectroscopy with particular emphasis on meson properties and in connection with potential discoveries at the future PANDA experiment at FAIR.

Authors and Co-Authors : A. Krassnigg

Presenter : A. Krassnigg

Registrant ID : 32

Dr. LI, Feng

Title of oral presentation : Baryon-Rich QCD Matter and Astrophysics

Abstract of oral presentation : The spinodal instability, i.e. the self-amplified deviation from the equilibrium state during a first order phase transition, of the baryonic rich quark matter is studied by both using the linear response theory and solving the Boltzmann equations with the test particle method. The former approach includes the quantum effect but only works near equilibrium, while the second one is semi-classical but capable of describing a highly non-equilibrated system. In the first approach, we obtain both the spinodal boundaries of the unstable modes with different wavelengths and the growth rates of them at a certain temperature and baryon density in the early stage of phase separation. We find the spinodal boundaries shrink with the wavelengths of the unstable modes, and the spinodal instability is suppressed by a repulsive vector interaction. In the second approach, we study the spinodal instability of the baryonic rich quark matter in both a static box and an expanding fireball by investigating the time evolution of the quantities such as the scaled density moments, the event distribution of the particle numbers in a sub-volume, the event distribution of the anisotropic flows, and the dilepton yield.

Authors and Co-Authors : Feng Li and Che-Ming Ko

Presenter : Feng Li

Registrant ID : 29

Mr. MANEU, Jordi

Title of oral presentation : Hypernuclear decay of strangeness -2 hypernuclei

Abstract of oral presentation : Since the discovery in 1952 of the first strange fragment in emulsion chamber experiments, many efforts have been put in extending our knowledge of the nuclear chart, including the SU(3) sector. Worldwide, the study of the interactions among nucleons and hyperons has been a priority in the research plan of many experimental facilities. After more than sixty years of Λ-hypernuclear studies, some attention has moved to more strange systems, with the production of ΛΛ-hypernuclei and more recently, with proposals to study Ξ-hypernuclear spectroscopy.
Our main objective is to calculate the decay rate for the weak decay of ΛΛ-hypernuclei, including all the intermediate baryonic channels allowed by the strong interaction. I will focus on the analysis of the decay induced by the Λ hyperon, i.e., starting with a ΛΛ pair. The weak decay mechanism describing the two-body weak interaction is modelled by the exchange of mesons belonging to the ground state of pseudoscalar and vector octets.
The tree-level values for the baryon-baryon-meson coupling constants are derived using SU(3) symmetry for pseudoscalar mesons and the Hidden Local Symmetry for vector mesons. In the computation of the decay rate, the effects of the strong interaction on the initial state are introduced through the solution of a G-matrix equation, with the input of realistic baryon-baryon potentials, while the final hyperon-nucleon wavefunctions are obtained in an analogous way, by solving the corresponding T-matrix equation.
As a new development with respect to previous calculations[1] the G-matrix wavefunctions for the channels ΛΛ-ΛΛ and ΛΛ-ΞN have been implemented in the calculations. Furthermore, the transition potential for the weak ΞN-YN decay has also been derived, where Y can be either the Λ or Σ baryon. These two new ingredients have allowed us to obtain an update on the decay rate for the ΛΛ-ΛΛ-YN-Y'N channel as well as new results for the ΛΛ-ΞN-YN-Y'N channel, where Y' follows the same criteria as Y.
[1] Novel weak decays in doubly strange systems; Parreno, A. and Ramos, A. and Bennhold, C. Phys.Rev. C65 (2002) 015205

Authors and Co-Authors : Jordi Maneu, Assumpta Parreño, Àngels Ramos

Presenter : Jordi Maneu

Registrant ID : 13

Ms. MOMOT, Ievgeniia

Title of oral presentation : Charge collection studies of silicon microstrips sensors for the CBM Silicon Tracking System

Abstract of oral presentation : The Silicon Tracking System (STS), the core detector of CBM experiment located in the dipole magnet. STS provides track reconstruction and momentum determination of charged particles originating from beam-target interactions. Amplitude response of the charge sensitive electronics to the interaction with charged particles will be used for the track reconstruction. The radiation load of the CBM experiment is expected to be 10^{14} 1 MeV n/cm$^2/$, which may have significant influence on the detector response. The STS will consist of eight planar tracking stations covering the aperture between the polar angles 2.5$\deg$< θ < 25$\deg$. At the outer part of detector where occupancy of particles is low exist possibility to cut signal with threshold. To reduce number of read-out channels in outer aperture of STS detector three different configurations of connection were tested: each strip corresponds to one r/o channel, every second strip is read-out, and when two strips connected to one r/o channel. The development of radiation tolerant prototype STS microstrip sensors irradiated will be reviewed. Results on signal to noise studies with the latest silicon sensor prototypes with different interconnection schemes between sensor and read-out electronics are addressed.

Authors and Co-Authors : Maksym Teklishyn (FAIR), Johann Heuser (GSI)

Presenter : Ievgeniia Momot

Registrant ID : 33

Dr. PAGURA, Valeria Paula

Title of oral presentation : Magnetic catalysis and inverse magnetic catalysis in nonlocal chiral quark models

Abstract of oral presentation : Over the last years the understanding of the behavior of strongly interacting matter under extremely intense magnetic fields has attracted increasing attention, due to its relevance for various subjects such as the physics of compact objects like magnetars, the analysis of heavy ion collisions at very high energies or the study of the first phases of the Universe. We study the behavior of strongly interacting matter under an external constant magnetic field in the context of nonlocal chiral quark models within the mean field approximation. We find that at zero temperature the behavior of the quark condensates shows the expected magnetic catalysis effect, our predictions being in good quantitative agreement with lattice QCD results. On the other hand, in contrast to what happens in the standard local Nambu−Jona-Lasinio model, when the analysis is extended to the case of finite temperature our results show that nonlocal models naturally lead to the Inverse Magnetic Catalysis effect.

Authors and Co-Authors : V. P. Pagura, D. Gómez Dumm, S. Noguera, N.N. Scoccola

Presenter : Valeria Paula Pagura

Registrant ID : 26

Mr. PAROTTO, Paolo

Title of oral presentation : Testing the hadronic spectrum in the strange sector

Abstract of oral presentation : Heavier resonances are continually being added to the hadronic spectrum from the Particle Data Group [1]. The existence of additional states is predicted by relativistic quark models [2, 3]. It has been suggested [4, 5] that further states might need to be included in the hadronic spectrum in order to improve the agreement between the hadron resonance gas model predictions and lattice QCD data. However, for some selected observables, the inclusion of these states worsens the agreement with the lattice results. We propose a new set of observables which allow us to test the predictions of the quark model, by dividing the new states according to their quantum numbers. This will help to clarify the situation and determine how many new states are needed.

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Authors and Co-Authors : Paolo Parotto, Jaquelyn Noronha-Hostler, Claudia Ratti

Presenter : Paolo Parotto

Registrant ID : 15

Mr. PARÍS LÓPEZ, Jordi

Title of oral presentation : Calculating hadron properties from dynamical hadronization within the Functional Renormalisation Group

Abstract of oral presentation : Within QCD hadrons are described as gauge-invariant relativistic bound states of quarks and gluons. The solution of corresponding bound state equations allows to calculate hadronic properties as e.g. masses and form factors. In this talk a fully Poincaré-covariant bound state equation derived from a Functional Renormalisation Group equation (the Wetterich equation) via dynamical hadronization is critically compared to the Bethe-Salpeter equation. Hereby different versions of the latter equation are obtained in differently sophisticated truncations to (i) the Dyson-Schwinger hierarchy and (ii) n-particle irreducible actions. The problem of analytically continuing to time-like momenta in these approaches is discussed. Some first preliminary results of the novel bound state equation will be shown.

Authors and Co-Authors : Jordi París-López
Reinhard Alkofer
Hèlios Sanchis-Alepuz

Presenter : Jordi París-López

Registrant ID : 51

PASZTOR, Attila

Title of oral presentation : The QCD phase diagram and lattice calculations

Abstract of oral presentation : I will review our current understanding of the phase diagram of QCD, from the point of view of first principle lattice calculations. Whenever possible, I will also make contact with the experimental efforts of the RHIC Beam Energy Scan Program.

Authors and Co-Authors : A. Pasztor, R. Bellwied, Sz. Borsanyi, Z. Fodor, J. Gunther, S. Katz, C. Ratti

Presenter : Attila Pasztor

Registrant ID : 72

PELLEGRINO, Jacopo

Title of oral presentation : Integrate Cloud with Distributed Computing at BESIII

Abstract of oral presentation : The BESIII experiment at BEPCII in Beijing is an electron-positron collision experiment to study Tau-Charm physics. Now BESIII has been running for several years and gathered more than 1PB raw data. In order to analyze these data and perform massive Monte Carlo simulations, a large amount of computing and storage resources is needed. The distributed computing system is based up on DIRAC and is in production since 2012. It integrates computing and storage resources from different institutes and variety of resource types such as cluster, grid, cloud or volunteer computing. About 15 sites from BESIII Collaboration all over the world joined this distributed computing infrastructure, giving a significant contribution to the IHEP computing facility. Nowadays cloud computing is playing a key role in the HEP computing field, due to its scalability and elasticity. Cloud infrastructures take advantages of several tools, such as VMDIRAC, to manage virtual machines through cloud managers according to the job requirements. With the virtually unlimited resources from commercial clouds, the computing capacity could scale accordingly to deal with any burst demands. In this talk general computing models will be discussed, with particular focus on the BESIII infrastructure. Moreover new computing tools and upcoming infrastructures will be addressed.

Authors and Co-Authors : J. Pellegrino for the BESIII Collaboration

Presenter : Jacopo Pellergrino

Registrant ID : 19

Mrs. PEROTTI, Elisabetta

Title of oral presentation : Extraction of Polarization Parameters from the Proton anti-Proton to Omega anti-Omega Reaction

Abstract of oral presentation : The upcoming PANDA experiment will make it possible to study the Proton anti-Proton to Omega anti-Omega reaction for the first time. Previous studies of spin variables in anti-hyperon hyperon production have given very interesting results, but have been restricted to single strangeness hyperons. The triple strangeness Omega hyperon is believed to be a spin 3/2 particle, which therefore carries more polarization parameters than a spin 1/2 particle. The aim of this presentation is to show how one still can retrieve the Omega polarization from the angular distribution of its decay together with that of the subsequent decay of the daughter Lambda hyperon.

Authors and Co-Authors : Elisabetta Perotti, Erik Thomé, Walter Andersson, Stefan Leupold, Karin Schönning, Tord Johansson

Presenter : Elisabetta Perotti

Registrant ID : 27

PORTILLO VAZQUEZ, Israel

Title of oral presentation : Susceptibilities from a black hole engineered EoS with a critical point

Abstract of oral presentation : Currently at the Beam Energy Scan at RHIC experimental efforts are being made to find the QCD critical point. On the theoretical side, the behavior of higher-order susceptibilities of the net-baryon charge from Lattice QCD may allows us to estimate its position via Taylor expansion of the density of states at $\mu_B=0$. However, even if the series expansion continues to higher-orders, there is always the possibility to miss the critical point behavior due to truncation errors.

An alternative approach to exploring the QCD critical point is using black hole engineering. This method allow us to obtain susceptibilities fitting the lattice data at $\mu_B=0$ but also can be expanded out to extremely large baryonic chemical potentials as well. Additionally, in the black hold engineered EoS there is a clear critical point at $\mu_B=725$ MeV and $T=80$ MeV. In this talk, we obtain the freeze-out line and compare it with the hadron resonance gas model, lattice calculations, and experimental data. We also explore fluctuations at the lowest energies at the beam energy scan to see if there are signatures of the critical point.

Authors and Co-Authors : Israel Portillo, Jacquelyn Noronha-Hostler, Jorge Noronha, Claudia Ratti, Romulo Rougemont, Stefano Ivo Finazzo, Renato Critelli

Presenter : Israel Portillo

Registrant ID : 48

Dr. PRENCIPE, Elisabetta

Title of oral presentation : Open charm physics: from e+e- experiments to ppbar machines

Abstract of oral presentation : The charm spectrum is still not completely understood. This talk intends to summarize the most interesting experimental results in open charm physics, achieved by the past e+e- experiments, and show some new theoretical developments, in particular for Ds mesons. After the observation of the Ds2317, more than 10 years ago, still questions remain opened due to the poor knowledge of experimental results. The measurement of the width of narrow states below the D(*)K threshold in this respect is essential for a better understanding: a technique to measure it will be shown, and an overview on new future facilities where this measurement can be achieved will be given. In particular, we will focus on the role of the future PANDA experiment at FAIR, and the original contribution of this project in the measurement of very narrow widths.

Authors and Co-Authors : Elisabetta Prencipe

Presenter : Elisabetta Prencipe

Registrant ID : 46

Dr. PÉREZ-OBIOL, Axel

Title of oral presentation : Coordinate space potential for the Lambda N --> NN interaction at next-to-leading order in EFT

Abstract of oral presentation : The next-to-leading order potential in coordinate space,
which drives the weak decay of most hypernuclei,
is derived within the effective field theory formalism.
It is organized into all the possible spin and isospin operators
contributing at this order, and explicit expressions for the coefficients
of each operator are given in analytical form.
All the contributions are plotted and compared, and the relevance
of explicitly including the mass differences among the baryons entering
the two-pion-exchange diagrams is discussed.

Authors and Co-Authors : Axel Pérez-Obiol, David R. Entem, Bruno Juliá-Díaz, Assumpta Parreño

Presenter : Axel Pérez-Obiol

Registrant ID : 17

Dr. RODRIGUEZ SANCHEZ, Jose Luis

Title of oral presentation : Excitation of baryon resonances in isobaric charge-exchange reactions of heavy-exotic nuclei

Abstract of oral presentation : Nucleonic excitations play an important role in many and diverse facets of nuclear science such as the definition of three body forces[1], the quenching of the Gamow-Teller strength[2], or the description of relativistic heavy-ion collisions by using transport codes[3]. Recently, it has been also pointed out the direct role of the lowest-energy nucleon excitations, the so-called Δ-isobars, in the composition of neutron stars[4]. Recent constraints of the symmetry energy at saturation density and its density derivative favor the appearance of Δ-isobars in β-stable nuclear matter at densities around three times the saturation density, even below the limit for hyperon formation.

In this work, isobaric charge-exchange reactions induced by tin projectiles in thin targets of C, CH2, Cu, and Pb at energies of 1A GeV were used to investigate the baryon-resonance production. These reactions were measured by using the fragment separator spectrometer FRS [5] at GSI (Darmstadt). The excellent momentum resolution of the FRS allowed to obtain with high accuracy the missing-energy distributions of the residual nuclei, in particular, for the (p,n) and (n,p) charge-exchange channels. These missing-energy distributions show two components corresponding to the quasi-elastic and inelastic charge-exchange channels, which are used to extract information about the produced resonances (widths, masses, production cross sections, etc), as well as information about in-medium nuclear matter effects. Finally, the new ideas for the investigation of baryon resonances at the Super-FRS/FRS will be presented, in particular, the experiments of 2018.

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[2] C. Ellegaard et al., Phys. Rev. Lett. 50, 1745 (1983).
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[4] A. Drago et al., Phys. Rev. C 90, 065809 (2014).
[5] H. Geissel et al., Nucl. Instr. Meth. B 70, 286 (1992).

Authors and Co-Authors : Jose-Luis Rodriguez-Sanchez

Presenter : Jose-Luis Rodriguez-Sanchez

Registrant ID : 45

Mr. ROETHER, Florian

Title of oral presentation : Construction of Multi Wire Proportional Chambers for the CBM Transition Radiation Detector

Abstract of oral presentation : The Compressed Baryonic Matter (CBM) experiment at the future Facility for Antiproton and Ion Research (FAIR) will explore the QCD phase-diagram in the region of high net-baryon densities. The Transition Radiation Detector (TRD) with its multi-layer-design will provide electron identification for higher momenta and contribute to the global particle tracking. In this talk, we will examine the underlying operating principle of a TRD in general and how the requirements of the experiment affects the detector design as well as the construction of our first large full size prototypes. Eventually we will analyse the detector performance by data obtained at beamtimes at CERN and DESY.

Authors and Co-Authors : Florian Roether, Christoph Blume, Susanne Glaessel, Cyrano Bergmann, Philipp Kähler

Presenter : Florian Roether

Registrant ID : 37

Mr. ROSE, Jean-Bernard

Title of oral presentation : Shear viscosity and entropy of a hadron gas

Abstract of oral presentation : Microscopic non-equilibrium dynamics are used to calculate the transport coefficients of dense hadronic matter. Specifically, the shear viscosity to entropy density ratio is investigated, and its temperature dependence between 75 MeV and 175 MeV is explored, and the effects of non-zero baryon and strange chemical potentials are probed. This is important to constrain the value of shear viscosity over entropy density used in hydrodynamic calculations of heavy ion reactions at RHIC and the LHC, and will provide interesting insight into physics of finite μ_{B} such that will be investigated at FAIR. Calculations are initialized using the corresponding particle densities computed from a thermal model in a hadronic box simulating infinite matter. After an appropriate equilibration delay, the shear viscosity η is computed using the Green-Kubo formalism. The entropy density s is obtained using the Gibbs formula and dN/dp spectral fitting to obtain the final (equilibrated) temperatures and chemical potentials of the system. As a check, the results for the entropy and shear viscosity of a massive and massless pion gas are compared to analytic estimates. The shear viscosity to entropy density ratio η/s is found to be significantly lower than found in previous similar calculations by Demir & Bass, but in qualitative agreement with other calculations using other methods by Romatschke & Pratt and Song, Bass & Heinz. This will be the starting point for the calculation of more transport coefficients as functions of T and μ_{B}.

Authors and Co-Authors : Jean-Bernard Rose, Dmytro Oliinychenko, Juan Torres-Rincon, Hannah Petersen

Presenter : Jean-Bernard Rose

Registrant ID : 6

SECK, Florian

Title of oral presentation : Thermal Dileptons as Fireball Probes at SIS Energies

Abstract of oral presentation : Electromagnetic probes are an ideal tool to probe the extreme forms of strongly interacting matter excited inside the fireball of a heavy-ion collision.

They are emitted during the whole course of the collision event and decouple from the collision zone due to their small interaction probability once they are produced. Thus, they transmit information about the properties of matter produced inside the hot and dense fireball to the detector which gets irretrievably lost in the spectra of final state hadrons due to rescattering.

In particular, the yield of thermal low-mass dileptons was identified to be sensitive to the fireball lifetime, while the slope in the intermediate-mass region of the dilepton invariant-mass spectrum can serve as a thermometer which is unaffected by blue-shift effects caused by the collective expansion of the medium [1].

Realistic thermal dilepton emission rates and an accurate description of the fireball's space-time evolution are needed to properly describe the contribution of in-medium signals to the dilepton invariant-mass spectrum.

Utilizing a coarse-graining method we extract local temperature, baryon and pion densities from hadronic transport simulations of different collision systems at SIS energies. These serve as an input for the calculation of the pertinent radiation of thermal dileptons based on an in-medium rho spectral function that describes available spectra at ultrarelativistic collision energies.

The obtained yields and slopes of the invariant-mass spectra [2] will be compared to the excitation function of the lifetime and temperatures of the fireball established at higher energies [1]. The results can serve as a baseline for future explorations by the HADES and CBM experiments at FAIR as well as the RHIC beam energy scan phase II.

[1] R. Rapp and H. van Hees: Phys. Lett. B 753 (2016) 586.
[2] T. Galatyuk, P. M. Hohler, R. Rapp, F. Seck and J. Stroth: Eur. Phys. J. A 52 (2016) 131.

Authors and Co-Authors : Florian Seck,
Tetyana Galatyuk,
Ralf Rapp,
Joachim Stroth

Presenter : Florian Seck

Registrant ID : 7

Dr. SEGOVIA, Jorge

Title of oral presentation : Numerical determination of Electric Dipole Transitions in Quarkonium using potential nonrelativistic QCD

Abstract of oral presentation : Electric dipole (E1) and magnetic dipole (M1) transitions have been studied since the early days of hadron spectroscopy because they are a suitable experimental tool to access the lowest spectrum of heavy quarkonium. Moreover, these transitions are also interesting because particular regions of the hadrons' wave function can be checked and thus their internal structure and dynamics are exposed.

The E1 (and M1) electromagnetic transitions have been treated for a long time by means of potential models that basically use nonrelativistic reductions of QCD-based quark-quark interactions. However, the progress made in effective field theories (EFTs) for studying heavy quarkonia and the new large set of accurate experimental data taken in the heavy quark sector by B-factories (BaBar, Belle and CLEO), tau-charm facilities (CLEO-c, BESIII) and even proton-proton colliders (CDF, D0, LHCb, ATLAS, CMS) ask for a systematic and model-independent analysis.

This contribution contains the first numerical computation of the complete set of relativistic corrections of relative order v^{2} for electric dipole (E1) transitions in heavy quarkonium; in particular, for the processes $\chi_{bJ}(1P) \to \Upsilon(1S) + \gamma$ with $J=0,\,1,\,2$. We assume
that the heavy mesons involved in the reactions lie in the weak-coupling regime of a low-energy effective field theory called potential nonrelativistic QCD (pNRQCD) and thus a full perturbative calculation can be performed.

Authors and Co-Authors : Sebastian Steinbeisser, Jorge Segovia, Antonio Vairo and Nora Brambilla

Presenter : Sebastian Steinbeisser (or Jorge Segovia)

Registrant ID : 65

Dr. SELYUZHENKOV, Ilya

Title of oral presentation : The Compressed Baryonic Matter experiment at FAIR

Abstract of oral presentation : An overview of the Compressed Baryonic Matter (CBM) experiment at the future Facility for Antiproton and Ion Research (FAIR) with an emphasis on its physics program will be given

Authors and Co-Authors : Ilya Selyuzhenkov for the CBM Collaboration

Presenter : Ilya Selyuzhenkov

Registrant ID : 69

Mr. STEFANESCU, Ionut-Catalin

Title of oral presentation : AstroBox2E: A detection system for very low-energy β-delayed proton decay

Abstract of oral presentation : To study very low-energy β-delayed proton decay branchings, which are of interest for astrophysics, is essential to achieve an efficient suppression of β-background. Energetic precursor nuclei are identified and then stopped into the gas volume of the detector. The resulting β or β-proton decay traces are ionizing paths in the gas. The ionization electrons are drifted in an electric field and are amplified with a Micro Pattern Gas Amplifier Detector (MPGAD). High gain and signal to noise ratio are expected to be obtained.
The two predecesors of this detection system which is under construction now in our group are AstroBox and AstroBox2, which were built and commissioned at Texas A University. The goal of this project is to build and use AstroBox2E at European facilities.

Authors and Co-Authors : Ionut-Catalin Stefanescu

Presenter : Ionut-Catalin Stefanescu

Registrant ID : 35

Mr. STEINERT, Thorsten

Title of oral presentation : Quark susceptibilities in a generalized quasiparticle model

Abstract of oral presentation : The QCD equation of state as predicted by lattice QCD calculations (lQCD) is well reproduced in terms of effective quasiparticle models. These models so far fail to describe the susceptibilties and underestimate the pressure at finite densities. We present a generalised quasiparticle model where the partonic propagators explicitly depend on the three-momentum with respect to the medium. Within this extended model we reproduce simultaneously the equation of state and the susceptibilties as provided by lQCD. We calculate the shear and bulk viscosity as well as the electric conductivity and compared them to default quasiparticle models. We find a good agreement between our model and available lattice data for all transport coefficients.

Authors and Co-Authors : Thorsten Steinert, Wolfgang Cassing

Presenter : Thorsten Steinert

Registrant ID : 70

Mrs. SZALA, Melanie

Title of oral presentation : Higher-Order Moments of Proton-Number Fluctuations in Au+Au Collisions at 1.23A GeV measured with HADES

Abstract of oral presentation : The HADES experiment investigates heavy-ion collisions at low beam energies. By varying the collision system and the beam energy of heavy-ion collisions one can access broad areas of the phase diagram of strongly interacting matter.
In particular, higher order moments of conserved quantities (e.g. baryon number, charge, strangeness) are predicted to be sensitive to a first order phase transition and especially to a critical end point of the QCD phase diagram. Strong critical fluctuations would indeed modify these moments resulting in deviations from a Poisson distribution.

In the analysis of Au+Au collisions at √□□□ =2.41 GeV measured with HADES in 2012 the experimental efficiency correction is an important step in obtaining the higher order moments of the proton number distribution. For this purpose detailed investigations of efficiency correction methods were performed with Au + Au UrQMD events and GEANT simulations. Two different approaches were tested: correction of the moments and unfolding of the distributions. After their successful investigation in the simulation the two methods were applied to the HADES experimental data and the higher moments of the proton distributions were extracted. It is shown that the two methods provide plausible and consistent results in the Au + Au data.

Experimentally measured dynamical event-by-event fluctuation signals such as cumulants of (net-)particle distributions can also be modified by the fluctuations of the number of participants for a given centrality selection. To correct data for these volume fluctuations we applied the procedure of Skokov et al. on the higher order moments.
Since the targeted conservation parameter is the baryon number, the (net-)proton number can be used representatively at higher radiation energies. At the low energies available at SIS18 many light nuclei are produced however.
In order to investigate the influence of the bound protons on the higher moments the protons bound in deuterons are added to the analysis of the proton number.

Authors and Co-Authors : M. Szala, Dr. R. Holzmann

Presenter : Melanie Szala

Registrant ID : 41

Mr. VOCKERT, Marco

Title of oral presentation : CONCEPTION OF AN IMPROVED SI(LI)-COMPTON POLARIMETER FOR THE SPARC COLLABORATION

Abstract of oral presentation : The study of particle and photon polarization phenomena occurring in the interaction of fast ion and electron beams with matter is of particular relevance for the understanding of cosmic and laboratory plasmas where high temperatures, high atomic charge-states and high field strengths prevail. In addition, polarization-sensitive studies of radiative processes in highly-charged, heavy ions may provide detailed insights in both relativistic particle dynamics as well as QED effects and other atomic structure properties at extreme electromagnetic field strengths. Moreover, x-ray polarimetry was proposed as a tool for diagnosis of spin-polarized ion beams. Owing to the recent progress in x-ray detector technology, accurate measurements of the linear polarization for hard x-ray photons as well as the determination of the polarization orientation have become possible.
To strengthen the instrumentation portfolio in line with the scientific program of the SPARC pillar of FAIR a novel Si(Li)-Compton polarimeter was build and recently commissioned in a test experiment at the ESR storagering at GSI accelerator facility. I will present a preliminary analyses of the data obtained with the new instrument.

Authors and Co-Authors : M. Vockert, G. Weber, U. Spillmann, T. Krings, T. Stöhlker

Presenter : M. Vockert

Registrant ID : 38

Mr. WALLBOTT, Paul Christian

Title of oral presentation : Progress on calculating tetraquarks from Bethe-Salpeter and Dyson-Schwinger equations

Abstract of oral presentation : Panda will provide new insight to the charmonium spectrum around threshold, and in particular for quantum numbers that are not typically probed in electron positron collisions. Therein, numerous new states have been found. However, they still lack satisfactory explanation. Prominent examples are the XYZ states. In some cases the properties suggest at a minimum four quarks; the so-called tetraquarks.
To describe these bound states of the strong force, mainly lattice QCD and potential models have thus far been used. We develop an approach that allows the calculation of four quark states with continuum QCD methods, namely the BSEs and DSEs. In recent years it has already successfully been applied to the full meson and baryon sector, as well as the scalar tetraquarks.

Authors and Co-Authors : Eichmann, Fischer, Heupel, Wallbott

Presenter : Paul Christian Wallbott

Registrant ID : 53

Mr. WANG, Weiping

Title of oral presentation : Lambda_c physics at BESIII

Abstract of oral presentation : Lambda_c pair production cross section near its threshold is measured in high precision, and an enhancement of cross section near threshold is firstly observed. In addition, the absolute Branching fractions of 12 Cabibbo-favored hadronic decay channels of Lambda_c are measured. BESIII also measured the absolute branching fraction of the semileptonic decay channel of Lambda_c. Moreover, several single Cabibbo-suppressed hadronic branching fractions are also studied at BESIII.

Authors and Co-Authors : BESIII Collaboration

Presenter : Weiping WANG

Registrant ID : 42

Ms. WEIL, Esther

Title of oral presentation : Progress on calculation of meson transition form factors within the Dyson-Schwinger framework

Abstract of oral presentation : Meson transition form factors are part of many decay and collision processes. As experiments continue to reduce uncertainties on such observables, it is important to match the effort on the theoretical side. To calculate these non-perturbative quantities we are using the framework of the Dyson-Schwinger and Bethe-Saltpeter equations. This is expected to have particular relevance for reducing the theoretical uncertainty on muonic g-2 and for constraining form factors relevant for the upcoming PANDA measurement. In addition form factors we calculate various rare leptonic decay rates.

Authors and Co-Authors : Esther Weil, Christian Fischer, Richard Williams, Gernot Eichmann

Presenter : Esther Weil

Registrant ID : 56

Dr. YANG, Xiaofei

Title of oral presentation : Precision laser spectroscopy and applications

Abstract of oral presentation : Through high resolution laser spectroscopy, achieved by the collinear overlap between a radioactive beam and one or more laser beams, we have access to multiple nuclear properties of ground/isomeric states of exotic nuclei far from stability, such as nuclear spins, nuclear magnetic and quadruple moments and charge radii [1]. These fundamental properties of exotic nuclei can provide major input for nuclear structure studies in different regions of the nuclear chart. There has been a renaissance in laser spectroscopy in the last 10 years with many new experiments being established at facilities around the world. These laser techniques can also be applied for the study of several interdisciplinary fields, such as fundamental physics, or material and life sciences [2].

Three different collinear laser spectroscopy experiments are currently available at ISOLDE. Two complementary high resolution laser spectroscopy setups, Collinear Laser Spectroscopy (COLLAPS) [3] and Collinear Resonant Ionization Spectroscopy (CRIS) [4,5], are devoted to high-precision measurements of nuclear ground-state properties for short-lived radioactive nuclei across the nuclear chart. A recently developed VITO (Versatile Ion-polarized Techniques On-Line) setup is dedicated to the production of polarized radioactive beams using laser techniques, to study the weak interaction for searches of new physics beyond the Standard Model, using asymmetric beta-decay measurements of polarized radioactive beams and for biophysics applications using beta-NMR on polarized radioactive beams implanted in liquids[6,7].

In this talk, using the three different laser spectroscopy techniques at ISOLDE as examples, the details of the collinear laser spectroscopy experimental techniques and its applications will be presented, together with recent results from the experiments at COLLAPS, CRIS, and VITO.

References:
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[5]K. M. Lynch et al., Phys. Rev. X, 4, 011055 (2014);
[6]P Velten et al., CERN-INTC-2014-062/INTC-P-426;
[7]M Kowalska et al., CERN-INTC-2016-026/INTC-I-168;

Authors and Co-Authors : Xiaofei Yang

on behalf of the COLLAPS, CRIS and VITO Collaborations at ISOLDE-CERN

Presenter : Xiaofei Yang

Registrant ID : 68

Ms. YU, Dan

Title of oral presentation : Physics at CEPC and tau measurement

Abstract of oral presentation : The CEPC is the next generation of the proposed Higgs factory. Colliding electron and positrons at center-of-mass energy of 240-250 GeV, the CEPC will deliver 1 Million clean Higgs boson event. Such a sample will leads to a 0.1-1% level accuracy in the absolute Higgs coupling measurement, and will limit the exotic Higgs decay branching ratio, generally to 0.1% level or even 10-6 level, and to measure the absolute width of Higgs boson to ~ 3% accuracy.
The general status and Higgs analysis will be reported in this talk. Several key performances and analyses will also be presented.

Authors and Co-Authors : Dan YU

Presenter : Dan YU

Registrant ID : 2

Mr. ZÖLLNER, Rico

Title of oral presentation : Holographically emulating sequential versus instantaneous disappearance of vector mesons in a hot environment

Abstract of oral presentation : In the frameset of the AdS/CFT correspondence, minor extensions of the soft-wall model are used to accommodate two variants of Regge trajectories of radial vector meson excitations. At non-zero temperatures, various options for either sequential or instantaneous disappearance of vector mesons as normalisable modes are found, thus emulating deconfinement at a certain temperature in the order of the (pseudo-) critical temperature of QCD. The crucial role of the blackness function, which steers the thermodynamic properties of the considered system, is highlighted.

Authors and Co-Authors : Rico Zöllner
Burkhard Kämpfer

Presenter : Rico Zöllner