# PHYSICAL REVIEW A™

For editorial and subscription correspondence,
please see inside front cover
(ISSN: 1050-2947)

**PERIODICALS**
**Postmaster send address changes to:**
**APS Subscription Services**
**Suite 1NO1**
**2 Huntington Quadrangle**
**Melville, NY 11747-4502**

**THIRD SERIES, VOLUME 84, NUMBER 6**
**PARTS A AND B**

***CONTENTS***

**DECEMBER 2011**

***The Table of Contents is a total listing of Parts A and B.***
***Part A consists of pages 060301(R)-063425, and Part B pages 063601-069911(E).***

## PART A

## RAPID COMMUNICATIONS

### Quantum information

On-chip, photon-number-resolving, telecommunication-band detectors for scalable photonic information processing *(4 pages)* . . . . . 060301(R)
Thomas Gerrits, Nicholas Thomas-Peter, James C. Gates, Adriana E. Lita, Benjamin J. Metcalf, Brice Calkins, Nathan A. Tomlin, Anna E. Fox, Antía Lamas Linares, Justin B. Spring, Nathan K. Langford, Richard P. Mirin, Peter G. R. Smith, Ian A. Walmsley, and Sae Woo Nam

Universal dynamical decoupling of multiqubit states from environment *(4 pages)* . . . . . 060302(R)
Liang Jiang and Adilet Imambekov

Communication cost of classically simulating a quantum channel with subsequent rank-1 projective measurement *(4 pages)* . . . . . 060303(R)
Alberto Montina

### Atomic and molecular structure and dynamics

Temperature-independent Casimir-Polder forces in arbitrary geometries *(4 pages)* . . . . . 060501(R)
Simen Å. Ellingsen, Stefan Yoshi Buhmann, and Stefan Scheel

Infrared spectrum of $H_5^+$ and $D_5^+$: The simplest shared-proton model *(4 pages)* . . . . . 060502(R)
Cristina Sanz-Sanz, Octavio Roncero, Alvaro Valdés, Rita Prosmiti, Gerardo Delgado-Barrio, Pablo Villarreal, Patricia Barragán, and Alfredo Aguado

### Atomic and molecular processes in external fields, including interactions with strong fields and short pulses

Formation of ultracold $X\,^1\Sigma^+(v'' = 0)$ NaCs molecules via coupled photoassociation channels *(4 pages)* . . . . . 061401(R)
P. Zabawa, A. Wakim, M. Haruza, and N. P. Bigelow

Optical rotation in excess of 100 rad generated by Rb vapor in a multipass cell *(4 pages)* . . . . . 061403(R)
S. Li, P. Vachaspati, D. Sheng, N. Dural, and M. V. Romalis

Time delay between photoemission from the $2p$ and $2s$ subshells of neon *(4 pages)* . . . . . 061404(R)
L. R. Moore, M. A. Lysaght, J. S. Parker, H. W. van der Hart, and K. T. Taylor

**Copyright 2011 by American Physical Society**

*(Continued)*

1050-2947(201112)84:6:A;1-U

PHYSICAL REVIEW A THIRD SERIES, VOLUME 84, NUMBER 6 DECEMBER 2011

Hyperpolarization of $^{133}$Cs nuclei enhanced by ion movement in a cesium salt *(4 pages)* . . . . . 061405(R)
Kiyoshi Ishikawa

All-optical production of a lithium quantum gas using narrow-line laser cooling *(4 pages)* . . . . . 061406(R)
P. M. Duarte, R. A. Hart, J. M. Hitchcock, T. A. Corcovilos, T.-L. Yang, A. Reed, and R. G. Hulet

**Matter waves and collective properties of cold atoms and molecules**

Dynamical bifurcation as a semiclassical counterpart of a quantum phase transition *(4 pages)* . . . . . 061601(R)
P. Buonsante, V. Penna, and A. Vezzani

Auxiliary-field quantum Monte Carlo method for strongly paired fermions *(5 pages)* . . . . . 061602(R)
J. Carlson, Stefano Gandolfi, Kevin E. Schmidt, and Shiwei Zhang

Mott-insulating phases and magnetism of fermions in a double-well optical lattice *(5 pages)* . . . . . 061603(R)
Xin Wang, Qi Zhou, and S. Das Sarma

Universal phase structure of dilute Bose gases with Rashba spin-orbit coupling *(5 pages)* . . . . . 061604(R)
Sarang Gopalakrishnan, Austen Lamacraft, and Paul M. Goldbart

Nonlocal state swapping of polar molecules in bilayers *(4 pages)* . . . . . 061605(R)
A. Pikovski, M. Klawunn, A. Recati, and L. Santos

Coherence properties of a two-dimensional trapped Bose gas around the superfluid transition *(4 pages)* . . . . . 061606(R)
T. Plisson, B. Allard, M. Holzmann, G. Salomon, A. Aspect, P. Bouyer, and T. Bourdel

**Quantum optics, physics of lasers, nonlinear optics, classical optics**

Optical vortex interaction and generation via nonlinear wave mixing *(4 pages)* . . . . . 061801(R)
F. Lenzini, S. Residori, F. T. Arecchi, and U. Bortolozzo

Higher-order photon correlations in pulsed photonic crystal nanolasers *(4 pages)* . . . . . 061802(R)
D. Elvira, X. Hachair, V. B. Verma, R. Braive, G. Beaudoin, I. Robert-Philip, I. Sagnes, B. Baek, S. W. Nam, E. A. Dauler, I. Abram, M. J. Stevens, and A. Beveratos

Control of high-order harmonics for attoscience using a static-electric-field pattern *(4 pages)* . . . . . 061803(R)
Carles Serrat

Entangled-photon compressive ghost imaging *(4 pages)* . . . . . 061804(R)
Petros Zerom, Kam Wai Clifford Chan, John C. Howell, and Robert W. Boyd

Preparation of subradiant states using local qubit control in circuit QED *(4 pages)* . . . . . 061805(R)
S. Filipp, A. F. van Loo, M. Baur, L. Steffen, and A. Wallraff

## ARTICLES

**Fundamental concepts**

Tomography of the quantum state of photons entangled in high dimensions *(6 pages)* . . . . . 062101
Megan Agnew, Jonathan Leach, Melanie McLaren, F. Stef Roux, and Robert W. Boyd

Model for noncancellation of quantum electric field fluctuations *(7 pages)* . . . . . 062102
Victor Parkinson and L. H. Ford

*(Continued)*

**PHYSICAL REVIEW A** **THIRD SERIES, VOLUME 84, NUMBER 6** **DECEMBER 2011**

Dynamical manifestation of an evolving Berry phase as a frequency shift of the resonance transition between two eigenstates *(4 pages)* . . . . . 062103
Koichi Toriyama, Akihide Oguchi, and Atsuo Morinaga

Propagator for the general time-dependent harmonic oscillator with application to an ion trap *(4 pages)* . . . . . 062104
Gal Harari, Yacob Ben-Aryeh, and Ady Mann

Measure of nonclassical correlation in coherence-vector representation *(5 pages)* . . . . . 062105
Tao Zhou, Jingxin Cui, and Gui Lu Long

Limits on amplification by Aharonov-Albert-Vaidman weak measurement *(5 pages)* . . . . . 062106
Tatsuhiko Koike and Saki Tanaka

Generalized Bell-inequality experiments and computation *(16 pages)* . . . . . 062107
Matty J. Hoban, Joel J. Wallman, and Dan E. Browne

Estimating the reduction time of quantum states *(5 pages)* . . . . . 062108
Fernando Parisio

Vacuum-induced Berry phase beyond the rotating-wave approximation *(5 pages)* . . . . . 062109
Tao Liu, Mang Feng, and Kelin Wang

Feasibility of loophole-free nonlocality tests with a single photon *(7 pages)* . . . . . 062110
Rafael Chaves and Jonatan Bohr Brask

Residual entanglement of accelerated fermions is not nonlocal *(5 pages)* . . . . . 062111
Nicolai Friis, Philipp Köhler, Eduardo Martín-Martínez, and Reinhold A. Bertlmann

Pulse control of sudden transition for two qubits in $XY$ spin baths and quantum phase transition *(4 pages)* . . . . . 062112
Da-Wei Luo, Hai-Qing Lin, Jing-Bo Xu, and Dao-Xin Yao

Stochastic resonance of quantum discord *(5 pages)* . . . . . 062113
Chee Kong Lee, Leong Chuan Kwek, and Jianshu Cao

Effect of $\alpha$ variation on the vibrational spectrum of $Sr_2$ *(4 pages)* . . . . . 062114
K. Beloy, A. W. Hauser, A. Borschevsky, V. V. Flambaum, and P. Schwerdtfeger

Tunneling properties of nonplanar molecules in a gas medium *(4 pages)* . . . . . 062115
Mohammad Bahrami and Angelo Bassi

Radiative polarization of electrons in a strong laser wave *(12 pages)* . . . . . 062116
Dmitry V. Karlovets

Zeno effect and ergodicity in finite-time quantum measurements *(5 pages)* . . . . . 062117
D. Sokolovski

Asymptotically optimal data analysis for rejecting local realism *(10 pages)* . . . . . 062118
Yanbao Zhang, Scott Glancy, and Emanuel Knill

Models including electron correlation in relation to Fock's proposed expansion of the ground-state wave function of He-like atomic ions *(4 pages)* . . . . . 062119
M. L. Glasser, N. H. March, and L. M. Nieto

Finite-temperature electromagnetic-field quantization in a medium: The thermofield approach *(7 pages)* . . . . . 062120
F. Kheirandish, M. Soltani, and M. Jafari

*(Continued)*

**PHYSICAL REVIEW A** **THIRD SERIES, VOLUME 84, NUMBER 6** **DECEMBER 2011**

Decoherence and the nature of system-environment correlations *(6 pages)* . . . . . 062121
A. Pernice and W. T. Strunz

Quantum field theory in the presence of a medium: Green's function expansions *(9 pages)* . . . . . 062122
Fardin Kheirandish and Shahriar Salimi

Direct measure of quantum correlation *(5 pages)* . . . . . 062123
Chang-shui Yu and Haiqing Zhao

Nonlocality of Foldy-Wouthuysen and related transformations for the Dirac equation *(7 pages)* . . . . . 062124
Tomasz M. Rusin and Wlodek Zawadzki

Adaptive schemes for incomplete quantum process tomography *(9 pages)* . . . . . 062125
Yong Siah Teo, Berthold-Georg Englert, Jaroslav Řeháček, and Zdeněk Hradil

Escape behavior of a quantum particle in a loop coupled to a lead *(14 pages)* . . . . . 062126
Ph. A. Jacquet

Realistic limits on the nonlocality of an $N$-partite single-photon superposition *(5 pages)* . . . . . 062127
Amine Laghaout, Gunnar Björk, and Ulrik L. Andersen

**Quantum information**

Efficient synthesis of quantum gates on a three-spin system with triangle topology *(7 pages)* . . . . . 062301
Haidong Yuan and Navin Khaneja

Single-qubit unitary gates by graph scattering *(7 pages)* . . . . . 062302
Benjamin A. Blumer, Michael S. Underwood, and David L. Feder

Perspectives for laboratory implementation of the Duan-Lukin-Cirac-Zoller protocol for quantum repeaters *(16 pages)* . . . . . 062303
Milrian S. Mendes and Daniel Felinto

Coherent feedback control of multipartite quantum entanglement for optical fields *(6 pages)* . . . . . 062304
Zhihui Yan, Xiaojun Jia, Changde Xie, and Kunchi Peng

Correlation-tensor criteria for genuine multiqubit entanglement *(8 pages)* . . . . . 062305
Wiesław Laskowski, Marcin Markiewicz, Tomasz Paterek, and Marek Żukowski

Multipartite entanglement detection from correlation tensors *(10 pages)* . . . . . 062306
Julio I. de Vicente and Marcus Huber

Negativity for two blocks in the one-dimensional spin-1 Affleck-Kennedy-Lieb-Tasaki model *(6 pages)* . . . . . 062307
Raul A. Santos, V. Korepin, and Sougato Bose

Attacking a practical quantum-key-distribution system with wavelength-dependent beam-splitter and multiwavelength sources *(5 pages)* . . . . . 062308
Hong-Wei Li, Shuang Wang, Jing-Zheng Huang, Wei Chen, Zhen-Qiang Yin, Fang-Yi Li, Zheng Zhou, Dong Liu, Yang Zhang, Guang-Can Guo, Wan-Su Bao, and Zheng-Fu Han

Local Gaussian operations can enhance continuous-variable entanglement distillation *(7 pages)* . . . . . 062309
ShengLi Zhang and Peter van Loock

Quantum computation with moving quantum dots generated by surface acoustic waves *(8 pages)* . . . . . 062310
X. Shi, M. Zhang, and L. F. Wei

*(Continued)*

**PHYSICAL REVIEW A** **THIRD SERIES, VOLUME 84, NUMBER 6** **DECEMBER 2011**

Designing robust unitary gates: Application to concatenated composite pulses *(6 pages)* . . . . . 062311
Tsubasa Ichikawa, Masamitsu Bando, Yasushi Kondo, and Mikio Nakahara

Weaving independently generated photons into an arbitrary graph state *(6 pages)* . . . . . 062312
Qing Lin and Bing He

Nonexistence of a universal quantum machine to examine the precision of unknown quantum states *(4 pages)* . . . . 062313
Shengshi Pang, Shengjun Wu, and Zeng-Bing Chen

Environment-assisted error correction of single-qubit phase damping *(7 pages)* . . . . . 062314
Benjamin Trendelkamp-Schroer, Julius Helm, and Walter T. Strunz

Maximum-confidence discrimination among symmetric qudit states *(13 pages)* . . . . . 062315
O. Jiménez, M. A. Solís-Prosser, A. Delgado, and L. Neves

Quantum fields on closed timelike curves *(10 pages)* . . . . . 062316
J. L. Pienaar, C. R. Myers, and T. C. Ralph

Long-distance continuous-variable quantum key distribution with a Gaussian modulation *(7 pages)* . . . . . 062317
Paul Jouguet, Sébastien Kunz-Jacques, and Anthony Leverrier

Fidelity spectrum and phase transitions of quantum systems *(12 pages)* . . . . . 062318
P. D. Sacramento, N. Paunković, and V. R. Vieira

Design of additive quantum codes via the code-word-stabilized framework *(11 pages)* . . . . . 062319
Alexey A. Kovalev, Ilya Dumer, and Leonid P. Pryadko

Entanglement creation in low-energy scattering *(11 pages)* . . . . . 062320
Ricardo Weder

Entanglement-assisted codeword stabilized quantum codes *(6 pages)* . . . . . 062321
Jeonghwan Shin, Jun Heo, and Todd A. Brun

Lower bound on concurrence and distillation for arbitrary-dimensional bipartite quantum states *(5 pages)* . . . . . 062322
Ming-Jing Zhao, Xue-Na Zhu, Shao-Ming Fei, and Xianqing Li-Jost

Reducing sequencing complexity in dynamical quantum error suppression by Walsh modulation *(13 pages)* . . . . . 062323
David Hayes, Kaveh Khodjasteh, Lorenza Viola, and Michael J. Biercuk

$M$-ary-state phase-shift-keying discrimination below the homodyne limit *(9 pages)* . . . . . 062324
F. E. Becerra, J. Fan, G. Baumgartner, S. V. Polyakov, J. Goldhar, J. T. Kosloski, and A. Migdall

Purification of mixed states with closed timelike curve is not possible *(5 pages)* . . . . . 062325
Arun K. Pati, Indranil Chakrabarty, and Pankaj Agrawal

How to implement decoy-state quantum key distribution for a satellite uplink with 50-dB channel loss *(8 pages)* 062326
Evan Meyer-Scott, Zhizhong Yan, Allison MacDonald, Jean-Philippe Bourgoin, Hannes Hübel, and Thomas Jennewein

Convex polytopes and quantum separability *(9 pages)* . . . . . 062327
F. Holik and A. Plastino

Irreducible multiqutrit correlations in Greenberger-Horne-Zeilinger-type states *(5 pages)* . . . . . 062328
Fu-Lin Zhang(张福林) and Jing-Ling Chen(陈景灵)

*(Continued)*

**PHYSICAL REVIEW A** **THIRD SERIES, VOLUME 84, NUMBER 6** **DECEMBER 2011**

Quantum tests for the linearity and permutation invariance of Boolean functions *(7 pages)* . . . . . 062329
Mark Hillery and Erika Andersson

Security problem on arbitrated quantum signature schemes *(5 pages)* . . . . . 062330
Jeong Woon Choi, Ku-Young Chang, and Dowon Hong

Fair and optimistic quantum contract signing *(11 pages)* . . . . . 062331
N. Paunković, J. Bouda, and P. Mateus

Rigorous performance bounds for quadratic and nested dynamical decoupling *(11 pages)* . . . . . 062332
Yuhou Xia, Götz S. Uhrig, and Daniel A. Lidar

**Atomic and molecular structure and dynamics**

Casimir interactions between graphene sheets and metamaterials *(7 pages)* . . . . . 062501
D. Drosdoff and Lilia M. Woods

Ultrahigh-resolution spectroscopy with atomic or molecular dark resonances: Exact steady-state line shapes and asymptotic profiles in the adiabatic pulsed regime *(17 pages)* . . . . . 062502
Thomas Zanon-Willette, Emeric de Clercq, and Ennio Arimondo

Repulsive and attractive Casimir interactions in liquids *(6 pages)* . . . . . 062503
Anh D. Phan and N. A. Viet

Scalar vertex operator for bound-state QED in the Coulomb gauge *(4 pages)* . . . . . 062504
Johan Holmberg

Sensitivity of transitions in internal rotor molecules to a possible variation of the proton-to-electron mass ratio *(12 pages)* . . . . . 062505
Paul Jansen, Isabelle Kleiner, Li-Hong Xu, Wim Ubachs, and Hendrick L. Bethlem

Radiative one- and two-electron transitions into the empty $K$ shell of He-like ions *(9 pages)* . . . . . 062506
Riddhi Kadrekar and L. Natarajan

Full configuration-interaction calculations with the simplest iterative complement method: Merit of the inverse Hamiltonian *(7 pages)* . . . . . 062507
Hiroshi Nakatsuji

Precision measurement of the decay rate of the negative positronium ion $Ps^-$ *(9 pages)* . . . . . 062508
Hubert Ceeh, Christoph Hugenschmidt, Klaus Schreckenbach, Stefan A. Gärtner, Peter G. Thirolf, Frank Fleischer, and Dirk Schwalm

Casimir forces at the threshold of the Cherenkov effect *(7 pages)* . . . . . 062509
Stanislav I. Maslovski and Mário G. Silveirinha

Isotope shift of the electric-dipole transition in $Os^-$ *(5 pages)* . . . . . 062510
A. Kellerbauer, C. Canali, A. Fischer, U. Warring, and S. Fritzsche

Spectroscopic prescription for optimal stimulated Raman transfer of ultracold heteronuclear molecules to the lowest rovibronic level *(7 pages)* . . . . . 062511
Jin-Tae Kim, Yonghoon Lee, Bongsoo Kim, Dajun Wang, William C. Stwalley, Phillip L. Gould, and Edward E. Eyler

*(Continued)*

**PHYSICAL REVIEW A** **THIRD SERIES, VOLUME 84, NUMBER 6** **DECEMBER 2011**

XUV frequency-comb metrology on the ground state of helium *(16 pages)* . . . . . 062512
Dominik Z. Kandula, Christoph Gohle, Tjeerd J. Pinkert, Wim Ubachs, and Kjeld S. E. Eikema

Spectroscopy of the methane $\nu_3$ band with an accurate midinfrared coherent dual-comb spectrometer *(9 pages)* . . . . . 062513
E. Baumann, F. R. Giorgetta, W. C. Swann, A. M. Zolot, I. Coddington, and N. R. Newbury

*Ab initio* study of permanent electric dipole moment and radiative lifetimes of alkaline-earth-metal–Li molecules *(7 pages)* . . . . . 062514
Geetha Gopakumar, Minori Abe, Masatoshi Kajita, and Masahiko Hada

Radiative double-electron capture by bare nucleus with emission of one photon *(12 pages)* . . . . . 062515
E. A. Chernovskaya, O. Yu. Andreev, and L. N. Labzowsky

**Atomic and molecular collisions and interactions**

Calculation of intermediate-energy electron-impact ionization of molecular hydrogen and nitrogen using the paraxial approximation *(8 pages)* . . . . . 062701
Vladislav V. Serov

Low-energy elastic electron interactions with pyrimidine *(8 pages)* . . . . . 062702
Prasanga Palihawadana, James Sullivan, Michael Brunger, Carl Winstead, Vincent McKoy, Gustavo Garcia, F. Blanco, and Stephen Buckman

Universalities in ultracold reactions of alkali-metal polar molecules *(11 pages)* . . . . . 062703
Goulven Quéméner, John L. Bohn, Alexander Petrov, and Svetlana Kotochigova

Trimers in the resonant $(2 + 1)$-fermion problem on a narrow Feshbach resonance: Crossover from Efimovian to hydrogenoid spectrum *(24 pages)* . . . . . 062704
Yvan Castin and Edoardo Tignone

Electron-impact vibrational excitation of furan *(12 pages)* . . . . . 062705
L. R. Hargreaves, R. Albaridy, G. Serna, M. C. A. Lopes, and M. A. Khakoo

Three-body radio-frequency association of Efimov trimers *(6 pages)* . . . . . 062706
T. V. Tscherbul and Seth T. Rittenhouse

Particle escapes in an open quantum network via multiple leads *(13 pages)* . . . . . 062707
Tooru Taniguchi and Shin-ichi Sawada

Convergent close-coupling calculations of helium single ionization by antiproton impact *(6 pages)* . . . . . 062708
I. B. Abdurakhmanov, A. S. Kadyrov, D. V. Fursa, I. Bray, and A. T. Stelbovics

Cross sections for elastic electron scattering by tetramethylsilane in the intermediate-energy range *(6 pages)* . . . . . 062709
R. T. Sugohara, M.-T. Lee, G. L. C. de Souza, M. G. P. Homem, and I. Iga

Theoretical description of two ultracold atoms in finite three-dimensional optical lattices using realistic interatomic interaction potentials *(17 pages)* . . . . . 062710
Sergey Grishkevich, Simon Sala, and Alejandro Saenz

Cold collisions of PH ($^3\Sigma^-$) with helium in magnetic fields *(9 pages)* . . . . . 062711
Eryin Feng, Chunhua Yu, Chunyan Sun, Xi Shao, and Wuying Huang

*(Continued)*

**PHYSICAL REVIEW A** **THIRD SERIES, VOLUME 84, NUMBER 6** **DECEMBER 2011**

Ultracold bosons in the vicinity of a narrow resonance: Shallow dimer and recombination *(11 pages)* . . . . . 062712
Ludovic Pricoupenko and Mattia Jona-Lasinio

Electron-impact ionization of $C^+$ excited states *(5 pages)* . . . . . 062713
C. P. Ballance, S. D. Loch, J. A. Ludlow, Sh. A. Abdel-Naby, and M. S. Pindzola

Electron collisions with hydrogen-bonded complexes *(4 pages)* . . . . . 062714
T. C. Freitas, S. d'A. Sanchez, M. T. do N. Varella, and M. H. F. Bettega

Ion-induced triple fragmentation of $CO_2^{3+}$ into $C^+ + O^+ + O^+$ *(5 pages)* . . . . . 062715
M. R. Jana, P. N. Ghosh, B. Bapat, R. K. Kushawaha, K. Saha, I. A. Prajapati, and C. P. Safvan

Charge transfer in collisions between diatomic molecular ions and atomic hydrogen using merged beams *(5 pages)* 062716
V. M. Andrianarijaona, I. N. Draganić, D. G. Seely, and C. C. Havener

High-resolution total-cross-section measurements for electron scattering from Ar, Kr, and Xe employing a threshold-photoelectron source *(13 pages)* . . . . . 062717
M. Kurokawa, M. Kitajima, K. Toyoshima, T. Kishino, T. Odagiri, H. Kato, M. Hoshino, H. Tanaka, and K. Ito

**Photon, electron, atom, and molecule interactions with solids and surfaces**

Production of excitons in grazing collisions of protons with LiF surfaces: An onion model *(11 pages)* . . . . . 062901
J. E. Miraglia and M. S. Gravielle

**Clusters (including fullerenes)**

Confinement and correlation effects in the $Xe@C_{60}$ generalized oscillator strengths *(6 pages)* . . . . . 063201
M. Ya. Amusia, L. V. Chernysheva, and V. K. Dolmatov

**Atomic and molecular processes in external fields, including interactions with strong fields and short pulses**

Prospects for rapid deceleration of small molecules by optical bichromatic forces *(10 pages)* . . . . . 063401
M. A. Chieda and E. E. Eyler

Interaction-induced stabilization of circular Rydberg atoms *(17 pages)* . . . . . 063402
Bernd Hezel, Michael Mayle, and Peter Schmelcher

Probing dielectric-response effects with attosecond time-resolved streaked photoelectron spectroscopy of metal surfaces *(7 pages)* . . . . . 063403
C.-H. Zhang and U. Thumm

Ionization of a lithium ion by electron impact in a strong laser field *(10 pages)* . . . . . 063404
S. Ghosh Deb, A. Chattopadhyay, and C. Sinha

Doubly resonant three-photon double ionization of Ar atoms induced by an EUV free-electron laser *(4 pages)* . . . 063405
E. V. Gryzlova, Ri Ma, H. Fukuzawa, K. Motomura, A. Yamada, K. Ueda, A. N. Grum-Grzhimailo, N. M. Kabachnik, S. I. Strakhova, A. Rouzée, A. Hundermark, M. J. J. Vrakking, P. Johnsson, K. Nagaya, S. Yase, Y. Mizoguchi, M. Yao, M. Nagasono, K. Tono, T. Togashi, Y. Senba, H. Ohashi, M. Yabashi, and T. Ishikawa

*(Continued)*

**PHYSICAL REVIEW A** **THIRD SERIES, VOLUME 84, NUMBER 6** **DECEMBER 2011**

High-order-harmonic generation in gas with a flat-top laser beam *(6 pages)* . . . . . 063406
W. Boutu, T. Auguste, O. Boyko, I. Sola, Ph. Balcou, L. Binazon, O. Gobert, H. Merdji, C. Valentin, E. Constant, E. Mével, and B. Carré

Polarization of nuclear spins by a cold nanoscale resonator *(26 pages)* . . . . . 063407
Mark C. Butler and Daniel P. Weitekamp

Competition between two-photon-resonant three-photon ionization and four-wave mixing in Xe *(5 pages)* . . . . . 063408
Hidekazu Nagai and Taisuke Nakanaga

Direct imaging of the Fermi resonance interaction in *para*-difluorobenzene: A special insight into energy redistributions in the $S_1$ low-energy regime *(6 pages)* . . . . . 063409
Jinyou Long, Chaochao Qin, Yuzhu Liu, Song Zhang, and Bing Zhang

Optical pumping and spectroscopy of Cs vapor at high magnetic field *(11 pages)* . . . . . 063410
B. A. Olsen, B. Patton, Y.-Y. Jau, and W. Happer

Evolution of superpositions of quantum states through a level crossing *(5 pages)* . . . . . 063411
B. T. Torosov and N. V. Vitanov

Attosecond control of dissociative ionization of $O_2$ molecules *(4 pages)* . . . . . 063412
W. Siu, F. Kelkensberg, G. Gademann, A. Rouzée, P. Johnsson, D. Dowek, M. Lucchini, F. Calegari, U. De Giovannini, A. Rubio, R. R. Lucchese, H. Kono, F. Lépine, and M. J. J. Vrakking

Optimized control of multistate quantum systems by composite pulse sequences *(10 pages)* . . . . . 063413
G. T. Genov, B. T. Torosov, and N. V. Vitanov

Intensity-resolved ionization yields of aniline with femtosecond laser pulses *(5 pages)* . . . . . 063414
J. Strohaber, T. Mohamed, N. Hart, F. Zhu, R. Nava, F. Pham, A. A. Kolomenskii, H. Schroeder, G. G. Paulus, and H. A. Schuessler

Nonadiabatic tunneling in circularly polarized laser fields: Physical picture and calculations *(5 pages)* . . . . . 063415
Ingo Barth and Olga Smirnova

Effects of pulse shape on strongly driven two-level systems *(15 pages)* . . . . . 063416
C. W. S. Conover

Laser-driven Sisyphus cooling in an optical dipole trap *(8 pages)* . . . . . 063417
Vladyslav V. Ivanov and Subhadeep Gupta

Dressed-bound-state molecular strong-field approximation: Application to above-threshold ionization of heteronuclear diatomic molecules *(9 pages)* . . . . . 063418
E. Hasović, M. Busuladžić, W. Becker, and D. B. Milošević

Theory of ac Stark splitting in core-resonant Auger decay in strong x-ray fields *(7 pages)* . . . . . 063419
L. A. A. Nikolopoulos, T. J. Kelly, and J. T. Costello

Low-temperature high-density magneto-optical trapping of potassium using the open $4S \rightarrow 5P$ transition at 405 nm *(8 pages)* . . . . . 063420
D. C. McKay, D. Jervis, D. J. Fine, J. W. Simpson-Porco, G. J. A. Edge, and J. H. Thywissen

Population transfer in the Na *s-p* Rydberg ladder by a chirped microwave pulse *(8 pages)* . . . . . 063421
H. Maeda, J. H. Gurian, and T. F. Gallagher

*(Continued)*

PHYSICAL REVIEW A THIRD SERIES, VOLUME 84, NUMBER 6 DECEMBER 2011

Raman-laser spectroscopy of Wannier-Stark states *(7 pages)* . . . . . 063422
G. Tackmann, B. Pelle, A. Hilico, Q. Beaufils, and F. Pereira dos Santos

Efficient collection of single photons emitted from a trapped ion into a single-mode fiber for scalable quantum-information processing *(10 pages)* . . . . . 063423
Taehyun Kim, Peter Maunz, and Jungsang Kim

Exactly solvable model for nonlinear light-matter interaction in an arbitrary time-dependent field *(9 pages)* . . . . . 063424
J. M. Brown, A. Lotti, A. Teleki, and M. Kolesik

Complex decay patterns in atomic core photoionization disentangled by ion-recoil measurements *(5 pages)* . . . . . 063425
Renaud Guillemin, Cédric Bomme, Thierry Marin, Loic Journel, Tatiana Marchenko, Rajesh K. Kushawaha, Nicolas Trcera, Maria Novella Piancastelli, and Marc Simon

**PART B**

**Matter waves and collective properties of cold atoms and molecules**

Loschmidt echo in one-dimensional interacting Bose gases *(9 pages)* . . . . . 063601
K. Lelas, T. Ševa, and H. Buljan

Impurity in a Bose-Einstein condensate in a double well *(17 pages)* . . . . . 063602
F. Mulansky, J. Mumford, and D. H. J. O'Dell

Topological superfluid in a trapped two-dimensional polarized Fermi gas with spin-orbit coupling *(9 pages)* . . . . . 063603
Jing Zhou, Wei Zhang, and Wei Yi

Vortices in spin-orbit-coupled Bose-Einstein condensates *(14 pages)* . . . . . 063604
J. Radić, T. A. Sedrakyan, I. B. Spielman, and V. Galitski

Rotating Fulde-Ferrell-Larkin-Ovchinnikov state in cold Fermi gases *(9 pages)* . . . . . 063605
Tomohiro Yoshida and Youichi Yanase

Few-body bound complexes in one-dimensional dipolar gases and nondestructive optical detection *(15 pages)* . . . 063606
N. T. Zinner, B. Wunsch, I. B. Mekhov, S.-J. Huang, D.-W. Wang, and E. Demler

Spin segregation via dynamically induced long-range interactions in a system of ultracold fermions *(7 pages)* . . . . 063607
Ulrich Ebling, André Eckardt, and Maciej Lewenstein

Imbalanced ultracold Fermi gas in the weakly repulsive regime: Renormalization-group approach for $p$-wave superfluidity *(7 pages)* . . . . . 063608
Shao-Jian Jiang, Xiao-Lu Yu, and W. M. Liu

Semiclassical spectrum of small Bose-Hubbard chains: A normal-form approach *(7 pages)* . . . . . 063609
A. P. Itin and P. Schmelcher

Binary mixture of pseudo-spin-$\frac{1}{2}$ Bose gases with interspecies spin exchange: From classical fixed points and ground states to quantum ground states *(11 pages)* . . . . . 063610
Rukuan Wu and Yu Shi

Vortex structures of a two-component Bose-Einstein condensate for large anisotropies *(5 pages)* . . . . . 063611
Ran Wei and Erich Mueller

Many-polaron description of impurities in a Bose-Einstein condensate in the weak-coupling regime *(7 pages)* . . . . 063612
W. Casteels, J. Tempere, and J. T. Devreese

*(Continued)*

**PHYSICAL REVIEW A** **THIRD SERIES, VOLUME 84, NUMBER 6** **DECEMBER 2011**

Dynamical phase interferometry of cold atoms in optical lattices *(8 pages)* . . . . . 063613
Uri London and Omri Gat

Finite-temperature properties of one-dimensional hard-core bosons in a quasiperiodic optical lattice *(8 pages)* . . . 063614
Nicolas Nessi and Aníbal Iucci

Dynamical enhancement of spatial entanglement in massive particles *(5 pages)* . . . . . 063615
Michael Lubasch, Florian Mintert, and Sandro Wimberger

Finite-size and particle-number effects in an ultracold Fermi gas at unitarity *(12 pages)* . . . . . 063616
Jens Braun, Sebastian Diehl, and Michael M. Scherer

Controlled wave-packet manipulation with driven optical lattices *(10 pages)* . . . . . 063617
Stephan Arlinghaus and Martin Holthaus

Rashba spin-orbit-coupled atomic Fermi gases *(9 pages)* . . . . . 063618
Lei Jiang, Xia-Ji Liu, Hui Hu, and Han Pu

Ground states of dipolar gases in quasi-one-dimensional ring traps *(13 pages)* . . . . . 063619
Sascha Zöllner

Elementary modes of excitation caused by the quadratic Zeeman term and the sensitivity of spin structures of small spin-2 condensates against the magnetic field *(8 pages)* . . . . . 063620
Y. Z. He and C. G. Bao

Phase diagram of Rydberg atoms with repulsive van der Waals interaction *(5 pages)* . . . . . 063621
O. N. Osychenko, G. E. Astrakharchik, Y. Lutsyshyn, Yu. E. Lozovik, and J. Boronat

Colliding clouds of strongly interacting spin-polarized fermions *(6 pages)* . . . . . 063622
Edward Taylor, Shizhong Zhang, William Schneider, and Mohit Randeria

Atom-interferometric techniques for measuring uniform magnetic field gradients and gravitational acceleration *(17 pages)* . . . . . 063623
B. Barrett, I. Chan, and A. Kumarakrishnan

Vortex structures of rotating spin-orbit-coupled Bose-Einstein condensates *(7 pages)* . . . . . 063624
Xiang-Fa Zhou, Jing Zhou, and Congjun Wu

Long-time-scale dynamics of spin textures in a degenerate $F = 1$ $^{87}$Rb spinor Bose gas *(6 pages)* . . . . . 063625
J. Guzman, G.-B. Jo, A. N. Wenz, K. W. Murch, C. K. Thomas, and D. M. Stamper-Kurn

Universal relations for the two-dimensional spin-1/2 Fermi gas with contact interactions *(4 pages)* . . . . . 063626
Manuel Valiente, Nikolaj T. Zinner, and Klaus Mølmer

Ground-state Dirac monopole *(5 pages)* . . . . . 063627
E. Ruokokoski, V. Pietilä, and M. Möttönen

Creation of a vortex in a Bose-Einstein condensate by superradiant scattering *(5 pages)* . . . . . 063628
M. E. Taşgın, Ö. E. Müstecaplıoğlu, and L. You

Chern numbers hiding in time-of-flight images *(5 pages)* . . . . . 063629
Erhai Zhao, Noah Bray-Ali, Carl J. Williams, I. B. Spielman, and Indubala I. Satija

Gutzwiller study of extended Hubbard models with fixed boson densities *(12 pages)* . . . . . 063630
Takashi Kimura

*(Continued)*

**PHYSICAL REVIEW A** **THIRD SERIES, VOLUME 84, NUMBER 6** **DECEMBER 2011**

Thermalization of atom-molecule Bose gases in a double-well potential *(11 pages)* . . . . . 063631
Atsushi Motohashi

Orthogonality catastrophe as a consequence of qubit embedding in an ultracold Fermi gas *(6 pages)* . . . . . 063632
J. Goold, T. Fogarty, N. Lo Gullo, M. Paternostro, and Th. Busch

Collective modes, stability, and superfluid transition of a quasi-two-dimensional dipolar Fermi gas *(20 pages)* . . . 063633
L. M. Sieberer and M. A. Baranov

Quantum entangled ground states of two spinor Bose-Einstein condensates *(6 pages)* . . . . . 063634
Z. F. Xu, R. Lü, and L. You

Many-site coherence revivals in the extended Bose-Hubbard model and the Gutzwiller approximation *(8 pages)* . . . . . 063635
Uwe R. Fischer and Bo Xiong

Spin-1 atoms in optical superlattices: Single-atom tunneling and entanglement *(13 pages)* . . . . . 063636
Andreas Wagner, Christoph Bruder, and Eugene Demler

Superfluid-to-Mott-insulator transition in the one-dimensional Bose-Hubbard model for arbitrary integer filling factors *(6 pages)* . . . . . 063637
Ippei Danshita and Anatoli Polkovnikov

Superfluidity of Bose-Einstein condensates in toroidal traps with nonlinear lattices *(8 pages)* . . . . . 063638
A. V. Yulin, Yu. V. Bludov, V. V. Konotop, V. Kuzmiak, and M. Salerno

*d*-wave superfluidity in optical lattices of ultracold polar molecules *(20 pages)* . . . . . 063639
Kevin A. Kuns, Ana Maria Rey, and Alexey V. Gorshkov

**Quantum optics, physics of lasers, nonlinear optics, classical optics**

Entanglement of a two-mode field in a collective three-level atomic system *(8 pages)* . . . . . 063801
Zhao-Hong Tang and Gao-Xiang Li

Slow light with photorefractive four-wave mixing *(10 pages)* . . . . . 063802
Pierre Mathey, Grégory Gadret, and Konstantin Shcherbin

Two-photon transport in a waveguide coupled to a cavity in a two-level system *(8 pages)* . . . . . 063803
T. Shi (石弢), Shanhui Fan (范汕洄), and C. P. Sun (孙昌璞)

Equivalence between free-electron-laser oscillators and actively-mode-locked lasers: Detailed studies of temporal, spatiotemporal, and spectrotemporal dynamics *(8 pages)* . . . . . 063804
C. Bruni, T. Legrand, C. Szwaj, S. Bielawski, and M. E. Couprie

Bouncing plasmonic waves in half-parabolic potentials *(4 pages)* . . . . . 063805
Wei Liu, Dragomir N. Neshev, Andrey E. Miroshnichenko, Ilya V. Shadrivov, and Yuri S. Kivshar

Quantum-mechanical theory of optomechanical Brillouin cooling *(5 pages)* . . . . . 063806
Matthew Tomes, Florian Marquardt, Gaurav Bahl, and Tal Carmon

Phase-dependent coherent population trapping and optical switching *(6 pages)* . . . . . 063807
J. Kou, R. G. Wan, Z. H. Kang, L. Jiang, L. Wang, Y. Jiang, and J. Y. Gao

*(Continued)*

**PHYSICAL REVIEW A** **THIRD SERIES, VOLUME 84, NUMBER 6** **DECEMBER 2011**

Effect of dephasing on transient and steady-state entanglement in a quantum-beat laser *(8 pages)* . . . . . 063808
Eyob A. Sete

Bistability and instability of dark-antidark solitons in the cubic-quintic nonlinear Schrödinger equation *(8 pages)* 063809
M. Crosta, A. Fratalocchi, and S. Trillo

Strongly coupling a cavity to inhomogeneous ensembles of emitters: Potential for long-lived solid-state quantum memories *(9 pages)* . . . . . 063810
I. Diniz, S. Portolan, R. Ferreira, J. M. Gérard, P. Bertet, and A. Auffèves

Phase control of group velocity in a dielectric slab doped with three-level ladder-type atoms *(7 pages)* . . . . . 063811
D. Jafari, M. Sahrai, H. Motavalli, and M. Mahmoudi

Coherent generation and dynamic manipulation of double stationary light pulses in a five-level double-tripod system of cold atoms *(6 pages)* . . . . . 063812
Qian-Qian Bao, Xiao-Hang Zhang, Jun-Yan Gao, Yan Zhang, Cui-Li Cui, and Jin-Hui Wu

Extreme nonlinear response of ultranarrow optical transitions in cavity QED for laser stabilization *(6 pages)* . . . . . 063813
M. J. Martin, D. Meiser, J. W. Thomsen, Jun Ye, and M. J. Holland

Phase-mediated long-range interactions of cavity solitons in a semiconductor laser with a saturable absorber *(7 pages)* . . . . . 063814
H. Vahed, R. Kheradmand, H. Tajalli, G. Tissoni, L. A. Lugiato, and F. Prati

Probing mechanical quantum coherence with an ultracold-atom meter *(7 pages)* . . . . . 063815
N. Lo Gullo, Th. Busch, G. M. Palma, and M. Paternostro

Quantum phase transitions for two coupled cavities with dipole-interaction atoms *(8 pages)* . . . . . 063816
Lei Tan, Yu-Qing Zhang, and Wu-Ming Liu

Coherent x-ray generation from below-threshold harmonics *(8 pages)* . . . . . 063817
Ji-Cai Liu, Markus C. Kohler, Christoph H. Keitel, and Karen Z. Hatsagortsyan

Photonic band gaps in three-dimensional network structures with short-range order *(6 pages)* . . . . . 063818
Seng Fatt Liew, Jin-Kyu Yang, Heeso Noh, Carl F. Schreck, Eric R. Dufresne, Corey S. O'Hern, and Hui Cao

Enhancement of peak intensity in a filament core with spatiotemporally focused femtosecond laser pulses *(7 pages)* 063819
Bin Zeng, Wei Chu, Hui Gao, Weiwei Liu, Guihua Li, Haisu Zhang, Jinping Yao, Jielei Ni, See Leang Chin, Ya Cheng, and Zhizhan Xu

Conservation of the photon number in the generalized nonlinear Schrödinger equation in axially varying optical fibers *(7 pages)* . . . . . 063820
O. Vanvincq, J. C. Travers, and A. Kudlinski

Quantum superpositions of crystalline structures *(10 pages)* . . . . . 063821
Jens D. Baltrusch, Cecilia Cormick, Gabriele De Chiara, Tommaso Calarco, and Giovanna Morigi

Consistency of certain constitutive relations with quantum electromagnetism *(10 pages)* . . . . . 063822
S. A. R. Horsley

Ultrahigh sensitivity of rotation sensing beyond the trade-off between sensitivity and linewidth by the storage of light in a dynamic slow-light resonator *(11 pages)* . . . . . 063823
Xuenan Zhang (张学楠), Yundong Zhang (掌蕴东), He Tian (田赫), Hao Wu (吴昊), Geng Li (李赓), Ruidong Zhu (朱瑞冬), and Ping Yuan (袁萍)

*(Continued)*

**PHYSICAL REVIEW A** **THIRD SERIES, VOLUME 84, NUMBER 6** **DECEMBER 2011**

Reflective ghost imaging through turbulence *(12 pages)* . . . . . 063824
Nicholas D. Hardy and Jeffrey H. Shapiro

Crossing of manifolds leads to flat dispersion: Blazed Littrow waveguides *(5 pages)* . . . . . 063825
H. Benisty, N. Piskunov, P. K. Kashkarov, and O. Khayam

Singularity-driven second- and third-harmonic generation at $\epsilon$-near-zero crossing points *(6 pages)* . . . . . 063826
M. A. Vincenti, D. de Ceglia, A. Ciattoni, and M. Scalora

Optomechanical entanglement in the presence of laser phase noise *(5 pages)* . . . . . 063827
R. Ghobadi, A. R. Bahrampour, and C. Simon

Structure of whispering-gallery modes in optical microdisks perturbed by nanoparticles *(9 pages)* . . . . . 063828
Jan Wiersig

Nonclassicality in phase-number uncertainty relations *(7 pages)* . . . . . 063829
Paloma Matía-Hernando and Alfredo Luis

Chirped femtosecond solitons and double-kink solitons in the cubic-quintic nonlinear Schrödinger equation with self-steepening and self-frequency shift *(6 pages)* . . . . . 063830
Alka, Amit Goyal, Rama Gupta, C. N. Kumar, and Thokala Soloman Raju

Broadband colored-crescent generation in a single $\beta$-barium-borate crystal by intense femtosecond pulses *(5 pages)* 063831
L. Wang, Y. X. Fan, H. Zhu, Z. D. Yan, H. Zeng, H.-T. Wang, S. N. Zhu, and Z. L. Wang

Few-photon transport in a waveguide coupled to a pair of colocated two-level atoms *(6 pages)* . . . . . 063832
Eden Rephaeli, Şükrü Ekin Kocabaş, and Shanhui Fan

Quantum noise and mode nonorthogonality in non-Hermitian $\mathcal{PT}$-symmetric optical resonators *(14 pages)* . . . . . 063833
Gwangsu Yoo, H.-S. Sim, and Henning Schomerus

Approaching perfect microwave photodetection in circuit QED *(8 pages)* . . . . . 063834
B. Peropadre, G. Romero, G. Johansson, C. M. Wilson, E. Solano, and J. J. García-Ripoll

Coherent control of refractive index in far-detuned $\Lambda$ systems *(8 pages)* . . . . . 063835
Chris O'Brien, Petr M. Anisimov, Yuri Rostovtsev, and Olga Kocharovskaya

High-sensitivity three-mode optomechanical transducer *(6 pages)* . . . . . 063836
C. Zhao, Q. Fang, S. Susmithan, H. Miao, L. Ju, Y. Fan, D. Blair, D. J. Hosken, J. Munch, P. J. Veitch, and B. J. J. Slagmolen

Complex coordinates in transformation optics *(6 pages)* . . . . . 063837
Bogdan-Ioan Popa and Steven A. Cummer

Understanding the dynamics of photoionization-induced nonlinear effects and solitons in gas-filled hollow-core photonic crystal fibers *(9 pages)* . . . . . 063838
Mohammed F. Saleh and Fabio Biancalana

Surface-induced nonlinearity enhancement in subwavelength rod waveguides *(7 pages)* . . . . . 063839
A. Marini, R. Hartley, A. V. Gorbach, and D. V. Skryabin

Coherent and thermal light: Tunable hybrid states with second-order coherence without first-order coherence *(5 pages)* . . . . . 063840
Martin Blazek and Wolfgang Elsäßer

*(Continued)*

**PHYSICAL REVIEW A** **THIRD SERIES, VOLUME 84, NUMBER 6** **DECEMBER 2011**

Constructive and destructive quantum interference sensitive to quantum vacuum mode structure in a metallic waveguide *(6 pages)* . . . . . 063841
Jian Qi Shen

Quantum complementarity of cavity photons coupled to a three-level system *(8 pages)* . . . . . 063842
R. Vilardi, A. Ridolfo, S. Portolan, S. Savasta, and O. Di Stefano

Wavelength-scale deformed microdisk lasers *(8 pages)* . . . . . 063843
Q. H. Song, Li Ge, J. Wiersig, J.-B. Shim, J. Unterhinninghofen, A. Eberspächer, W. Fang, G. S. Solomon, and Hui Cao

Nonponderomotive electron acceleration in ultrashort surface-plasmon fields *(5 pages)* . . . . . 063844
Péter Rácz and Péter Dombi

Energy transfer, orbital angular momentum, and discrete current in a double-ring fiber array *(11 pages)* . . . . . 063845
C. N. Alexeyev, A. V. Volyar, and M. A. Yavorsky

Comparative investigation of third- and fifth-harmonic generation in atomic and molecular gases driven by midinfrared ultrafast laser pulses *(4 pages)* . . . . . 063846
Jielei Ni, Jinping Yao, Bin Zeng, Wei Chu, Guihua Li, Haisu Zhang, Chenrui Jing, S. L. Chin, Y. Cheng, and Z. Xu

Partial angular coherence and the angular Schmidt spectrum of entangled two-photon fields *(6 pages)* . . . . . 063847
Anand Kumar Jha, Girish S. Agarwal, and Robert W. Boyd

Resonant photo-pumping x-ray-laser scheme using intense characteristic x rays for water-window radiation generation *(7 pages)* . . . . . 063848
Tetsuya Kawachi and Yoshiaki Kato

Subwavelength atom localization via quantum coherence in a three-level atomic system *(8 pages)* . . . . . 063849
Fazal Ghafoor

Steady-state entanglement and normal-mode splitting in an atom-assisted optomechanical system with intensity-dependent coupling *(11 pages)* . . . . . 063850
Sh. Barzanjeh, M. H. Naderi, and M. Soltanolkotabi

Single-photon pulse propagation in and into a medium of two-level atoms: Microscopic Fresnel equations *(14 pages)* 063851
P. R. Berman and C. H. Raymond Ooi

## BRIEF REPORTS

### Fundamental concepts

Imprinting interference fringes in massive optomechanical systems *(4 pages)* . . . . . 064101
Ole Steuernagel

Thermal correction to the molar polarizability of a Boltzmann gas *(3 pages)* . . . . . 064102
U. D. Jentschura, M. Puchalski, and P. J. Mohr

### Quantum information

Coupling mechanism between microscopic two-level system and superconducting qubits *(5 pages)* . . . . . 064301
Zhen-Tao Zhang and Yang Yu

*(Continued)*

**PHYSICAL REVIEW A** **THIRD SERIES, VOLUME 84, NUMBER 6** **DECEMBER 2011**

Steady-state entanglement for distant atoms by dissipation in coupled cavities *(4 pages)* . . . . . 064302
Li-Tuo Shen, Xin-Yu Chen, Zhen-Biao Yang, Huai-Zhi Wu, and Shi-Biao Zheng

**Atomic and molecular structure and dynamics**

Heliumlike and lithiumlike ionic sequences: Critical charges *(4 pages)* . . . . . 064501
N. L. Guevara and A. V. Turbiner

Constraint on axionlike particles from atomic physics *(2 pages)* . . . . . 064502
S. G. Karshenboim and V. V. Flambaum

Three-body hyperspherical method with infinite angular expansions *(4 pages)* . . . . . 064503
Hui-Li Han, Li-Yan Tang, and Ting-Yun Shi

**Atomic and molecular processes in external fields, including interactions with strong fields and short pulses**

Parity-selective enhancement of field-free molecular orientation in an intense two-color laser field *(4 pages)* . . . . . 065401
Hyeok Yun, Hyung Taek Kim, Chul Min Kim, Chang Hee Nam, and Jongmin Lee

Temporal analysis of nonresonant two-photon coherent control involving bound and dissociative molecular states *(4 pages)* . . . . . 065402
Jing Su, Shaohao Chen, Agnieszka Jaroń-Becker, and Andreas Becker

Effect of wave-function localization on the time delay in photoemission from surfaces *(4 pages)* . . . . . 065403
C.-H. Zhang and U. Thumm

Arbitrarily accurate narrowband composite pulse sequences *(4 pages)* . . . . . 065404
Nikolay V. Vitanov

Differential study on molecular suppressed ionization in intense linearly and circularly polarized laser fields *(5 pages)* . . . . . 065405
Yongkai Deng, Yunquan Liu, Xianrong Liu, Hong Liu, Yudong Yang, Chengyin Wu, and Qihuang Gong

Enhancing photoassociation efficiency by using a picosecond laser pulse with cubic-phase modulation *(5 pages)* 065406
Wei Zhang(张为), Ting Xie(谢廷), Yin Huang(黄寅), and Shu-Lin Cong(丛书林)

**Matter waves and collective properties of cold atoms and molecules**

First Mott lobe of bosons with local two- and three-body interactions *(4 pages)* . . . . . 065601
J. Silva-Valencia and A. M. C. Souza

Anderson localization in optical lattices with speckle disorder *(3 pages)* . . . . . 065602
Serpil Sucu, Saban Aktas, S. Erol Okan, Zehra Akdeniz, and Patrizia Vignolo

**Quantum optics, physics of lasers, nonlinear optics, classical optics**

Optimal filling factor of nanorod lenses for subwavelength imaging *(4 pages)* . . . . . 065801
Sergey Yu. Kosulnikov, Elizaveta A. Yankovskaya, Stanislav I. Maslovski, Pavel A. Belov, and Yuri S. Kivshar

Addendum to "Scattering of twisted particles: Extension to wave packets and orbital helicity" *(2 pages)* . . . . . 065802
I. P. Ivanov and V. G. Serbo

*(Continued)*

**PHYSICAL REVIEW A** **THIRD SERIES, VOLUME 84, NUMBER 6** **DECEMBER 2011**

## COMMENTS

Comment on "Optical rogue waves in telecommunication data streams" *(1 page)* . . . . . 067801
Eric Lantz

Reply to "Comment on 'Optical rogue waves in telecommunication data streams"' *(2 pages)* . . . . . 067802
Sergey Vergeles and Sergei K. Turitsyn

## ERRATA

Erratum: Microscopic model of electric-field-noise heating in ion traps [Phys. Rev. A **84**, 023412 (2011)] *(1 page)* 069901(E)
A. Safavi-Naini, P. Rabl, P. F. Weck, and H. R. Sadeghpour

Publisher's Note: Third-order perturbation theory for van der Waals interaction coefficients [Phys. Rev. A **84**, 052502 (2011)] *(1 page)* . . . . . 069902(E)
Li-Yan Tang, Zong-Chao Yan, Ting-Yun Shi, and J. Mitroy

Erratum: Optical homodyne tomography with polynomial series expansion [Phys. Rev. A **84**, 032104 (2011)] *(1 page)* . . . . . 069903(E)
Hugo Benichi and Akira Furusawa

Erratum: Resonance phenomena in $e^+$-Li collisions [Phys. Rev. A **83**, 032718 (2011)] *(1 page)* . . . . . 069904(E)
F. Liu, Y. Cheng, Y. Zhou, and L. Jiao

Erratum: Quantum teleportation of nonclassical wave packets: An effective multimode theory [Phys. Rev. A **84**, 012308 (2011)] *(1 page)* . . . . . 069905(E)
Hugo Benichi, Shuntaro Takeda, Noriyuki Lee, and Akira Furusawa

Erratum: Scattering of twisted particles: Extension to wave packets and orbital helicity [Phys. Rev. A **84**, 033804 (2011)] *(1 page)* . . . . . 069906(E)
I. P. Ivanov and V. G. Serbo

Publisher's Note: Efficient multipartite entanglement purification with the entanglement link from a subspace [Phys. Rev. A **84**, 052312 (2011)] *(1 page)* . . . . . 069907(E)
Fu-Guo Deng

Erratum: $5p$ photoemission from laser-excited cesium atoms [Phys. Rev. A **73**, 062721 (2006)] *(1 page)* . . . . . 069908(E)
J. Schulz, M. Määttä, S. Heinäsmäki, M. Huttula, R. Sankari, E. Kukk, T. Rander, S. Svensson, S. Aksela, and H. Aksela

Erratum: Collective dipole excitations in sodium clusters [Phys. Rev. A **79**, 023202 (2009)] *(1 page)* . . . . . 069909(E)
A. A. Raduta, R. Budaca, and Al. H. Raduta

Erratum: Simulation of non-Abelian anyons using ribbon operators connected to a common base site [Phys. Rev. A **84**, 052314 (2011)] *(1 page)* . . . . . 069910(E)
Xi-Wang Luo, Yong-Jian Han, Guang-Can Guo, Xingxiang Zhou, and Zheng-Wei Zhou

Publisher's Note: Full configuration-interaction calculations with the simplest iterative complement method: Merit of the inverse Hamiltonian [Phys. Rev. A **84**, 062507 (2011)] *(1 page)* . . . . . 069911(E)
Hiroshi Nakatsuji