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 1
PARTS A AND B

CONTENTS

JULY 2011

The Table of Contents is a total listing of Parts A and B.
Part A consists of pages 010001(R)-012902, and Part B pages 013401-019907(E).

PART A

Physical Review A Editorial Policies and Practices iii
Physical Review A Information for Contributors viii

EDITORIALS AND ANNOUNCEMENTS

Editorial: Redefining Length *(1 page)* 010001

RAPID COMMUNICATIONS

Quantum information

High-fidelity quantum memory using nitrogen-vacancy center ensemble for hybrid quantum computation *(4 pages)* 010301(R)
W. L. Yang, Z. Q. Yin, Y. Hu, M. Feng, and J. F. Du

Semi-device-independent security of one-way quantum key distribution *(4 pages)* . . . . . 010302(R)
Marcin Pawłowski and Nicolas Brunner

Enhanced quantum communication via optical refocusing *(4 pages)* . . . . . 010303(R)
Cosmo Lupo, Vittorio Giovannetti, Stefano Pirandola, Stefano Mancini, and Seth Lloyd

Heralded-qubit amplifiers for practical device-independent quantum key distribution *(4 pages)* . . . . . 010304(R)
Marcos Curty and Tobias Moroder

Atomic and molecular structure and dynamics

Lifetime measurement of the cesium $6P_{3/2}$ state using ultrafast laser-pulse excitation and ionization *(4 pages)* . . . 010501(R)
J. F. Sell, B. M. Patterson, T. Ehrenreich, G. Brooke, J. Scoville, and R. J. Knize

Parity nonconservation in ytterbium ion *(4 pages)* . . . . . 010502(R)
B. K. Sahoo and B. P. Das

Computation of Casimir interactions between arbitrary three-dimensional objects with arbitrary material properties *(4 pages)* . . . . . 010503(R)
M. T. Homer Reid, Jacob White, and Steven G. Johnson

Copyright 2011 by American Physical Society

(Continued)

1050-2947(201107)84:1:B;1-K

Selected for a Viewpoint in *Physics*. Please visit http://physics.aps.org/.

PHYSICAL REVIEW A THIRD SERIES, VOLUME 84, NUMBER 1 JULY 2011

Atomic and molecular collisions and interactions

Rydberg-Rydberg interaction profile from the excitation dynamics of ultracold atoms in lattices *(4 pages)* . . . . . 010701(R)
Michael Mayle, Wolfgang Zeller, Nikolas Tezak, and Peter Schmelcher

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

Coherent flash of light emitted by a cold atomic cloud *(4 pages)* . . . . . 011401(R)
M. Chalony, R. Pierrat, D. Delande, and D. Wilkowski

Matter waves and collective properties of cold atoms and molecules

Strongly interacting isotopic Bose-Fermi mixture immersed in a Fermi sea *(4 pages)* . . . . . 011601(R)
Cheng-Hsun Wu, Ibon Santiago, Jee Woo Park, Peyman Ahmadi, and Martin W. Zwierlein

Quantum criticality and universal scaling of strongly attractive spin-imbalanced Fermi gases in a one-dimensional harmonic trap *(4 pages)* . . . . . 011602(R)
Xiangguo Yin, Xi-Wen Guan, Shu Chen, and Murray T. Batchelor

Dual-species Bose-Einstein condensate of ^{87}Rb and ^{133}Cs *(4 pages)* . . . . . 011603(R)
D. J. McCarron, H. W. Cho, D. L. Jenkin, M. P. Köppinger, and S. L. Cornish

Emergence of a new pair-coherent phase in many-body quenches of repulsive bosons *(4 pages)* . . . . . 011604(R)
Uwe R. Fischer, Kang-Soo Lee, and Bo Xiong

Guiding-center dynamics of vortex dipoles in Bose-Einstein condensates *(4 pages)* . . . . . 011605(R)
S. Middelkamp, P. J. Torres, P. G. Kevrekidis, D. J. Frantzeskakis, R. Carretero-González, P. Schmelcher, D. V. Freilich, and D. S. Hall

Quantum degenerate mixture of ytterbium and lithium atoms *(4 pages)* . . . . . 011606(R)
Anders H. Hansen, Alexander Khramov, William H. Dowd, Alan O. Jamison, Vladyslav V. Ivanov, and Subhadeep Gupta

Textures of $F = 2$ spinor Bose-Einstein condensates with spin-orbit coupling *(4 pages)* . . . . . 011607(R)
Takuto Kawakami, Takeshi Mizushima, and Kazushige Machida

Pairing-gap, pseudogap, and no-gap phases in the radio-frequency spectra of a trapped unitary ^{6}Li gas *(4 pages)* . . . . . 011608(R)
P. Pieri, A. Perali, G. C. Strinati, S. Riedl, M. J. Wright, A. Altmeyer, C. Kohstall, E. R. Sánchez Guajardo, J. Hecker Denschlag, and R. Grimm

Local and spatially extended sub-Poisson atom-number fluctuations in optical lattices *(4 pages)* . . . . . 011609(R)
C. Gross, J. Estève, M. K. Oberthaler, A. D. Martin, and J. Ruostekoski

Bose-Einstein condensate in gases of rare atomic species *(4 pages)* . . . . . 011610(R)
Seiji Sugawa, Rekishu Yamazaki, Shintaro Taie, and Yoshiro Takahashi

Gauge fields emerging from time-reversal symmetry breaking for spin-5/2 fermions in a honeycomb lattice *(4 pages)* . . . . . 011611(R)
G. Szirmai, E. Szirmai, A. Zamora, and M. Lewenstein

(Continued)

Selected for a Viewpoint in *Physics*. Please visit http://physics.aps.org/.

PHYSICAL REVIEW A THIRD SERIES, VOLUME 84, NUMBER 1 JULY 2011

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

Anderson localization of partially incoherent light *(4 pages)* . . . . . 011801(R)
D. Čapeta, J. Radić, A. Szameit, M. Segev, and H. Buljan

Trapping a single atom with a fraction of a photon using a photonic crystal nanocavity *(4 pages)* . . . . . 011802(R)
D. van Oosten and L. Kuipers

Quantum-dot-induced phase shift in a pillar microcavity *(4 pages)* . . . . . 011803(R)
A. B. Young, R. Oulton, C. Y. Hu, A. C. T. Thijssen, C. Schneider, S. Reitzenstein, M. Kamp, S. Höfling, L. Worschech, A. Forchel, and J. G. Rarity

Thermal-noise-limited crystalline whispering-gallery-mode resonator for laser stabilization *(4 pages)* . . . . . 011804(R)
J. Alnis, A. Schliesser, C. Y. Wang, J. Hofer, T. J. Kippenberg, and T. W. Hänsch

Coupling of a single diamond nanocrystal to a whispering-gallery microcavity: Photon transport benefitting from Rayleigh scattering *(4 pages)* . . . . . 011805(R)
Yong-Chun Liu, Yun-Feng Xiao, Bei-Bei Li, Xue-Feng Jiang, Yan Li, and Qihuang Gong

Ultrabroadband coherent supercontinuum frequency comb *(4 pages)* . . . . . 011806(R)
Axel Ruehl, Michael J. Martin, Kevin C. Cossel, Lisheng Chen, Hugh McKay, Brian Thomas, Craig Benko, Liang Dong, John M. Dudley, Martin E. Fermann, Ingmar Hartl, and Jun Ye

Mapping the mechanical action of light *(4 pages)* . . . . . 011807(R)
Dana C. Kohlgraf-Owens, Sergey Sukhov, and Aristide Dogariu

ARTICLES

Fundamental concepts

Inferring the Gibbs state of a small quantum system *(12 pages)* 012101
Jochen Rau

Minimum error discrimination between similarity-transformed quantum states *(9 pages)* 012102
M. A. Jafarizadeh, R. Sufiani, and Y. Mazhari Khiavi

Magnetic field sensing beyond the standard quantum limit under the effect of decoherence *(5 pages)* 012103
Yuichiro Matsuzaki, Simon C. Benjamin, and Joseph Fitzsimons

Spin Hall effect on a noncommutative space *(5 pages)* 012104
Kai Ma and Sayipjamal Dulat

Decoherence of many-body systems due to many-body interactions *(15 pages)* 012105
T. Carle, H. J. Briegel, and B. Kraus

Nonclassicality in the statistics of noncommuting observables: Nonclassical states are more compatible than classical states *(7 pages)* 012106
Alfredo Luis

Estimation of many-body quantum Hamiltonians via compressive sensing *(8 pages)* 012107
A. Shabani, M. Mohseni, S. Lloyd, R. L. Kosut, and H. Rabitz

Salpeter equation and probability current in the relativistic Hamiltonian quantum mechanics *(11 pages)* 012108
K. Kowalski and J. Rembieliński

(Continued)

Selected for a Viewpoint in *Physics*. Please visit http://physics.aps.org/.

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 84, NUMBER 1** **JULY 2011**

Exploring quantum control landscapes: Topology, features, and optimization scaling *(14 pages)* 012109
Katharine W. Moore and Herschel Rabitz

Nonlocality of a single photon: Paths to an Einstein-Podolsky-Rosen-steering experiment *(11 pages)* 012110
S. J. Jones and H. M. Wiseman

Experimental demonstration of tripartite entanglement versus tripartite nonlocality in three-qubit Greenberger-Horne-Zeilinger–class states *(4 pages)* 012111
Huai-Xin Lu, Jia-Qiang Zhao, Xiao-Qin Wang, and Lian-Zhen Cao

Decoherence-free evolution of time-dependent superposition states of two-level systems and thermal effects *(7 pages)* 012112
F. O. Prado, N. G. de Almeida, E. I. Duzzioni, M. H. Y. Moussa, and C. J. Villas-Boas

Long-time behavior of many-particle quantum decay *(6 pages)* 012113
A. del Campo

Decoherence of a quantum harmonic oscillator monitored by a Bose-Einstein condensate *(5 pages)* 012114
S. Brouard, D. Alonso, and D. Sokolovski

Quantum states for quantum processes: A toy model for ammonia inversion spectra *(10 pages)* 012115
Gustavo A. Arteca and O. Tapia

Variance control in weak-value measurement pointers *(4 pages)* 012116
A. D. Parks and J. E. Gray

Bipartite entangled stabilizer mutually unbiased bases as maximum cliques of Cayley graphs *(7 pages)* 012117
Wim van Dam and Mark Howard

Quantum-to-classical correspondence and Hubbard-Stratonovich dynamical systems: A Lie-algebraic approach *(22 pages)* 012118
Victor Galitski

Complete parametrizations of diffusive quantum monitorings *(20 pages)* 012119
A. Chia and H. M. Wiseman

Quantum theory of multiple-input–multiple-output Markovian feedback with diffusive measurements *(18 pages)* 012120
A. Chia and H. M. Wiseman

Finite-time quantum-to-classical transition for a Schrödinger-cat state *(9 pages)* 012121
Janika Paavola, Michael J. W. Hall, Matteo G. A. Paris, and Sabrina Maniscalco

Semigroup evolution in the Wigner-Weisskopf pole approximation with Markovian spectral coupling *(9 pages)* 012122
F. Shikerman, A. Peer, and L. P. Horwitz

Nonlinearly $\mathcal{PT}$-symmetric systems: Spontaneous symmetry breaking and transmission resonances *(4 pages)* . . . 012123
Andrey E. Miroshnichenko, Boris A. Malomed, and Yuri S. Kivshar

Quantum information

Entanglement quantification by local unitary operations *(11 pages)* 012301
A. Monras, G. Adesso, S. M. Giampaolo, G. Gualdi, G. B. Davies, and F. Illuminati

(Continued)

Selected for a Viewpoint in *Physics*. Please visit http://physics.aps.org/.

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 84, NUMBER 1** **JULY 2011**

Enhancing quantum entanglement for continuous variables by a coherent superposition of photon subtraction and addition *(6 pages)* 012302
Su-Yong Lee, Se-Wan Ji, Ho-Joon Kim, and Hyunchul Nha

Observables can be tailored to change the entanglement of any pure state *(4 pages)* 012303
N. L. Harshman and Kedar S. Ranade

Any $2 \otimes n$ subspace is locally distinguishable *(3 pages)* 012304
Nengkun Yu, Runyao Duan, and Mingsheng Ying

Combining dynamical decoupling with fault-tolerant quantum computation *(38 pages)* 012305
Hui Khoon Ng, Daniel A. Lidar, and John Preskill

Optimal primitive reference frames *(8 pages)* 012306
David Jennings

All possible coupling schemes in XY spin chains for perfect state transfer *(4 pages)* 012307
Yaoxiong Wang, Feng Shuang, and Herschel Rabitz

Quantum teleportation of nonclassical wave packets: An effective multimode theory *(9 pages)* 012308
Hugo Benichi, Shuntaro Takeda, Noriyuki Lee, and Akira Furusawa

Gate fidelity fluctuations and quantum process invariants *(11 pages)* 012309
Easwar Magesan, Robin Blume-Kohout, and Joseph Emerson

Tradeoff between energy and error in the discrimination of quantum-optical devices *(6 pages)* 012310
Alessandro Bisio, Michele Dall'Arno, and Giacomo Mauro D'Ariano

Informational derivation of quantum theory *(39 pages)* 012311
Giulio Chiribella, Giacomo Mauro D'Ariano, and Paolo Perinotti

Speeding up critical system dynamics through optimized evolution *(5 pages)* 012312
Tommaso Caneva, Tommaso Calarco, Rosario Fazio, Giuseppe E. Santoro, and Simone Montangero

Conservation law for distributed entanglement of formation and quantum discord *(4 pages)* 012313
Felipe F. Fanchini, Marcio F. Cornelio, Marcos C. de Oliveira, and Amir O. Caldeira

Simple trapped-ion architecture for high-fidelity Toffoli gates *(6 pages)* 012314
Massimo Borrelli, Laura Mazzola, Mauro Paternostro, and Sabrina Maniscalco

Proposed spin-qubit controlled-NOT gate robust against noisy coupling *(5 pages)* 012315
J. P. Kestner and S. Das Sarma

Entanglement and quantum discord dynamics of two atoms under practical feedback control *(5 pages)* 012316
Yang Li, Bin Luo, and Hong Guo

Asymptotic evolution of quantum walks on the N-cycle subject to decoherence on both the coin and position degrees of freedom *(7 pages)* 012317
Chaobin Liu and Nelson Petulante

Propagation properties and limitations on the attainable entanglement in a driven harmonic chain *(8 pages)* 012318
Fernando Galve

Quantum effects in thermal conduction: Nonequilibrium quantum discord and entanglement *(6 pages)* 012319
Lian-Ao Wu and Dvira Segal

(Continued)

Selected for a Viewpoint in *Physics*. Please visit http://physics.aps.org/.

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 84, NUMBER 1** **JULY 2011**

Localization effects induced by decoherence in superpositions of many-spin quantum states *(10 pages)* 012320
Gonzalo A. Álvarez and Dieter Suter

Characterization of qutrit channels in terms of their covariance and symmetry properties *(11 pages)* 012321
Vahid Karimipour, Azam Mani, and Laleh Memarzadeh

Long-lived qubit from three spin-$\frac{1}{2}$ atoms *(14 pages)* 012322
Rui Han, Niels Lörch, Jun Suzuki, and Berthold-Georg Englert

Fidelity of an encoded [7,1,3] logical zero *(5 pages)* 012323
Yaakov S. Weinstein

Limit theorems for quantum walks associated with Hadamard matrices *(12 pages)* 012324
Clement Ampadu

Weaker entanglement between two parties guarantees stronger entanglement with a third party *(5 pages)* 012325
Masahito Hayashi and Lin Chen

Quantum tagging: Authenticating location via quantum information and relativistic signaling constraints *(7 pages)* 012326
Adrian Kent, William J. Munro, and Timothy P. Spiller

Quantum correlation transfer through two parallel XXZ spin chains with phase shift control *(8 pages)* 012327
Jian Zhang (张剑), Bin Shao, Ben-Qiong Liu, Jian Zou, Qian-Shu Li, and Lian-Ao Wu

Location-oblivious data transfer with flying entangled qudits *(4 pages)* 012328
Adrian Kent

Cross-Kerr-effect induced by coupled Josephson qubits in circuit quantum electrodynamics *(11 pages)* 012329
Yong Hu, Guo-Qin Ge, Shi Chen, Xiao-Fei Yang, and You-Ling Chen

Remote state preparation of spatial qubits *(15 pages)* 012330
M. A. Solís-Prosser and L. Neves

State protection under collective damping and diffusion *(5 pages)* 012331
M. A. de Ponte, S. S. Mizrahi, and M. H. Y. Moussa

Unified approach to topological quantum computation with anyons: From qubit encoding to Toffoli gate *(4 pages)* 012332
Haitan Xu and J. M. Taylor

Quantum computation over the butterfly network *(11 pages)* 012333
Akihito Soeda, Yoshiyuki Kinjo, Peter S. Turner, and Mio Murao

Relativistic effects on the spin entanglement of two massive Dirac particles *(5 pages)* 012334
Taeseung Choi, Jin Hur, and Jaewan Kim

Improving entanglement concentration of Gaussian states by local displacements *(5 pages)* 012335
Jaromír Fiurášek

Comparison of mixed quantum states *(6 pages)* 012336
Shengshi Pang and Shengjun Wu

Entanglement of arbitrary spin fields in noninertial frames *(7 pages)* 012337
Miguel Montero and Eduardo Martín-Martínez

(Continued)

Selected for a Viewpoint in *Physics*. Please visit http://physics.aps.org/.

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 84, NUMBER 1** **JULY 2011**

Atomic and molecular structure and dynamics

Transition properties of low-lying states in atomic indium *(5 pages)* 012501
B. K. Sahoo and B. P. Das

Statistical correlations in the Moshinsky atom *(7 pages)* 012502
H. G. Laguna and R. P. Sagar

Collision-induced hyper-Rayleigh light scattering in gaseous dihydrogen-neon mixtures *(6 pages)* 012503
W. Głaz, J.-L. Godet, A. Haskopoulos, T. Bancewicz, and G. Maroulis

Polarizabilities of two-electron positive ions with screened Coulomb potentials *(6 pages)* 012504
Zishi Jiang, Sabyasachi Kar, and Y. K. Ho

Relativistic reduced-mass and recoil corrections to vacuum polarization in muonic hydrogen, muonic deuterium, and muonic helium ions *(6 pages)* 012505
U. D. Jentschura

Nonperturbative relativistic calculation of the muonic hydrogen spectrum *(9 pages)* 012506
J. D. Carroll, A. W. Thomas, J. Rafelski, and G. A. Miller

Spin-forbidden $c\,^3\Sigma^+(\Omega = 1) \leftarrow X\,^1\Sigma^+$ transition in NaCs: Investigation of the $\Omega = 1$ state in hot and cold environments *(6 pages)* 012507
A. Grochola, P. Kowalczyk, J. Szczepkowski, W. Jastrzebski, A. Wakim, P. Zabawa, and N. P. Bigelow

Molecular-beam optical Stark and Zeeman study of the $A\,^2\Pi$–$X\,^2\Sigma^+$ (0,0) band system of BaF *(12 pages)* 012508
Timothy C. Steimle, Sarah Frey, Anh Le, David DeMille, David. A. Rahmlow, and Colan Linton

Ground-state energy and relativistic corrections for positronium hydride *(8 pages)* 012509
Sergiy Bubin and Kálmán Varga

Diamagnetic correction to the $^9Be^+$ ground-state hyperfine constant *(11 pages)* 012510
N. Shiga, W. M. Itano, and J. J. Bollinger

Correlation and relativistic effects for the $4f - nl$ and $5p - nl$ multipole transitions in Er-like tungsten *(12 pages)* 012511
U. I. Safronova and A. S. Safronova

Low-lying energy spectrum of the cerium dimer *(9 pages)* 012512
A. V. Nikolaev

Relativistic configuration-interaction calculations of the $n = 3$-3 transition energies in highly charged tungsten ions *(6 pages)* 012513
M. H. Chen (陳茂雄) and K. T. Cheng (鄭國錚)

Atomic and molecular collisions and interactions

Application of the finite-element-discrete-model method for calculating resonance properties *(7 pages)* 012701
G. A. Gallup

Incorporation of the effect of the composite electric fields of molecular ions as a simulation tool for biological damage due to heavy-ion irradiation *(7 pages)* 012702
Kengo Moribayashi

(Continued)

Selected for a Viewpoint in *Physics*. Please visit http://physics.aps.org/.

PHYSICAL REVIEW A THIRD SERIES, VOLUME 84, NUMBER 1 JULY 2011

Mutual neutralization in low-energy $H^+ + F^-$ collisions *(6 pages)* 012703
J. Zs. Mezei, J. B. Roos, K. Shilyaeva, N. Elander, and Å. Larson

Electron loss of fast projectiles in collisions with molecules *(6 pages)* 012704
V. I. Matveev, D. N. Makarov, and Kh. Yu. Rakhimov

Breit-Pauli R-matrix method for electron-impact excitation to magnetic sublevels and x-ray-line polarization of ions *(6 pages)* 012705
G. X. Chen

Influence of the isotope effect on the charge exchange in slow collisions of Li, Be, and C ions with H, D, and T *(6 pages)* 012706
Inga Yu. Tolstikhina, Daiji Kato, and V. P. Shevelko

Cross sections for 14-eV e-H_2 resonant collisions: Isotope effect in dissociative electron attachment *(7 pages)* . . . 012707
R. Celiberto, R. K. Janev, J. M. Wadehra, and A. Laricchiuta

Ionization of water molecules by fast charged projectiles *(6 pages)* 012708
A. Dubois, S. Carniato, P. D. Fainstein, and J. P. Hansen

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

Surface-electronic-state effects in electron emission from the Be(0001) surface *(5 pages)* 012901
C. D. Archubi, M. S. Gravielle, and V. M. Silkin

Nonequilibrium forces between atoms and dielectrics mediated by a quantum field *(17 pages)* 012902
Ryan O. Behunin and Bei-Lok Hu

PART B

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

Multiobjective adaptive feedback control of two-photon absorption coupled with propagation through a dispersive medium *(10 pages)* 013401
François O. Laforge, Jonathan Roslund, Ofer M. Shir, and Herschel Rabitz

Initial-state and final-state vibrational effects in the treatment of molecular photoionization dynamics *(11 pages)* 013402
Ivan Powis

Glass-wool study of laser-induced spin currents en route to hyperpolarized Cs salt *(5 pages)* 013403
Kiyoshi Ishikawa

Evidence of the $2s2p(^1P)$ doubly excited state in the harmonic generation spectrum of helium *(12 pages)* 013404
J. M. Ngoko Djiokap and Anthony F. Starace

Theory and experiment on laser-enabled inner-valence Auger decay of rare-gas atoms *(8 pages)* 013405
X. M. Tong, P. Ranitovic, C. W. Hogle, M. M. Murnane, H. C. Kapteyn, and N. Toshima

Absolute high-resolution Se^+ photoionization cross-section measurements with Rydberg-series analysis *(10 pages)* 013406
D. A. Esteves, R. C. Bilodeau, N. C. Sterling, R. A. Phaneuf, A. L. D. Kilcoyne, E. C. Red, and A. Aguilar

(Continued)

Selected for a Viewpoint in *Physics*. Please visit http://physics.aps.org/.

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 84, NUMBER 1** **JULY 2011**

Endohedral fullerenes: A way to control resonant high-order harmonic generation *(5 pages)* 013407
P. V. Redkin, M. B. Danailov, and R. A. Ganeev

Field-free molecular alignment by shaping femtosecond laser pulse with cubic phase modulation *(4 pages)* 013408
Shian Zhang, Chenhui Lu, Junhui Shi, Tianqing Jia, Zugeng Wang, and Zhenrong Sun

Observation of laser-induced field-free permanent planar alignment of molecules *(6 pages)* 013409
Md. Z. Hoque, M. Lapert, E. Hertz, F. Billard, D. Sugny, B. Lavorel, and O. Faucher

Incoherent control in a non-Hermitian Bose-Hubbard dimer *(6 pages)* 013410
Honghua Zhong, Wenhua Hai, Genbiao Lu, and Zejun Li

State detection using coherent Raman repumping and two-color Raman transfers *(4 pages)* 013411
Boon Leng Chuah, Nicholas C. Lewty, and Murray D. Barrett

Cooling and quenching of $^{24}MgH^+(X\,^1\Sigma^+)$ by $^4He(^1S)$ in a Coulomb trap: A quantum study of the dynamics *(5 pages)* 013412
M. Tacconi, F. A. Gianturco, E. Yurtsever, and D. Caruso

Valence-shell photoionization of chlorinelike Ar^+ ions *(11 pages)* 013413
A. M. Covington, A. Aguilar, I. R. Covington, G. Hinojosa, C. A. Shirley, R. A. Phaneuf, I. Álvarez, C. Cisneros, I. Dominguez-Lopez, M. M. Sant'Anna, A. S. Schlachter, C. P. Ballance, and B. M. McLaughlin

Pythagorean coupling: Complete population transfer in a four-state system *(8 pages)* 013414
Haim Suchowski, Yaron Silberberg, and Dmitry B. Uskov

Resonant photoionization in a system of two nonidentical atoms *(8 pages)* 013415
A. B. Voitkiv and B. Najjari

Energy-dependent photoelectron angular distributions of two-color two-photon above threshold ionization of atomic helium *(9 pages)* 013416
Louis H. Haber, Benjamin Doughty, and Stephen R. Leone

Perturbation-theory analysis of ionization by a chirped few-cycle attosecond pulse *(6 pages)* 013417
E. A. Pronin, Anthony F. Starace, and Liang-You Peng

High-order harmonic generation on atoms and ions with laser fields of relativistic intensities *(6 pages)* 013418
H. K. Avetissian, A. G. Markossian, and G. F. Mkrtchian

Fingerprints of exceptional points in the survival probability of resonances in atomic spectra *(5 pages)* 013419
Holger Cartarius and Nimrod Moiseyev

Numerical studies of optical forces from adiabatic rapid passage *(7 pages)* 013420
Daniel Stack, John Elgin, Petr M. Anisimov, and Harold Metcalf

Photoexcitation and photoionization from the $2p^5 3p[5/2]_{2,3}$ levels in neon *(7 pages)* 013421
M. A. Baig, I. A. Bokhari, M. Rafiq, M. A. Kalyar, T. Hussian, Raheel Ali, and N. K. Piracha

Time scaling with efficient time-propagation techniques for atoms and molecules in pulsed radiation fields *(14 pages)* 013422
Aliou Hamido, Johannes Eiglsperger, Javier Madroñero, Francisca Mota-Furtado, Patrick O'Mahony, Ana Laura Frapiccini, and Bernard Piraux

(Continued)

Selected for a Viewpoint in *Physics*. Please visit http://physics.aps.org/.

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 84, NUMBER 1** **JULY 2011**

Optimal adiabatic passage by shaped pulses: Efficiency and robustness *(10 pages)* 013423
S. Guérin, V. Hakobyan, and H. R Jauslin

Nuclear interference in dissociating of HD^+ in ultrashort laser fields *(7 pages)* 013424
Di Yang and Shu-Lin Cong

Quantum control in two-dimensional Fourier-transform spectroscopy *(5 pages)* 013425
Jongseok Lim, Han-gyeol Lee, Sangkyung Lee, and Jaewook Ahn

Angle-dependent molecular above-threshold ionization with ultrashort intense linearly and circularly polarized laser pulses *(7 pages)* 013426
Kai-Jun Yuan and André D. Bandrauk

Interplay of mulitphoton and tunneling ionization in short-wavelength-driven high-order harmonic generation *(6 pages)* 013427
Vasileios-Marios Gkortsas, Siddharth Bhardwaj, Chien-Jen Lai, Kyung-Han Hong, Edilson L. Falcão-Filho, and Franz X. Kärtner

Interaction of strongly chirped pulses with two-level atoms *(6 pages)* 013428
S. Ibáñez, A. Peralta Conde, D. Guéry-Odelin, and J. G. Muga

Excitation two-center interference and the orbital geometry in laser-induced nonsequential double ionization of diatomic molecules *(10 pages)* 013429
T. Shaaran, B. B. Augstein, and C. Figueira de Morisson Faria

High-order harmonic generation in the presence of a resonance *(6 pages)* 013430
Maria Tudorovskaya and Manfred Lein

Matter waves and collective properties of cold atoms and molecules

Anomalous dimers in quantum mixtures near broad resonances: Pauli blocking, Fermi surface dynamics, and implications *(13 pages)* 013601
Jun-Liang Song and Fei Zhou

Bose-Hubbard model in a ring-shaped optical lattice with high filling factors *(8 pages)* 013602
H. M. Cataldo and D. M. Jezek

Topological $p_x + ip_y$ superfluid phase of fermionic polar molecules *(13 pages)* 013603
J. Levinsen, N. R. Cooper, and G. V. Shlyapnikov

Techniques to measure quantum criticality in cold atoms *(10 pages)* 013604
Kaden R. A. Hazzard and Erich J. Mueller

Phase transitions in dipolar spin-1 Bose gases *(13 pages)* 013605
Ville Pietilä and Mikko Möttönen

Enhancement of spin coherence in a spin-1 Bose-Einstein condensate by dynamical decoupling approaches *(6 pages)* 013606
Bo-Yuan Ning, Jun Zhuang, J. Q. You, and Wenxian Zhang

Finite-momentum Bose-Einstein condensates in shaken two-dimensional square optical lattices *(6 pages)* 013607
M. Di Liberto, O. Tieleman, V. Branchina, and C. Morais Smith

(Continued)

Selected for a Viewpoint in *Physics*. Please visit http://physics.aps.org/.

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 84, NUMBER 1** **JULY 2011**

Quantum transport of bosonic cold atoms in double-well optical lattices *(7 pages)* 013608
Yinyin Qian, Ming Gong, and Chuanwei Zhang

π junction and spontaneous current state in a superfluid Fermi gas *(8 pages)* 013609
Takashi Kashimura, Shunji Tsuchiya, and Yoji Ohashi

Interacting preformed Cooper pairs in resonant Fermi gases *(9 pages)* 013610
K. B. Gubbels and H. T. C. Stoof

Exact Bogoliubov–de Gennes solutions for gray-soliton backgrounds *(16 pages)* 013611
P. B. Walczak and J. R. Anglin

Localization of Bogoliubov quasiparticles in interacting Bose gases with correlated disorder *(18 pages)* 013612
P. Lugan and L. Sanchez-Palencia

Excitation spectra of bosons in optical lattices from the Schwinger-Keldysh calculation *(15 pages)* 013613
T. D. Graß, F. E. A. dos Santos, and A. Pelster

Diffraction of Bose-Einstein condensates in quantized light fields *(8 pages)* 013614
Peng Zhang, Z.-Y. Ma, Jian-Hua Wu, H. Fan, and W. M. Liu

Slow quench dynamics of periodically driven quantum gases *(9 pages)* 013615
Dario Poletti and Corinna Kollath

Anomalous tunneling of collective excitations and effects of superflow in the polar phase of a spin-1 spinor Bose-Einstein condensate *(8 pages)* 013616
Shohei Watabe, Yusuke Kato, and Yoji Ohashi

Bose-Einstein condensation and heat capacity of two-dimensional spin-polarized atomic hydrogen *(6 pages)* 013617
M. K. Al-Sugheir, H. B. Ghassib, and M. Awawdeh

Nonlinear Bose-Einstein-condensate dynamics induced by a harmonic modulation of the s-wave scattering length *(11 pages)* 013618
Ivana Vidanović, Antun Balaž, Hamid Al-Jibbouri, and Axel Pelster

Phase separation of a two-component dipolar Bose-Einstein condensate in the quasi-one-dimensional and quasi-two-dimensional regime *(6 pages)* 013619
Kui-Tian Xi, Jinbin Li, and Da-Ning Shi

Simultaneous differential measurement of a magnetic-field gradient by atom interferometry using double fountains *(5 pages)* 013620
Zhong-Kun Hu, Xiao-Chun Duan, Min-Kang Zhou, Bu-Liang Sun, Jin-Bo Zhao, Mao-Mao Huang, and Jun Luo

Diffraction of slow neutrons by holographic SiO_2 nanoparticle-polymer composite gratings *(7 pages)* 013621
J. Klepp, C. Pruner, Y. Tomita, C. Plonka-Spehr, P. Geltenbort, S. Ivanov, G. Manzin, K. H. Andersen, J. Kohlbrecher, M. A. Ellabban, and M. Fally

Elliptic flow of the dilute Fermi gas: From kinetics to hydrodynamics *(7 pages)* 013622
K. Dusling and T. Schäfer

Spontaneous vortex production in driven condensates with narrow Feshbach resonances *(6 pages)* 013623
Chi-Yong Lin, Da-Shin Lee, and Ray J. Rivers

(Continued)

Selected for a Viewpoint in *Physics*. Please visit http://physics.aps.org/.

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 84, NUMBER 1** **JULY 2011**

Probing the homogeneous spectral function of a strongly interacting superfluid atomic Fermi gas in a trap using phase separation and momentum-resolved radio-frequency spectroscopy *(5 pages)* 013624
Qijin Chen

Validity of the scattering-length approximation in strongly interacting Fermi systems *(6 pages)* 013625
S. Q. Zhou, D. M. Ceperley, and Shiwei Zhang

Removal of excitations of Bose-Einstein condensates by space- and time-modulated potentials *(5 pages)* 013626
Kestutis Staliunas

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

Stark interaction of identical particles with the vacuum electromagnetic field as quantum Poisson process suppressing collective spontaneous emission *(14 pages)* 013801
A. M. Basharov

Calculation of spontaneous emission from a V-type three-level atom in photonic crystals using fractional calculus *(6 pages)* 013802
Chih-Hsien Huang, Jing-Nuo Wu, Yen-Yin Li, Szu-Cheng Cheng, and Wen-Feng Hsieh

Negative index of refraction in a four-level system with magnetoelectric cross coupling and local field corrections *(6 pages)* 013803
F. Bello

Enhancement and suppression of two coexisting six-wave-mixing processes *(7 pages)* 013804
Zhiguo Wang, Yanpeng Zhang, Haixia Chen, Zhenkun Wu, Yuxin Fu, and Huaibin Zheng

Generators of nonclassical states by a combination of linear coupling of boson modes, Kerr nonlinearity, and strong linear losses *(9 pages)* 013805
V. S. Shchesnovich and D. Mogilevtsev

Casimir forces in multilayer magnetodielectrics with both gain and loss *(14 pages)* 013806
Ehsan Amooghorban, Martijn Wubs, N. Asger Mortensen, and Fardin Kheirandish

Dark localized structures in a cavity filled with a left-handed material *(7 pages)* 013807
Mustapha Tlidi, Pascal Kockaert, and Lendert Gelens

Pathway interference in a loop array of three coupled microresonators *(13 pages)* 013808
Sandra Isabelle Schmid, Keyu Xia (夏可宇), and Jörg Evers

Instabilities of optical solitons and Hamiltonian singular solutions in a medium of finite extension *(4 pages)* 013809
E. Assémat, A. Picozzi, H. R. Jauslin, and D. Sugny

Scattering of surface-plasmon polaritons by a localized dielectric surface defect studied using an effective boundary condition *(8 pages)* 013810
Björn Baumeier, Felix Huerkamp, Tamara A. Leskova, and Alexei A. Maradudin

Comparison of natural and forced amplification regimes in plasma-based soft-x-ray lasers seeded by high-order harmonics *(5 pages)* 013811
Eduardo Oliva, Philippe Zeitoun, Marta Fajardo, Guillaume Lambert, David Ros, Stephane Sebban, and Pedro Velarde

Narrow structure in the coherent population trapping resonance in sodium *(9 pages)* 013812
S. Gozzini, L. Marmugi, A. Lucchesini, S. Gateva, S. Cartaleva, and K. Nasyrov

(Continued)

Selected for a Viewpoint in *Physics*. Please visit http://physics.aps.org/.

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 84, NUMBER 1** **JULY 2011**

Nonlinear properties and stabilities of polaritonic crystals beyond the low-excitation-density limit *(11 pages)* 013813
E. S. Sedov, A. P. Alodjants, S. M. Arakelian, Y. Y. Lin, and R.-K. Lee

Scalar wave propagation in random amplifying media: Influence of localization effects on length and time scales and threshold behavior *(10 pages)* 013814
Regine Frank and Andreas Lubatsch

Magneto-optic gradient effect in domain-wall images: At the crossroads of magneto-optics and micromagnetics *(5 pages)* 013815
V. Kamberský and R. Schäfer

Terahertz surface plasmon polaritons on a conductive right circular cone: Analytical description and experimental verification *(5 pages)* 013816
V. B. Zon and B. A. Zon

Femtosecond pulses in a dense two-level medium: Spectral transformations, transient processes, and collisional dynamics *(9 pages)* 013817
Denis V. Novitsky

$\mathcal{PT}$-symmetric sinusoidal optical lattices at the symmetry-breaking threshold *(8 pages)* 013818
Eva-Maria Graefe and H. F. Jones

Superradiant phase in field-matter interactions *(10 pages)* 013819
O. Castaños, E. Nahmad-Achar, R. López-Peña, and J. G. Hirsch

Power- and momentum-dependent soliton dynamics in lattices with longitudinal modulation *(9 pages)* 013820
Panagiotis Papagiannis, Yannis Kominis, and Kyriakos Hizanidis

Cooperative scattering and radiation pressure force in dense atomic clouds *(11 pages)* 013821
R. Bachelard, N. Piovella, and Ph. W. Courteille

Collisionally induced atomic clock shifts and correlations *(9 pages)* 013822
Y. B. Band and I. Osherov

Broadly tunable quasi-phase-matching in nonlinear metamaterials *(5 pages)* 013823
Alec Rose and David R. Smith

Hybrid squeezing of solitonic resonant radiation in photonic crystal fibers *(5 pages)* 013824
Truong X. Tran, Katiuscia N. Cassemiro, Christoph Söller, Keith J. Blow, and Fabio Biancalana

Two-photon-driven nonlinear dynamics and entanglement of an atom in a nonuniform cavity *(10 pages)* 013825
L. Chotorlishvili, Z. Toklikishvili, S. Wimberger, and J. Berakdar

Cylindrical periodic surface lattice as a metadielectric: Concept of a surface-field Cherenkov source of coherent radiation *(12 pages)* 013826
I. V. Konoplev, A. J. MacLachlan, C. W. Robertson, A. W. Cross, and A. D. R. Phelps

Control of dark-state polariton collapses in a doped crystal *(5 pages)* 013827
G. Heinze, S. Mieth, and T. Halfmann

Theory of anisotropic whispering-gallery-mode resonators *(12 pages)* 013828
Marco Ornigotti and Andrea Aiello

Models of the delayed nonlinear Raman response in diatomic gases *(11 pages)* 013829
J. P. Palastro, T. M. Antonsen, Jr., and A. Pearson

(Continued)

Selected for a Viewpoint in *Physics*. Please visit http://physics.aps.org/.

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 84, NUMBER 1** **JULY 2011**

Quantum-dot all-optical logic in a structured vacuum *(18 pages)* 013830
Xun Ma and Sajeev John

Generating two-photon entangled states in a driven two-atom system *(12 pages)* 013831
Khulud Almutairi, Ryszard Tanaś, and Zbigniew Ficek

Increasing the structural variety of discrete nondiffracting wave fields *(8 pages)* 013832
Martin Boguslawski, Patrick Rose, and Cornelia Denz

Scattering of linear and nonlinear waves in a waveguide array with a $\mathcal{PT}$-symmetric defect *(5 pages)* 013833
Sergey V. Dmitriev, Sergey V. Suchkov, Andrey A. Sukhorukov, and Yuri S. Kivshar

Pulse buildup from noise and intrinsic polarization of plasma-based x-ray lasers *(7 pages)* 013834
Chul Min Kim, Karol A. Janulewicz, and Jongmin Lee

Matched slow optical soliton pairs via biexciton coherence in quantum dots *(11 pages)* 013835
Wen-Xing Yang, Ai-Xi Chen, Ray-Kuang Lee, and Ying Wu

Evolution dynamics of discrete-continuous light bullets *(10 pages)* 013836
Falk Eilenberger, Stefano Minardi, Alexander Szameit, Ulrich Röpke, Jens Kobelke, Kay Schuster, Hartmut Bartelt, Stefan Nolte, Lluis Torner, Falk Lederer, Andreas Tünnermann, and Thomas Pertsch

Quantum versus classical phase-locking transition in a frequency-chirped nonlinear oscillator *(8 pages)* 013837
I. Barth, L. Friedland, O. Gat, and A. G. Shagalov

Measurement of birefringence inside a filament *(6 pages)* 013838
Shuai Yuan, Tie-Jun Wang, Olga Kosareva, Nikolay Panov, Vladimir Makarov, Heping Zeng, and See Leang Chin

BRIEF REPORTS

Quantum information

Optimized multiparty quantum clock synchronization *(3 pages)* 014301
Radel Ben-Av and Iaakov Exman

Conclusive discrimination among N equidistant pure states *(4 pages)* 014302
Luis Roa, Carla Hermann-Avigliano, R. Salazar, and A. B. Klimov

Constructing all entanglement witnesses from density matrices *(4 pages)* 014303
Bang-Hai Wang and Dong-Yang Long

Atomic-ensemble-based quantum repeater against general polarization and phase noise *(3 pages)* 014304
Bin-bin Zhang and Ya-qiong Xu

Atomic and molecular structure and dynamics

Weakly bound states of the He-He-Mg trimer *(4 pages)* 014501
Yong Li, Deping Huang, Qingdong Gou, Huili Han, and Tingyun Shi

Atomic and molecular collisions and interactions

Nonadiabatic nuclear dynamics of atomic collisions based on branching classical trajectories *(4 pages)* 014701
Andrey K. Belyaev and Oleg V. Lebedev

(Continued)

Selected for a Viewpoint in *Physics*. Please visit http://physics.aps.org/.

PHYSICAL REVIEW A THIRD SERIES, VOLUME 84, NUMBER 1 JULY 2011

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

Velocity dependence of outgoing neutral fractions for H(1*s*) and H^+ beams impinging on Al(111) at grazing incidence *(4 pages)* 014901
H. Jouin and F. A. Gutierrez

Experimental and theoretical study of the energy loss of C and O in Zn *(4 pages)* 014902
E. D. Cantero, C. C. Montanari, M. Behar, R. C. Fadanelli, G. H. Lantschner, J. E. Miraglia, and N. R. Arista

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

Photodetachment dynamics of F_2^- in a strong laser field *(4 pages)* 015401
Hannes Hultgren and Igor Yu. Kiyan

Matter waves and collective properties of cold atoms and molecules

Further evidence of antibunching of two coherent beams of fermions *(4 pages)* 015601
M. Iannuzzi, R. Messi, D. Moricciani, A. Orecchini, F. Sacchetti, P. Facchi, and S. Pascazio

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

Slow light with low group-velocity dispersion at the edge of photonic graphene *(4 pages)* 015801
Chunfang Ouyang, Zhiqiang Xiong, Fangyuan Zhao, Biqin Dong, Xinhua Hu, Xiaohan Liu, and Jian Zi

Magnus force effect in optical manipulation *(4 pages)* 015802
Gabriella Cipparrone, Raul Josue Hernandez, Pasquale Pagliusi, and Clementina Provenzano

Generation of even harmonics in coupled quantum dots *(4 pages)* 015803
Shi-Fang Guo, Su-Qing Duan, Ning Yang, Wei-Dong Chu, and Wei Zhang

COMMENTS

Comment on "Secure multiparty computation with a dishonest majority via quantum means" *(3 pages)* 016301
Yan-bing Li, Qiao-yan Wen, and Su-juan Qin

Comment on "Modal expansion approach to optical-frequency-comb generation with monolithic whispering-gallery-mode resonators" *(5 pages)* 017801
Lev Deych

Reply to "Comment on 'Modal expansion approach to optical-frequency-comb generation with monolithic whispering-gallery-mode resonators' " *(4 pages)* 017802
Yanne K. Chembo and Nan Yu

ERRATA

Erratum: Collisional loss of cesium Rydberg atoms in a magneto-optical trap [Phys. Rev. A **83**, 042711 (2011)] *(1 page)* . . . . . 019901(E)
Zhigang Feng, Hao Zhang, Junling Che, Linjie Zhang, Changyong Li, Jianming Zhao, and Suotang Jia

Editorial Note: One-dimensional Anderson localization in certain correlated random potentials [Phys. Rev. A **80**, 023605 (2009)] *(1 page)* . . . . . 019902(E)
P. Lugan, A. Aspect, L. Sanchez-Palencia, D. Delande, B. Grémaud, C. A. Müller, and C. Miniatura

(Continued)

Selected for a Viewpoint in *Physics*. Please visit http://physics.aps.org/.

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 84, NUMBER 1** **JULY 2011**

Erratum: Unitary expansion of the time evolution operator [Phys. Rev. A **82**, 042110 (2010)] *(1 page)* . . . . . 019903(E)
N. Zagury, A. Aragão, J. Casanova, and E. Solano

Erratum: Spin-orbit hybrid entanglement of photons and quantum contextuality
[Phys. Rev. A **82**, 022115 (2010)] *(1 page)* . . . . . 019904(E)
Ebrahim Karimi, Jonathan Leach, Sergei Slussarenko, Bruno Piccirillo, Lorenzo Marrucci, Lixiang Chen, Weilong She, Sonja Franke-Arnold, Miles J. Padgett, and Enrico Santamato

Erratum: Periodic revival of entanglement of two strongly driven qubits in a dissipative cavity
[Phys. Rev. A **82**, 052330 (2010)] *(1 page)* . . . . . 019905(E)
Marcin Dukalski and Ya. M. Blanter

Erratum: Qualitative explanation for the Schäfer-Hubert effect: A boundary effect at the crossroads of magneto-optics and near-field optics [Phys. Rev. A **77**, 033818 (2008)] *(1 page)* . . . . . 019906(E)
I. Banno

Erratum: First and second derivative of the wave function of the $^1\Sigma^+$ states of the KH molecule
[Phys. Rev. A **83**, 042502 (2011)] *(1 page)* . . . . . 019907(E)
Neji Khelifi

Selected for a Viewpoint in *Physics*. Please visit http://physics.aps.org/.