

强子物理新发展研讨会

Friday, April 24, 2020 - Sunday, April 26, 2020

Online

Book of Abstracts

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BESIII 上超子物理及其 CP 破坏实验研究进展

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The CKM mechanism for CP violation in the Standard Model (SM) fails to explain the matter-antimatter asymmetry of the Universe by more than 10 orders-of-magnitude. This suggests that additional CP violating processes occur, and motivates aggressive searches for new, non-SM sources of CP violation. To date, CP violation in hyperon decays have never been observed. Standard Model CP violations in hyperon decays are expected to be $\sim 10^{-4}$ to 10^{-5} , and any value higher than this level would be a signature of new, beyond the SM physics.

Currently BESIII has collected about 10 billion J/ψ decay events, the decay rate of J/ψ to hyperon-anti-hyperon pairs are 10^{-3} , which indicates that the produced hyperon pairs will be a few millions. In this talk I will present the first observation of transverse polarization of hyperon-anti-hyperon from the $e^+e^- \rightarrow J/\psi \rightarrow$ hyperon-anti-hyperon pairs, which allows us to measure the decay asymmetry parameters of both hyperon and anti-hyperon, therefore CP asymmetry in the hyperon decay can be precisely obtained with 5 dimensional fit to data. We expect that the study of hyperon physics will be the next frontier of the SM CP searches.

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Hadron Structure on the Light-front

Author: Xingbo Zhao¹

¹ *Iowa State University*

In this talk I will report our recent progress on the structure of light mesons, heavy quarkonia and the nucleon studied in a basis light-front approach. I will present the preliminary results on the observables such as the form factors, the parton distribution function and the generalized parton distribution functions of these systems.

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Lattice calculation of hadron structure: parton distribution functions

Author: Wei Wang¹

¹ *Shanghai JiaoTong University*

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In this talk, I will introduce the new method of using Lattice QCD to simulate the Parton distribution functions.

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Identifying the $\Sigma_b(6097)$, $\Xi_b(6227)$ and Ω_b as P-wave bottom baryons

Author: Er-Liang Cui¹

¹ *Northwest A&F University*

In this talk, I would like to report our recent studies on spectra and decay properties of the excited bottom baryons, $\Sigma_b(6097)$, $\Xi_b(6227)$ and four narrow Ω_b states, which were newly discovered by LHCb collaboration. At first, we calculated the spectra of P-wave bottom baryons by using the QCD sum rule. The estimations are well consistent with the experimental results. Then We also utilized the method of light-cone sum rules, which is widely used to study the hadron decays in recent years. Our estimations suggest that the bottom baryons $\Sigma_b(6097)^\pm$ and $\Xi_b(6227)^-$ both belong to the P-wave bottom baryon doublet $[\mathbf{6}_F, 2, 1, \lambda]$, whose color is symmetric $\mathbf{6}_F$, the total angular momentum of light system is 2, the spin of light system is 1, and it is λ -type excitation. And the four narrow Ω_b states can also be explained as the P-wave bottom baryons but belong to different excitation types. We also made some other predictions.

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BESIII 上的超子极化研究

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BESIII 上的超子极化研究

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Belle 实验上奇异粲介子对系统的研究

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1-+ 奇特态

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1-+ 奇特态

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BESIII 实验上的粲强子衰变研究

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BESIII 实验上的粲强子衰变研究

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The newly observed $\Omega(2012)$ as a $K\bar{\Xi}(1530)$ hadronic molecule

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Recently, Belle collaboration measured the ratios of the branching fractions of the newly observed $\Omega(2012)$ excited state. They did not observe significant signals for the $\Omega(2012) \rightarrow \bar{K}\Xi^*(1530) \rightarrow \bar{K}\pi\Xi$ decay, and reported an upper limit for the ratio of the three body decay to the two body decay mode of $\Omega(2012) \rightarrow \bar{K}\Xi$. In this work, we revisit the newly observed $\Omega(2012)$ from the molecular perspective where this resonance appears to be a dynamically generated state with spin-parity $3/2^-$ from the coupled channels interactions of the $\bar{K}\Xi^*(1530)$ and $\eta\Omega$ in s -wave and $\bar{K}\Xi$ in d -wave. With the model parameters for the d -wave interaction, we show that the ratio of these decay fractions reported recently by the Belle collaboration can be easily accommodated.

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Dibaryons and pentaquarks in quark models

Author: Hongxia Huang¹

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Dibaryons and pentaquarks in quark models

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ssss 四夸克态

Author: Hua-Xing Chen¹

¹ *Beihang University*

本次报告准备介绍我们使用 QCD 求和规则研究 ssss 四夸克强子态的一些情况。在研究工作中，我们构造了所有可能的试探流，然后考虑了这些试探流的混合，得到的结果和相关实验进行了比较。

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Recent results on hadron spectroscopy at LHCb

Author: Liming Zhang¹

¹ *Tsinghua University*

I will present several new results on observations of excited baryons at LHCb

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Decay properties of molecular states

Author: 殿勇陈¹

¹ 东南大学

Decay properties of molecular states

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Jetomography of QGP in heavy-ion collisions

Author: Xin-Nian Wang¹

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Jetomography of QGP in heavy-ion collisions

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DDK 3-body system in Lattice QCD

Author: Jin-Yi Pang¹

Co-author: Jia-Jun Wu²

¹ *University of Shanghai Science and Technology*

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The lattice QCD simulation has been generating 3-body hadron spectrum already. The finite volume analysis is necessary to translate these lattice spectra in a finite volume to physical information in the infinite volume. Based on non-relativistic effective field theory, we show the preliminary result of lattice spectrum for DDK 3-body system. In the work, the 2-body information is input referring to arXiv:1906.11995. And 3-body bound state predicted by arXiv:1906.11995 is reproduced in effective field theory. The lattice spectra both below and above threshold are given. They can be compared with future lattice 3-body simulation.

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Why DSEs?

Author: 雷常¹

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Why DSEs?

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Triangle singularity appearing as an X(3872)-like peak in $B \rightarrow (J/\psi\pi + \pi^-)K\pi$

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Triangle singularity appearing as an X(3872)-like peak in $B \rightarrow (J/\psi\pi + \pi^-)K\pi$

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会议开幕

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BESIII 上超子物理及其 CP 破坏实验研究进展

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Belle 实验上奇异粲介子对系统的研究

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Solution to the Y problem

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Solution to the Y problem

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Solution to the Y problem

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闭幕式

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