Strangeness Nuclear Physics 2014

Report of Contributions

https://indico.ihep.ac.cn/e/4454

Contribution ID: **0** Type: **not specified**

Mirror energy difference for Lambda hypernuclei

Mirror energy difference for mirror single-Lambda hypernuclei pair with mass 16, 18, 28, 40, and 42 are analyzed in a time-odd triaxial relativistic mean field theory. Effects as the spin-orbit interaction, the time-odd component of vector fields, the core polarization, the proton-neutron mass difference, and the center-of-mass energy correction are self-consistently considered. A mirror symmetry is found in time reversal conjugate levels. Compared to ordinary nuclei, the binding energy difference for mirror hypernuclei shows trivial change while the divergence ratio is relatively small. With core polarization modified by an impurity hyperon, the isospin nonconserving effects between proton and neutron is deduced

Primary author: Prof. LV, Hong-Feng (China Agricultural University)

Presenter: Prof. LV, Hong-Feng (China Agricultural University)

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

Production mechanisms of Xi baryon in Kbar-N scattering

In order to produce the strangeness -2 Cascade baryons, using Kbar-N scattering gives a better chance as the expected cross sections are much larger than the case of photon-N scattering. In this presentation, we report our studies on the model-independent and model-dependent aspects of the reaction of Kbar N -> K Xi.

Primary author: Prof. OH, Yongseok (Kyungpook National University)

Presenter: Prof. OH, Yongseok (Kyungpook National University)

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

The $K\Sigma$ production in pion- and photo-induced reactions up to 2.0 GeV

A coupled-channel model based on effective Lagrangians is applied to the combined analysis of the $(\pi, \gamma)N \to K\Sigma$ reactions up to the center of mass energy 2 GeV. The couplings constants and resonance parameters of the $K\Sigma$ state are extracted in the calculation. The main resonance contributions to the process come from the $S_{11}(1650)$, $D_{13}(1520)$, $D_{15}(1675)$, $P_{13}(1900)$, $P_{31}(1750)$, $D_{33}(1700)$ and $D_{35}(1930)$ states. The coherent sum of resonances and background contributions is essential to describe the recent photoproduction data obtained by the CLAS, CBELSA, LEPS, and GRAAL groups.

Primary author: CAO, Xu (Institute of Modern Physics, CAS, Lanzhou)

Presenter: CAO, Xu (Institute of Modern Physics, CAS, Lanzhou)

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

Advances and perspectives in the low-energy kaon-nucleon/nuclei interaction studies at the DAFNE collider

The low-energy QCD in the strangeness sector is still lacking fundamental experimental results in order to achieve a breakthrough in its understanding. Among these experimental results, the low-energy kaon-nucleon/nuclei interaction studies are playing a key-role.
Combining the excellent quality kaon beam delivered by the DAFNE collider with new experimental techniques, as fast and very precise X ray detectors, like the Silicon Drift Detectors, and with the almost full acceptance charged and neutral particles KLOE detector, we have performed unprecedented measurements in the low-energy strangeness sector in the framework of SIDDHARTA and AMADEUS Collaborations.
The kaonic atoms, as kaonic hydrogen and kaonic deuterium, provide the isospin dependent kaon-nucleon scattering lengths from the measurement of X rays emitted in the de-excitation process to the fundamental 1s level of the initially excited formed atom. The most precise kaonic hydrogen measurement was performed by the SIDDHARTA collaboration, which realized, as well, the first exploratory measurement for kaonic deuterium ever. Additional important measurements of more complex systems, as kaonic helium 3 and kaonic helium 4, were as well done (the kaonic helium 3 was measured for the first time as well). Presently, a major upgrade of the setup, SIDDHARTA-2 is ready to perform in the near future a precise measurement of kaonic deuterium and other exotic atoms.
The kaon–nuclei interactions are being measured by the AMADEUS collaboration for kaon momenta smaller than 100 MeV/c by using the KLOE detector implemented in the central region with a dedicated setup. Preliminary results for the interaction of negatively charged kaons with various type of nuclei will be shown, including an analyses of the still "mysterious" $\Lambda(1405)$. Future plans will be discussed.
DAFNE, with SIDDHARTA, SIDDHARTA-2 and AMADEUS, represents an opportunity which is unique in the world to, finally, unlock the secrets of the QCD in the strangeness sector, with important consequences going from particle and nuclear physics to astrophysics.

Primary author: Dr SCORDO, Alessandro (Laboratori Nazionali di Frascati INFN)

Presenter: Dr SCORDO, Alessandro (Laboratori Nazionali di Frascati INFN)

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

A Skyrme force for light and heavy hypernuclei

We present a lambda-nucleon Skyrme force suitable for
reproducing the observed binding energies of the
whole range of known light and heavy single-lambda hypernuclei
with A=5,…,208.
Notable exceptions are identified and examined
in comparison with a cluster approach for the hypernuclear structure.

Primary author: Dr SCHULZE, Hans-Josef (INFN Catania)

Co-author: Dr HIYAMA, Emiko (RIKEN)

Presenter: Dr SCHULZE, Hans-Josef (INFN Catania)

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

Precision measurements of light hypernuclear masses

The study of the masses of light hypernuclei can reveal details of the strong nucleon-hyperon interaction. Theoretical models include Lambda-N-N three-body forces and charge symmetry breaking terms in the description of the binding energies of the Lambda-hyperon in hyperhydrogen or hyperhelium.
During the 1960s and 1970s these binding energies were deduced from nuclear emulsion and bubble chamber experiments by analysing weak pionic decays.
In 2012, the first high-resolution spectroscopy of pions from decays of hyperhydrogen was performed at the Mainz Microtron MAMI, Germany. The binding energy of Lambda-H-4 was deduced from its two-body decay mode. This method can achieve a precision in light hypernuclear masses better than with the emulsion technique.

Primary author: Dr ACHENBACH, Patrick (University Mainz)

Presenter: Dr ACHENBACH, Patrick (University Mainz)

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

ΛΛ Interaction and Neutron Stars

We investigate the effects of ΛΛ interactions to the
bulk properties of neutron stars.
We employ a few Skyrme-type and a finite-range force models for the
description of ΛΛ interactions,
where the parameters of the model are determined to reproduce the binding energies
of double-Λ hypernuclei.
Equation of state of neutron star matter is calculated self-consistently,
and the mass-radius relation of neutron stars is obtained by solving
Tolman-Oppenheimer-Volkoff equations.
Results exhibit strong dependence on the ΛΛ interaction models,
and the corresponding uncertainties are as significant as those from the
dependence on the nucleon-nucleon interaction models.

Primary author: Prof. HYUN, Chang Ho (Deagu University)

Co-authors: Prof. LEE, Chang-Hwan (Pusan National University); Prof. KWAK, Kyunjin (UNIST); Dr LIM, Yeunhwan (RISP/IBS)

Presenter: Prof. HYUN, Chang Ho (Deagu University)

Contribution ID: **7** Type: **not specified**

Prospects of hypernuclear photoproduction

As the (e,e'K+) reactions performed at the Jefferson Laboratory have achieved great success in hypernuclear production spectroscopy, we are encouraged to apply the DWIA theory not only to light systems, but also to medium and heavier hypernuclear productions. The merits are based on the spin-flip dominance of the reaction process, the sizable momentum transfer, the conversion of proton into Lambda, the sub-MeV energy resolution, etc. We will discuss major and characteristic results of the theoretical predictions.

Primary author: Dr MOTOBA, Toshio (Osaka Electro-communication University)

Presenter: Dr MOTOBA, Toshio (Osaka Electro-communication University)

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

Induced polarization of Lambda(1116) in kaon electroproduction

We have measured the induced polarization of the Lambda(1116) in the reaction ep−>e'K+Lambda , detecting the scattered e' and K+ in the final state along with the proton from the decay Lambda−>ppi-. This study used the CLAS, which allowed for a large kinematic acceptance in invariant energy W(1.6<W<2.7 GeV) and covered the full range of the kaon production angle at an average momentum transfer Q2=1,896 GeV2. In this experiment a 5.5 GeVelectron beam was incident upon an unpolarized liquid-hydrogen target. We have mapped out the W and kaon production angle dependencies of the induced polarization and found striking difference from photoproduction data over most of the kinematic range. We also found that the induced polarization is essentially Q2 independent in the kinematic domain,suggesting that somewhere below the Q2 covered here, there must be a strong Q2 dependence.

Primary authors: Dr GABRIELLYN, Mariana (Florida International University); Prof. KIM, Wooyoung (Kyungpook National University)

Co-author: Prof. CARMAN, Daniel (Florida International University)

Presenter: Prof. KIM, Wooyoung (Kyungpook National University)

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

Chiral quark model study of 5-quark systems

The QCD allows qqq(q q\bar{q}) configuration in baryons. A dynamical study of some 5-quark systems with positive parity by means of a Gaussian expansion method in the chiral quark model. The calculated result of the lowest energy of the state which IJP is 1/2 5/2 + is under the threshold.

Primary author: Mr YANG, Gang (NNU)

Presenter: Mr YANG, Gang (NNU)

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

Progress on Hyperon Resonances

Friday, 12 December 2014 09:00 (25 minutes)

Presenter: Prof. ZOU, Bing-Song

Session Classification: 12A1

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

Extraction of the two Lambda(1405) poles from photoproduction data and hints for an I=1 state around the Kbar N threshold

Friday, 12 December 2014 09:25 (25 minutes)

Presenter: Prof. OSET, Eulogio

Session Classification: 12A1

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

Production mechanisms of Xi baryon in Kbar-N scattering

Friday, 12 December 2014 09:50 (25 minutes)

Presenter: Prof. OH, Yongseok

Session Classification: 12A1

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

Dibaryons with heavy quarks

Friday, 12 December 2014 10:15 (25 minutes)

Presenter: Prof. HUANG, Hong-Xia

Session Classification: 12A1

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

Precision measurements of light hypernuclear masses

Friday, 12 December 2014 11:10 (25 minutes)

Presenter: Prof. ACHENBACH, Patrick

Session Classification: 12A2

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

Spectroscopic research of light to medium-heavy Λ hypernuclei with high quality electron beam at JLab

Friday, 12 December 2014 11:35 (25 minutes)

Presenter: Dr GOGAMI, Toshiyuki

Session Classification: 12A2

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

Recent Spectroscopic Investigation of Λ-Hypernuclei by the (e,e′K+) Reaction at JLab Hall C

Friday, 12 December 2014 12:00 (25 minutes)

Presenter: Dr CHEN, Chun-Hua

Session Classification: 12A2

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

Study light hypernuclei by pion spectroscopy from two-body mesonic weak decay

Friday, 12 December 2014 14:30 (25 minutes)

Presenter: Prof. TANG, Li-Guag

Session Classification: 12P1

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

Antiproton beams - a unique tool to study antihyperons embedded in nuclei

Friday, 12 December 2014 14:55 (25 minutes)

Presenter: Prof. POCHODZALLA, Josef

Session Classification: 12P1

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

Status of the Search for Kaonic Nuclei at J-PARC (E15)

Friday, 12 December 2014 15:20 (25 minutes)

Presenter: Prof. OUTA, Haruhiko

Session Classification: 12P1

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

Advances and perspectives in the low-energy kaon-nucleon/nuclei interaction studies at the DAFNE collider

Friday, 12 December 2014 15:45 (25 minutes)

Presenter: Prof. SCORDO, Alessandro

Session Classification: 12P1

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

Superdeformed states and localization effects in hypernuclei

Friday, 12 December 2014 16:40 (25 minutes)

Presenter: Prof. ZHOU, Shan-Gui

Session Classification: 12P2

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

Mirror energy difference for Lambda hypernuclei

Friday, 12 December 2014 17:05 (25 minutes)

Presenter: Prof. LV, Hong-Feng

Session Classification: 12P2

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

Superdeformation of hypernuclei with antisymmetrized molecular dynamics

Friday, 12 December 2014 17:30 (25 minutes)

Presenter: Dr ISAKA, Masahiro

Session Classification: 12P2

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

Opening speech

Friday, 12 December 2014 08:30 (5 minutes)

Presenter: Prof. HIYAMA, Emiko

Session Classification: 12A0

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

Welcome Speech

Friday, 12 December 2014 08:35 (5 minutes)

Presenter: Prof. KUANG, Le-Man

Session Classification: 12A0

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

Workshop photo

Friday, 12 December 2014 08:40 (20 minutes)

Presenter: Prof. ZHONG, Xian-Hua

Session Classification: 12A0

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

Light hypernuclei and the nnLambda state observed by the 6Li+12C reaction at 2 A GeV

Saturday, 13 December 2014 09:00 (25 minutes)

Presenter: Prof. SAITO, Takehiko

Session Classification: 13A1

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

Observation of neutron-rich Λ-hypernuclei by the FINUDA experiment

Saturday, 13 December 2014 09:25 (25 minutes)

Presenter: Prof. FELICIELLO, Alessandro

Session Classification: 13A1

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

Shapes and energy spectra of hypernuclei in the Skyrme Hartree-Fock method

Saturday, 13 December 2014 09:50 (25 minutes)

Presenter: Prof. ZHOU, Xian-Rong

Session Classification: 13A1

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

Double Lambda He-6 in cluster effective field theory

Saturday, 13 December 2014 10:45 (25 minutes)

Presenter: Prof. ANDO, Shung-Ichi

Session Classification: 13A2

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

Baryon resonances in strangeness production

Saturday, 13 December 2014 11:10 (25 minutes)

Presenter: Prof. XIE, Ju-Jun

Session Classification: 13A2

Contribution ID: **33** Type: **not specified**

The K-Sigma production in pion- and photo-induced reactions up to 2.0 GeV

Saturday, 13 December 2014 11:35 (25 minutes)

Presenter: Prof. CAO, Xu

Session Classification: 13A2

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

πp to KΛ reaction in a Chiral quark model

Saturday, 13 December 2014 12:00 (25 minutes)

Presenter: Ms XIAO, Li-Ye

Session Classification: 13A2

Contribution ID: **35** Type: **not specified**

Lambda-Lambda Interaction and Neutron Stars

Saturday, 13 December 2014 14:30 (25 minutes)

Presenter: Prof. HYUN, Chang-Ho

Session Classification: 13P1

Contribution ID: **36** Type: **not specified**

A Skyrme force for light and heavy hypernuclei

Saturday, 13 December 2014 14:55 (25 minutes)

Presenter: Prof. SCHULZE, Hans-Josef

Session Classification: 13P1

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

Cluster variational method for nuclear matter with hyperons

Saturday, 13 December 2014 15:20 (25 minutes)

Presenter: Dr TOGASHI, Hajime

Session Classification: 13P1

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

Molecular Interpretation of Ds0(2317) and Ds1(2460)

Saturday, 13 December 2014 16:15 (25 minutes)

Presenter: Dr CLEVEN, Martin

Session Classification: 13P2

Contribution ID: **39** Type: **not specified**

Chiral quark model study of 5-quark systems

Saturday, 13 December 2014 16:40 (25 minutes)

Presenter: Mr YANG, Gang

Session Classification: 13P2

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

Possible existence of neutral hyper-nucleus with strangeness -2 and its production

Saturday, 13 December 2014 17:05 (25 minutes)

Presenter: Prof. ZHAO, Qiang

Session Classification: 13P2

Contribution ID: **41** Type: **not specified**

Closing Remark

Saturday, 13 December 2014 17:30 (25 minutes)

Presenter: Prof. MENG, Jie

Session Classification: 13P2