

INTERNATIONAL WORKSHOP ON CHIRAL SYMMETRY IN HADRONS AND NUCLEI

21–24 June 2010 *Valencia, Spain*

EDITORS

Juan M. Nieves
Eulogio Oset

Manuel J. Vicente Vacas

*IFIC-Instituto de Física Corpuscular
Valencia, Spain*

SPONSORING ORGANIZATIONS

Ministry of Science and Innovation
National Center for Particle Physics, Astroparticles, and Nuclear Physics (CPAN)
Spanish National Research Council (CSIC)
Institute for Corpuscular Physics (IFIC)
Department of Theoretical Physics (U. Valencia)
University of Valencia



Melville, New York, 2010

AIP CONFERENCE PROCEEDINGS ■ 1322

Editors

Juan M. Nieves
Eulogio Oset
Manuel J. Vicente-Vacas

IFIC-Instituto de Física Corpuscular
Edificio de Institutos de Investigación
Apartado de Correos 22085
E-46071 Valencia, Spain

Email: jmnieves@ific.uv.es
oset@ific.uv.es
vicente@ific.uv.es

Authorization to photocopy items for internal or personal use, beyond the free copying permitted under the 1978 U.S. Copyright Law (see statement below), is granted by the American Institute of Physics for users registered with the Copyright Clearance Center (CCC) Transactional Reporting Service, provided that the base fee of \$30.00 per copy is paid directly to CCC, 222 Rosewood Drive, Danvers, MA 01923, USA. For those organizations that have been granted a photocopy license by CCC, a separate system of payment has been arranged. The fee code for users of the Transactional Reporting Services is: 978-0-7354-0878-4/10/\$30.00

© 2010 American Institute of Physics

Permission is granted to quote from the AIP Conference Proceedings with the customary acknowledgment of the source. Republication of an article or portions thereof (e.g., extensive excerpts, figures, tables, etc.) in original form or in translation, as well as other types of reuse (e.g., in course packs) require formal permission from AIP and may be subject to fees. As a courtesy, the author of the original proceedings article should be informed of any request for republication/reuse. Permission may be obtained online using Rightslink. Locate the article online at <http://proceedings.aip.org>, then simply click on the Rightslink icon/"Permission for Reuse" link found in the article abstract. You may also address requests to: AIP Office of Rights and Permissions, Suite 1NO1, 2 Huntington Quadrangle, Melville, NY 11747-4502, USA; Fax: 516-576-2450; Tel.: 516-576-2268; E-mail: rights@aip.org.

L.C. Catalog Card No. 2010917652

ISBN 978-0-7354-0878-4

ISSN 0094-243X
Printed in the United States of America

CONTENTS

Preface	xi
Workshop Organization	xiii

PLENARY SESSION PRESENTATIONS

Thermal Dileptons from Hot and Dense Strongly Interacting Matter	1
H. J. Specht for the NA60 Collaboration	
Brief Introduction to Viscosity in Hadron Physics	11
A. Dobado, F. J. Llanes-Estrada, and J. M. Torres-Rincon	
Kaonic Atoms and Nuclei	19
R. S. Hayano	
Formation of η Mesic Nuclei at JPARC and COSY	28
S. Hirenzaki, H. Nagahiro, and D. Jido	
Chiral Symmetry, Scalar Field and Confinement: From Nucleon Structure to Nuclear Matter	36
G. Chanfray and M. Ericson	
Chiral Symmetry and Mesons in Hot and Dense Matter: Recent Developments	46
A. G. Nicola and D. Fernández-Fraile	
In-Medium Vector Mesons, Dileptons and Chiral Restoration	55
R. Rapp	
Theory Review on Hadrons in Strongly Interacting Matter	64
S. Leupold and U. Mosel	
The Search for In-Medium Modifications of Mesons—Experimental Status . . .	73
V. Metag	
The Pion and Relativistic Chiral Mean Field Model for Finite Nuclei	84
H. Toki and Y. Ogawa	
Axial-Vector Resonance in Nuclear Matter	90
D. Cabrera, D. Jido, R. Rapp, and L. Roca	
Nucleon Correlations and the Equation of State of Nuclear Matter	99
A. Polls, W. H. Dickhoff, H. Müther, A. Ramos, A. Rios, and I. Vidaña	
Modification of the ω Meson Properties in the Nuclear Medium	108
M. Nanova for CBELSA/TAPS Collaboration	
Future Experiments with HADES at FAIR	116
P. Tlustý for the HADES Collaboration	
Chiral Effective Field Theory for Nuclear Matter	125
A. Lacour, U.-G. Meißner, and J. A. Oller	
Algebraic Aspects of Chiral Symmetry	134
A. Hosaka	
Analytic Extension of the K-Matrix Formalism	143
O. Scholten	
Hadron Physics with KLOE and KLOE-2 Experiments	152
C. Di Donato on behalf of KLOE/KLOE-2 Collaboration	
Physics with WASA-at-COSY	161
S. Schadmand for the WASA-at-COSY Collaboration	

QCD Tests from Pion Reactions on Few-Nucleon Systems	169
C. Hanhart	
Basics of Resonance Chiral Theory	178
J. Portolés	
Recent Results from WASA-at-COSY	188
V. Hejny for the WASA-at-COSY Collaboration	
A QCD Sum Rules Approach to Mixing of Hadrons	197
T. M. Aliev, A. Ozpineci, and V. S. Zamiralov	
Perturbative Renormalizability of Chiral Two Pion Exchange and Power Counting in Nucleon-Nucleon Scattering	205
M. P. Valderrama	
The $f_0(1370)$, $f_0(1710)$, $f_2(1270)$, $f'_2(1525)$, and $K^*_2(1430)$ as Dynamically Generated States from Vector Meson—Vector Meson Interaction	214
L. S. Geng, E. Oset, R. Molina, A. M. Torres, T. Branz, F. K. Guo, L. R. Dai, and B. X. Sun	
$f_2(1270)$, $a_1(1260)$ and $f_0(1370)$ as Dynamically Reconstructed Quark-Antiquark States	223
F. Giacosa	
Unitary and Causal Dynamics Based on the Chiral Lagrangian	232
A. M. Gasparyan and M. F. M. Lutz	
Two Novel Methods in QCD Sum Rules	241
P. Gubler and M. Oka	
Heavy Quarkonium at Zero and Finite Temperature: An Effective Field Theory Perspective	250
N. Brambilla	
Heavy Meson Production in Hot Dense Matter	259
L. Tolos, D. Gamermann, C. Garcia-Recio, R. Molina, J. Nieves, E. Oset, and A. Ramos	
Loop Effects in Charmonium Transitions	266
U.-G. Meißner	
Hidden and Open Charm Meson Spectrum	275
J. Vijande and A. Valcarce	
D Meson-Nucleon Hadron and Nuclear Systems	283
S. Yasui and K. Sudoh	
Heavy Flavor Hadron Molecules	289
T. Gutsche and V. E. Lyubovitskij	
Heavy Quark Potentials Derived from Lattice QCD	298
Y. Koma and M. Koma	
Possible Signatures of New Physics in Bottomonium Spectroscopy and Decays	307
M.-A. Sanchis-Lozano	
Charm Form Factors in Hadronic Interactions	312
M. E. Bracco, M. Chiapparini, F. S. Navarra, and M. Nielsen	
Meson and Baryon Spectroscopy on the Lattice	320
D. G. Richards	

PARALLEL SESSION CONTRIBUTIONS

SESSION A: HADRONS IN NUCLEI

Study of the $K^-_{\text{stop}} A \rightarrow \Sigma^\pm \pi^\mp A'$ Reaction at DAΦNE	329
M. Agnello, L. Benussi, M. Bertani, H. C. Bhang, G. Bonomi, E. Botta, M. Bregnant, T. Bressani, S. Bufalino, L. Busso, D. Calvo, P. Camerini, B. Dalena, F. De Mori, G. D'Erasmus, F. L. Fabbri, A. Feliciello, A. Filippi, E. M. Fiore, A. Fontana, H. Fujioka, P. Genova, P. Gianotti, N. Grion, V. Lucherini, S. Marcello, N. Mirfakhrai, F. Moia, P. Montagna, O. Morra, T. Nagae, H. Ota, A. Pantaleo, V. Patichio, S. Piano, R. Rui, G. Simonetti, R. Wheadon, and A. Zenoni	
Experimental Status of Deeply Bound Kaonic States in Nuclei	334
V. K. Magas, J. Yamagata-Sekihara, S. Hirenzaki, E. Oset, and A. Ramos	
Mesonic and Nonmesonic Absorption of Kaon in Nuclear Matter and $\Lambda(1405)$ Doorway Process	339
T. Sekihara, J. Yamagata-Sekihara, D. Jido, and Y. Kanada-En'yo	
Spectral Properties of Mesons in Hot and Dense Matter from Energy Weighted Sum Rules	344
D. Cabrera, A. Polls, A. Ramos, and L. Tolós	
ϕ-Meson Production and the In-Medium ϕ-Width in Proton-Nucleus Collisions	349
M. Hartmann, Yu. T. Kiselev, E. Ya. Paryev, A. Polyanskiy, H. Schade, and C. Wilkin	
Light Scalar Susceptibilities and Isospin Breaking	354
R. T. Andrés and A. G. Nicola	

SESSION B: DYNAMICALLY GENERATED RESONANCES

On η and $\pi^0 \eta$ Photoproduction	359
M. Döring	
Chiral Model for KN Interactions and Its Pole Content	364
A. Cieplý and J. Smejkal	
Radiative Decay into γ-Baryon of Dynamically Generated Resonances from the Vector-Baryon Interaction	369
E. J. Garzon, B.-X. Sun and E. Oset	
Compositeness of Bound States in Chiral Unitary Approach	374
T. Hyodo, D. Jido, and A. Hosaka	
Nucleon Resonances from Three-Hadron Interactions	379
K. P. Khemchandani, A. M. Torres, and E. Oset	
Wave Functions for Dynamically Generated Resonances; The Two $\Lambda(1405)$ and $\Lambda(1670)$	384
J. Yamagata-Sekihara, J. Nieves, and E. Oset	
Analysis Techniques for the $\Lambda(1405)$ in $p+p$ Reactions	389
J. Siebenson for the HADES Collaboration	
An Alternative Explanation for the $\Theta(1540)$ Pentaquark Peak	394
A. M. Torres and E. Oset	

Quark Mass Dependence of Light Resonances and Phase Shifts in Elastic $\pi\pi$ and πK Scattering	399
J. Nebreda and J. R. Peláez	

SESSION C: HEAVY QUARK PHYSICS

Studying the Decay Mode of the J/Ψ into a Vector Meson and a Tensor Resonance	405
L. R. Dai	
The Role of Hyperfine Mixing in $b \rightarrow c$ Semileptonic Decays of Doubly-Heavy Baryons	410
C. Albertus, E. Hernández, and J. Nieves	
S-Wave Pion Exchange and Its Implications for Quarkonium Spectroscopy . .	415
C. Downum	
Exotic Dynamically Generated Baryons with $C = -1$	420
D. Gamermann, C. García-Recio, J. Nieves, L. L. Salcedo, and L. Tolos	
Mesonic Bound States in the c Spectrum	425
T. Branz, T. Gutsche, and V. E. Lyubovitskij	
A Molecular Interpretation for the $D_{s2}^*(2573)$ and the Prediction of Novel Exotic Charmed Mesons	430
R. Molina, T. Branz, and E. Oset	

SESSION D: HADRON PROPERTIES (THEORY+EXPERIMENT)

Analysis of Baryon Magnetic Moments in Large-N_c Chiral Perturbation Theory	435
R. Flores-Mendieta	
Analysis of the LQCD Results on the Lowest-Lying Baryon Masses in Chiral Perturbation Theory	440
J. M. Camalich, L. S. Geng, and M. J. Vicente Vacas	
Chiral Symmetry Breaking and Electromagnetic Structure of the Nucleon . .	445
H. Dahiya and N. Sharma	
N_c and m_π Dependence of ρ and σ Mesons from Unitarized Chiral Perturbation Theory	452
G. Ríos, C. Hanhart, and J. R. Peláez	
Tests of Chiral Perturbation Theory with COMPASS	457
J. Friedrich	
Precision Measurements of Kaon Radiative Decays at NA48/2	463
M. Raggi	
Precision Spectroscopy of Light Kaonic Atom X-Rays in the SIDDHARTA Experiment	468
T. Ishiwatari, M. Bazzi, G. Beer, L. Bombelli, A. M. Bragadireanu, M. Cargnelli, G. Corradi, C. Curceanu, A. d'Uffizi, C. Fiorini, T. Frizzi, F. Ghio, B. Girolami, C. Guaraldo, R. S. Hayano, M. Illescu, M. Iwasaki, P. Kienle, P. Levi Sandri, A. Longoni, V. Lucherini, J. Marton, S. Okada, D. Pietreanu, T. Ponta, A. Rizzo, A. R. Vidal, A. Scordo, H. Shi, D. L. Sirghi, F. Sirghi, H. Tatsuno, A. Tudorache, V. Tudorache, O. V. Doce, E. Widmann, and J. Zmeskal	

Precision Measurement of $\pi\pi$ Scattering Lengths at the NA48/2 Experiment	473
S. Venditti on behalf of the NA48/2 Collaboration	
Meson-Baryon Coupling Constants in Two-Flavor Lattice QCD	478
G. Erkol, M. Oka, and T. T. Takahashi	
Effective Interactions and Long Distance Symmetries in the Nucleon-Nucleon System	483
E. R. Arriola and A. C. Córdón	
Author Index	489