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Book of Abstracts

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Λ_c^+ Electromagnetic Form Factors

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We have investigated the electromagnetic form factors of charmed Λ_c^+ baryon and the total cross sections of the $^{+-} \to {}_c^+\bar{\Lambda}_c^-$ reaction within the extended vector meson dominance model. By including the charmonium-like states □(4500), □(4660), □(4790), and the possible □(4900) state, the current experimental data can be well reproduced.

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$boldsymbol P$**-wave states** $boldsymbol T_{bb}^-$ **from diquarks**

□□ □[1]

[1] □□□□

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We investigate the P-wave states T_{bb}^- in the isospin singlet and three
excited modes [excitation occurring in the diquark $[bb]_{c1}^{s_1}$ (ρ-mode), antidiquark $[\bar{u}\bar{d}]_{c2}^{s_2}$ (r-mode) or between them (λ-mode)] from diquarks in a quark model. We analyze the dynamical behaviors of the diquark $[bb]_{c1}^{s_1}$, antidiquark $[\bar{u}\bar{d}]_{c2}^{s_2}$ and their correlations in the states T_{bb}^- by decomposing the interactions from various sources in the model. The absolute dominant color-spin configuration, more than 99%, in the ρ-mode
with 1^1P_1 is $[bb]_{\mathbf{\bar{3}}}^0[\bar{u}\bar{d}]_{\mathbf{3}}^0$. Its energy is lower by about 18 MeV than the threshold $\bar{B}\bar{B}$ so that it can establish a compact bound state. The chromomagnetic and meson-exchange interactions in the antidiquark $[\bar{u}\bar{d}]_{\mathbf{3}}^0$ are responsible for its binding mechanism. Two other excited modes are higher than their respective threshold. The color configuration $\mathbf{6} \otimes \bar{\mathbf{6}}$ need to be handled discreetly in the tetraquark states.

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Axion production in $\eta \to \pi\pi a$ decay

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The axion-like particle (ALP) production from the $\eta \to \pi\pi a$ decay is studied within the SU(3) chiral perturbation theory up to one-loop level. The unitarized decay amplitudes are also constructed to take into account the $\pi\pi$ final-state interactions. Detail analyses between the perturbative amplitudes and the unitarized ones are given in the phenomenological discussions. By taking the values

of the chiral low energy constants in literature, we predict the Dalitz distributions, the spectra of the $\pi\pi$ and $a\pi$ systems, and also the branching ratios of the $\eta \to \pi\pi a$ process by varying m_a from zero to $m_\eta - 2m_\pi$.

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CMS □□Jpsijpsi□□□□□□□□□□□□

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Contact interaction study of proton parton distributions

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Using a symmetry-preserving formulation of a vector × vector contact interaction (SCI) and treating the proton as a quark + interacting-diquark bound state, whose structure is obtained by solving a Poincare covariant Faddeev equation, we provide a comprehensive, coherent set of predictions for unpolarised and polarised proton parton distribution functions (DFs): valence, glue, and four-flavour separated sea. The results enable many themes to be addressed, including: the asymmetry of antimatter in the proton; the neutron:proton structure function ratio; helicity retention in hard scattering processes; the charm quark momentum fraction; the sign and size of the polarised gluon DF; and the origin of the proton spin. In all cases where sound analyses of data are available, SCI predictions are semiquantitatively in agreement with the results. Those mismatches which exist are typically attributable to the momentum-independence of the underlying interaction. Judiciously interpreted, the SCI delivers a sound and insightful explanation of proton structure as expressed in DFs.

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Cross-Channel Constraints on Resonant Antikaon-Nucleon Scattering

Cross-Channel Constraints on Resonant Antikaon-Nucleon Scattering

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Developing predictions for pion fragmentation functions

□□ □[1]

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Exploiting crossing symmetry, the pion valence quark distribution function (DF) is used to predict the pion fragmentation function (FF). In this way, a unified treatment of the pion DFs and FFs was

accomplished. The significance of this work lies in that it is the first prediction of FFs in any approach with a traceable connection to quantum chromodynamics (QCD), and it also gives insights into the link between two fundamental phenomena in QCD: Emergent Hadron Mass (EHM) and confinement.

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Exclusive photoproduction of heavy vector mesons

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Exclusive photoproduction of heavy vector mesons from the proton is widely assumed to proceed via mechanisms that are sensitive to glue physics in the target proton. It was once thought that vector meson dominance could be used to relate this photoproduction process to the in-proton expectation value of the trace anomaly in quantum chromodynamics (QCD); hence, to deliver insights into the character of emergent hadron mass. That is now known to be false. Nevertheless, some consider that it may still be possible to interpret near-threshold heavy meson production using generalised parton distributions (GPDs) and therewith gain access to in-proton gluon gravitational form factors. There are arguments to the contrary, however. Using continuum Schwinger function methods, we show that it is possible to unify all J/psi photoproduction data, from threshold to very high energy, using a fully-dressed photon-to-quark+quark-to-J/psi transition amplitude, in which the dressed quarks communicate with their proton counterparts via Pomeron exchange. This being the case, then any interpretation of threshold J/psi production in terms of a proton mass radius is tenuous.

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Exporing Hexaquarks states from lattice QCD

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FDC[illegible]BESIII[illegible]

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BESIII[illegible]100[illegible]J/psi[illegible]30[illegible]psi(3686). [illegible]FDC[illegible]

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Flavor-spin symmetry of the P_c/H_c and P_{cs}/H_{cs} molecular states

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Based on a contact lagrangian possessing the SU(3) flavor and SU(2) spin symmetries, we discuss the symmetry properties of the interactions among the heavy flavor meson-baryon P_c ($[n\bar{c}][nnc]$), P_{cs} ($[s\bar{c}][nnc]$ and $[n\bar{c}][nsc]$) systems and the baryon-baryon H_c ($[nnc][ncc]$), H_{cs} ($[nnc][scc]$ and $[nsc][ncc]$) systems (with $n = u, d$). The light quark components of the P_c (P_{cs}) and H_c (H_{cs}) systems have identical flavors, the interactions generated from the exchanges of light mesons in the P_c (P_{cs}) systems should be very similar to that of the H_c (H_{cs}) systems. We perform the single-channel and multi-channel calculations on the $P_c/P_{cs}/H_c/H_{cs}$ systems and introduce the SU(3) breaking effect to identify the different mass spectra among the P_c (H_c) and P_{cs} (H_{cs}) systems. We suggest two kinds of evidences for the existence of the flavor-spin symmetry among the heavy flavor molecule community, i.e., the mass arrangement of the $P_c/H_c/P_{cs}/H_{cs}$ and the similar binding energies of the heavy flavor meson-baryon (baryon-baryon) systems with the same contact potentials.

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Further study of c\bar{c}c\bar{c} system within a chiral quark model

□□ □[1]

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Inspired by the recent ATLAS and CMS experiments on the invariant mass spectrum of J/\psi J/\psi, we systematically study the c\bar{c}c\bar{c} system of J^{P}=0^{+}. In the framework of chiral quark model, we have carried out bound-state calculation and resonance-state calculation respectively by using Real-scaling method. The results of bound-state calculation show that there are no bound states in the c\bar{c}c\bar{c} with 0^{+} system. The resonance-state calculation shows that there are four possible stable resonances: R(6920), R(7000), R(7080) and R(7160). R(6920) and R(7160) are experimental candidates for X(6900) and X(7200), whose main decay channel is J/\psi J/\psi. It is important to note that the another major decay channel of R(7160) is \chi_{c0} \chi_{c0} , and the \chi_{c0} \chi_{c0} is also the main decay channel of R(7000), R(7080). Therefore, we propose to search experimentally for these two predicted resonances in the \chi_{c0} \chi_{c0} invariant mass spectrum.

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Heavy flavor spectroscopy study at LHCb

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Studies on the spectroscopy of hadrons containing heavy quark(s) can deepen our understanding of the internal structure and dynamics of hadrons, thus improving our knowledge on the strong interaction, which is largely limited due to the non-perturbative behavior of Quantum Chromodynamics at low-energy regime. The discovery of a series of exotic heavy hadrons containing more than three valence quarks in the last decades has reinforced its importance. The LHCb experiment has been making significant contributions to such studies thanks to the large dataset provided by LHC and

the delicate design of the detector. In this talk, a review of the heavy flavor spectroscopy study at LHCb will be presented.

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Hidden charmonium decays of spin-2 partner of X(3872)

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In this work, we investigated in detail the widths of the X_2 decaying to $J/\psi V$ ($V = \rho^0, \omega$) and to $\eta_c P$ ($P = \pi^0, \eta, \eta'$) using the effective Lagrangian approach. In calculations, we assume the X_2 as a molecular state of the $D^{*0}\bar{D}^{*0}$ and $D^{*+}D^{*-}$ with equal proportion. Moreover, we only consider the contributions from the triangle hadron loops made of the charmed mesons $D^{(*)}$ and $\bar{D}^*$.We found that the processes $X_2 \to J/\psi\rho^0$ and $\eta_c\pi^0$ are both isospin breaking, while the processes $X_2 \to J/\psi\omega$ and $\eta_c\eta$ (η') are of isospin conservation. We also investigated the dependence of the ratios between these widths on the X_2 mass and on the η-η' mixing angle, which may be good quantities for experiments. We hope that these calculation results would be checked experimentally in the future.

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Highlights of BESIII experiment

Highlights of BESIII experiment

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Investigating excited Omega_c states from pentaquark perspective

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[1] □□□□□□

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Inspired by the recent observation of new \Omega_c states by the LHCb Collaboration, we explore the excited Omega_c states from the pentaquark perspective in the quark delocalization color screening model. Our results indicate that the \Omega_c(3185) can be well interpreted as a molecular \Xi D predominated resonance state with J^P = 1/2^−. The \Omega_c(3120) can also be interpreted as a molecular \Xi_c^ *bar{K} state with J^P = 3/2^− and a new molecular state \Xi_c^ \bar{K}^* with J^P = 5/2^− and a mass of 3526 MeV is predicted, which is worth searching in the future. Other reported \Omega_c states cannot be well described in the framework of pentaquark systems in the present work. The three-quark excited state or the unquenched picture may be a good explanation,which is worth further exploration.

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J/Psi N scattering length

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In this presentation, I will show our recent results on calculating the gluon-exchange contribution to the $J/\Psi N$ scattering length via dispersion relations. Additionally, I will compare these results with others to facilitate further discussion.

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Lattice calculation of Ds* radiative decay width

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We perform a lattice calculation on the radiative decay of D_s^* using the (2+1) Wilson-Clover gauge ensembles generated by CLQCD collaboration. The radiative transition $D_s^* \to D_s\gamma$ and Dalitz decay $D_s^* \to D_s e^+e^-$ are studied respectively. After a continuous extrapolation under three lattice spacings, we finally obtain these decay widths with much reduced errors compared to previous study. A poorly-known decay width of D_s^* is also determined precisely taking into account the the experimental branching fraction.

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Light scalar mesons in semileptonic decay of charm meson at BESIII

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The nontrivial quark structure of light scalar mesons f0(500), f0(980) and a0(980) remains controversial for many years. In passed years, BESIII studied them via several semileptonic D decays (D0->a0(980)- e+nu, D+ -> a0(980)0 e+nu, Ds+ -> a0(980)0 e+nu, D+ -> f0(500)/f0(980)e+nu, D+ -> f0(500)mu+nu, Ds+ -> f0(500)/f0(980)e+nu). Especially, the measurement of D -> f0/a0 form factor could shed light on the nature of them. In this talk, I will review all studies about light scalar mesons via semileptonic D decays at BESIII. A short outlook would be given based on BESIII new data in the future.

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New insight into the exotic states strongly coupled with the $D\bar{D}^*$ from the T_{cc}^+

GuangJuan Wang[None] ; Zhi Yang[None] ; Jia-Jun Wu[None] ; Shi-Lin Zhu[None] ; Makoto Oka[None]

New insight into the exotic states strongly coupled with the $D\bar{D}^*$ from the T_{cc}^+

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Nucleon electroweak elastic and transition form factors

Nucleon properties are largely determined by the strong interaction; and a central aim of on-going experimental and theoretical efforts is to understand their structure as composite objects made of three valence light quarks. Electron+nucleon scattering is a well developed experimental technique in such studies and it has delivered, for instance, precise measurements of nucleon electromagnetic and transition form factors. An entirely new window onto nucleon and baryon structure is opened when one uses neutrino scattering. Indeed, reliable predictions of nucleon (N) and N-to-Δ(1232) electroweak form factors are crucial for understanding new-generation long-baseline neutrino oscillation experiments. Recent developments within the framework of continuum Schwinger function methods (CSMs) have enabled practitioners to deliver the first Poincaré-invariant parameter-free predictions for such form factors. Where data are available, the predictions confirm the measurements. More importantly, the results are serving as motivation for new experiments at high-luminosity facilities. This presentation will describe nucleon electroweak elastic and transition form factors. Solving QCD is a hard problem and a many-pronged approach offers the best hope for success.

Nucleon electroweak elastic and transition form factors

1

Octet baryon and heavy meson interaction in chiral effective field theory

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Studies into baryon-meson interactions reveal significant insights into quantum chromodynamcis (QCD) at hadronic scales, forming a critical foundation for advancing hadron spectroscopy. We calculate the effective potentials of octet baryon and heavy meson systems using the chiral effective field theory up to the next-to-leading order. The low energy constants (LECs) are correlated with those of the \bar{N}N interaction using a quark-level Lagrangian approach. Our research provides

new insights into several near-threshold charmed baryons [e.g., \Lambda_{c}(2940), \Xi_{c}(3055), and \Omega_{c}(3188), etc.] around 3 GeV from the hadronic molecular perspective. We also identify several molecular states, designated as \Xi_{c}, within the mass range of 3100-3500 MeV.

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On the photoproduction of X(3872): insights from open-charm coupled-channel mechanism

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Hidden-charm exotic hadrons such as X(3872) can be produced through the exclusive X(3872) photoproduction. The vector meson dominance model has been commonly employed in estimating the cross sections of such processes. However, the coupled-channel production mechanism through open-charm meson-baryon intermediate states may play a crucial role. To assess the significance of such contributions, we estimate the cross section assuming the coupled-channel mechanism. For energies near the threshold, the total cross section is predicted to be of tens of nanobarns, which can be measured at future experimental facilities. Furthermore, the open-charm coupled-channel mechanism leads to a distinct line shape of the total cross section that can be utilized to reveal the production dynamics.

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Overview of Bell and Bell II results

[None]

Overview of Bell and Bell II results

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Partial wave effects in the heavy quarkonium radiative electromagnetic decays

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In a previous paper, it was pointed out that the wave functions of all particles are not pure waves, besides the main partial waves, they all contain other partial waves. It is very interesting to know what role these different partial waves play in particle transitions. Therefore, by using the Bethe-Salpeter equation method, we study the radiative electromagnetic decays $\psi \to \gamma\chi_{cJ}$ and $\Upsilon \to \gamma\chi_{bJ}$ $(J = 0, 1, 2)$. We find that for the S and P wave dominated states, like the $\psi(2S)$, $\Upsilon(2S)$, $\chi_{cJ}(1P)$,

and $\chi_{bJ}(1P)$ etc., the dominant S and P waves provide main and nonrelativistic contrition to the decays; other partial waves mainly contribute to the relativistic correction. For the states like the $\psi(1D)$, $\Upsilon(2D)$, $\chi_{c2}(1F)$, and $\chi_{b2}(1F)$ etc., they are the $S-P-D$ mixing state dominated by D wave or the $P-D-F$ mixing state dominated by F wave. Large decay widths are found in the transitions $\psi(2D)\to\chi_{c2}(1F)$, $\Upsilon(1D)\to\chi_{bJ}(1P)$, and $\Upsilon(2D)\to\chi_{bJ}(2P)$ etc., which may be helpful to study the missing states $\chi_{c2}(1F)$, $\Upsilon(1D)$, and $\Upsilon(2D)$.

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Pion Boer-Mulders function

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The leading-twist transverse momentum dependent distribution functions (TMDs) of the Pion, the unpolarized TMD and the transversely polarized Boer-Mulders function, were predicted by using a symmetry-preserving contact interaction (SCI) based on Dyson-Schwinger equations (DSEs). To account for the non-zero Boer-Mulders function, arising from the final state interaction between the quark and antiquark, one gluon exchange approximation was employed. The calculations were completed by using both Feynman diagram and pion light front wave functions. Finally, the comparison of different model calculations was performed accompanied by a discussion on the model-independent positivity relation constraining unpolrized TMD and Boer-Mulders function.

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Polarization analysis of two baryons with various spin combinations produced in electron-positron annihilation

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We developed a method to analyze the polarization correlations of two baryons $B_1\bar{B}_2$ with various spin combinations in the annihilation process. We established spin density matrices for arbitrary spins in standard and Cartesian forms, and demonstrated their application in the helicity formalism. This paper provides parametrization schemes for the helicity amplitudes and details the analysis of two baryons with spin combinations of (1/2, 1/2), (1/2, 3/2), and (1/2, 5/2). We also illustrated methods for determining the spin and parity of the excited baryon $\bar{\Xi}^{*+}$ using the $e^+e^-\to\gamma^*/\psi\to\Xi^-\bar{\Xi}^{*+}$ process as an example. Our research offers broad opportunities for exploring the baryon spectrum and transition form factors in electron-positron annihilation.

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Productions of XYZ states in B decay

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waiting

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Rethinking the molecular a1(1420) and its partners in low lying axial-vector meson spectrum

[illegible][None]

In this talk, I will present our recent study on the low lying axial-vector meson spectrum, which is an extention of our study on eta1(1855).

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Revisiting O(N) σ model at unphysical pion masses and high temperatures

[illegible][1]

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Roy-equation analyses on lattice data of ππ scattering phase shifts at m_π = 391MeV reveals that the lowest f0 meson becomes a bound state under this condition. In addition, there is a pair of complex poles below threshold generated by crossing symmetry [1]. We use the N/D method to partially recover crossing symmetry of the O(N) σ model amplitude at leading order of 1/N expansion, and qualitatively reproduce the pole structure and pole trajectories with varying pion masses as revealed by Roy-equation analyses. The σ pole trajectory with varying temperature is also discussed and found to be similar to its properties when varying m_π . As the temperature increases, the complex σ poles firstly move from the second Riemann sheet to the real axis becoming two virtual state poles, and then one virtual state pole moves to the first sheet turning into a bound state pole and finally tends to the pion pole position at high temperature which is as expected from the chiral symmetry restoration. Our results provide further evidences that the lowest f0 state extracted from experiments and lattice data plays the role of σ meson in the spontaneous breaking of chiral symmetry. Finally, we also briefly discuss the problems of the effective potential in the situation when m_π and temperature get large.

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Status and prospect of electron ion collider in China

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[illegible]99%[illegible],[illegible], [illegible]QCD[illegible]-[illegible](Electron Ion Collider, EIC)[illegible]EIC in China, EicC[illegible]EicC[illegible]

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Study of the tetraquark states

[redacted][1]

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In the present work, we use the coupled channel formalism to investigate the mass spectrum of the tetraquark states. Starting from the local hidden gauge symmetry and considering the t- and u-channels, the two-body interaction potentials are evaluated, and then, the scattering amplitude is calculated with the coupled channel Bethe-Salpeter equation, where one can look for the resonance pole in the second Riemann sheet. In the heavy sector with strangeness, some results for the molecular states are shown.

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Study on the non-trivial spectra of $\eta(1405/1475)$ decay

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We study the latest non-trivial resonant line-shape of $\eta(1405/1475)$ in the $K\bar{K}\pi$ invariant mass spectrum measured by the BESIII. The possible existence of two isoscalar pseudoscalars around 1.4 ~1.5 GeV is in contradiction with the nonet structure in the SU(3) flavor symmetry. Nevertheless, the glueball assignment of the outnumbering state is not favored by the Lattice QCD calculations. Trying to make the minimum assumptions based on the radial excitation picture, and taking into account the open channel effects in the decays of $\eta(1405/1475) \to K\bar{K}\pi$, such as the intermediate $K^*\bar{K} + c.c.$, $a_0\pi$, and $\kappa\bar{K} + c.c.$ channels, as well as the interference with $\eta(1295)$ and the non-resonant contributions, we can describe this non-trivial $K\bar{K}\pi$ spectrum with a set of reasonable parameters and without the introduction of an additional new state. Not only the total three-body and two-body spectra are fitted well, but also the shifted resonant line-shape of different partial waves of $K\bar{K}\pi$ decay. And with our best fitted parameters, we also have a good description on the $\eta\pi\pi$ spectrum. The mass of $\eta(1405)$ is fitted as 1.43 GeV, which is consistent with the peak positions in the γV spectra.

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The Progress of Super Tau-Charm Facility (STCF) in China

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The identification of the new state Y(3872) as the P-wave D\bar{D}^*/\bar{D}D^* resonance

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The BESIII Collaboration recently observed a new charmonium-like vector state Y(3872) in e^+e^- \rightarrow D\bar{D}^*, *which should be the first P-wave D\bar{D}^* molecular resonance. The experimental and theoretical identification of the P-wave dimeson state holds paramount importance in enhancing our comprehension of the non-perturbative QCD and few-body physics. Its existence is firmly established in a unified meson-exchange model which simultaneously depicts the features of the \chi_{c1}(3872), Z_c(3900) and T_{cc}(3875). This scenario can be directly examined in the e^+e^- \rightarrow D\bar{D}^*/\bar{D}D^* cross section to see whether a resonance exists at the threshold. The credibility of the investigations is also ensured by the fact that the P-wave interaction dominantly arises from the well-known long-range pion exchange. Additionally, the existence of the P-wave resonance only depends on the interaction strength and is less sensitive to the potential shapes. We extensively calculate all systems up to P-wave with various quantum numbers and predict a dense population of the D\bar{D}^/\bar{D}{D}^* and DD^* states, where the S-wave D\bar{D}^/\bar{D}{D}^* state with I^G(J^{PC})=0^-(1^{+-}), P-wave $D\bar{D}^/\bar{D}{D}^* state with I^G(J^{PC})=0^+(0^{-+}), and P-wave DD^* state with I(J^P)=0(0^-) are more likely to be observed in experiments.

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The relativistic three-body scattering and the D^0D^{*+}-D^+D^{*0} system

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Scattering amplitudes involving three-particle scattering processes are investigated within the isobar approximation which respects constraints from two- and three-body unitarity. The particular system considered is the D^0D^{+}-D^+D^{0}, where the D^{+}~(D^{0}) enters as a p-wave D^+\pi^0 or D^0\pi^+~(D^0\pi^0 or D^+\pi^-) resonance. The interaction potentials in the coupled-channel D^0D^{+}-D^+D^{0} system contain the \sigma, \rho, \omega and \pi-exchange. The analytic continuation of the amplitudes across the three-body unitary cuts is investigated to search for poles on the unphysical Riemann sheets. Associated with an unstable particle D^{+}~(D^{0}) is a complex two-body unitarity cut, through which one can further analytically continue into another unphysical Riemann sheet. Dynamical singularities emerged from the π-exchange potential are stressed. The pole generated from the D^0D^{+}-D^+D^{0} interaction and its line shape in D^0D^0\pi^+ break-up production are in agreement with double-charmed tetraquark T_{cc}^+ observed by the LHCb Collaboration.

The study on three-body systems \eta K^* \bar{K}^*, \pi K^* \bar{K}^* and K K^* \bar{K}^*by Faddeev fixed-center approximation.

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We study three-body systems \eta K^*bar{K}^*, \pi K^*bar{K}^* and K K^*bar{K}^* by Faddeev fixed-center approximation. Under fixed-center approximation framework, we can view a three-body system as a cluster which is generated by two particles in system and the third particle, where we view K^*bar{K}^*cluster as f_0(1710), a_0(1710) and f_2'(1525), respectively, and scatter \eta, \pi and K on K^*bar{K}^*. In module squared amplitude of three-body systems, we find \eta(2100) , \pi(2070) and \eta_2(1780) for \eta K^*bar{K}^*, \eta(2100), \pi(2070) and \pi _2(1880) for \pi K^*bar{K}^* and several new states for K K^*bar{K}^*. Our results offer some new views for some further states and exotic states.

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Theoretical study of the low-lying excited baryons

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Theoretical study of the low-lying excited baryons

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Unified unquenched quark model for heavy-light mesons with chiral dynamics

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We propose an unquenched quark model for describing the heavy-light mesons by taking into account the coupled-channel effects induced by chiral dynamics. After including a relativistic correction term for the strong transition amplitudes, both the mass spectra and decay widths of the observed heavy-light mesons can be successfully described simultaneously in a unified framework, several long-standing puzzles related to the small masses and broad widths are overcome naturally. We also provide valuable guidance in searching new heavy-light mesons by the detailed predictions of their masses, widths, and branching ratios.

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X(3872) Relevant D\bar{D}^* Scattering in $N_f = 2$ Lattice QCD

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We study the S-wave D\bar{D}^*(I=0) scattering at four different pion masses m_\pi ranging from 250 MeV to 417 MeV from N_f=2 lattice QCD. A bound state near the D\bar{D}^* threshold likely exists even after considering the possible left-hand cut effect due to the one pion exchange interaction. At m_\pi\approx 417 MeV where the effective range expansion is valid, the compositeness of the bound state is X\approx 1 and indicates a predominant D\bar{D}^* component. This state may correspond to X(3872). On the other hand, our results of the finite volume energies also hint at the existence of a 1^{++} resonance below 4.0 GeV.

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Y(10753)□□□□□

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We propose a chiral quark model that incorporates vector mesons and apply it to the study of the hadron spectrum. We consider the contributions of vector mesons within the framework of hidden local symmetry. Our results demonstrate a significant improvement in the masses of ground state baryons, including the nucleon, Λ_c, and Λ_b. We successfully reproduce the masses of all 45 experimentally confirmed ground states of mesons and baryons. Furthermore, our predictions for 21 ground states align well with the results obtained from lattice QCD analyses. This work represents the first successful achievement of all 45+21 ground states of mesons and baryons using a single set of parameters.

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We propose a chiral quark model that incorporates vector mesons and apply it to the study of the hadron spectrum. We consider the contributions of vector mesons within the framework of hidden local symmetry. Our results demonstrate a significant improvement in the masses of ground state baryons, including the nucleon, Λ_c, and Λ_b. We successfully reproduce the masses of all 45 experimentally confirmed ground states of mesons and baryons. Furthermore, our predictions for 21 ground states align well with the results obtained from lattice QCD analyses. This work represents

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