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 81, NUMBER 1
PARTS A AND B

CONTENTS

JANUARY 2010

The Table of Contents is a total listing of Parts A and B.
Part A consists of pages 010101(R)-013202, and Part B pages 013401-019904(E).

PART A

Physical Review A Editorial Policies iii
Physical Review A Information for Contributors vii
Guidelines for PRA Section Selection x

RAPID COMMUNICATIONS

Fundamental concepts

Superposition of macroscopically distinct states means large multipartite entanglement *(4 pages)* . . . . . 010101(R)
Tomoyuki Morimae

Entanglement and area law with a fractal boundary in a topologically ordered phase *(4 pages)* . . . . . 010102(R)
Alioscia Hamma, Daniel A. Lidar, and Simone Severini

Noise-induced looping on the Bloch sphere: Oscillatory effects in dephasing of qubits subject to broad-spectrum noise *(4 pages)* . . . . . 010103(R)
Dong Zhou and Robert Joynt

Quantum information

Computation on spin chains with limited access *(4 pages)* . . . . . 010301(R)
Alastair Kay and Peter J. Pemberton-Ross

Strong no-go theorem for Gaussian quantum bit commitment *(4 pages)* . . . . . 010302(R)
Loïck Magnin, Frédéric Magniez, Anthony Leverrier, and Nicolas J. Cerf

Simulation of interacting fermions with entanglement renormalization *(4 pages)* . . . . . 010303(R)
Philippe Corboz, Glen Evenbly, Frank Verstraete, and Guifré Vidal

Atomic and molecular collisions and interactions

Full two-electron calculations of antiproton collisions with molecular hydrogen *(4 pages)* . . . . . 010701(R)
Armin Lühr and Alejandro Saenz

Large spin relaxation rates in trapped submerged-shell atoms *(4 pages)* . . . . . 010702(R)
Colin B. Connolly, Yat Shan Au, S. Charles Doret, Wolfgang Ketterle, and John M. Doyle

Copyright 2010 by The American Physical Society

(Continued)

1050-2947(201001)81:1:B;1-7

PHYSICAL REVIEW A THIRD SERIES, VOLUME 81, NUMBER 1 JANUARY 2010

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

Storage of images in atomic coherences in a rare-earth-ion-doped solid *(4 pages)* . . . . . 011401(R)
G. Heinze, A. Rudolf, F. Beil, and T. Halfmann

Formation of inner-shell autoionizing CO^+ states below the CO^{2+} threshold *(4 pages)* . . . . . 011402(R)
T. Osipov, Th. Weber, T. N. Rescigno, S. Y. Lee, A. E. Orel, M. Schöffler, F. P. Sturm, S. Schössler, U. Lenz, T. Havermeier, M. Kühnel, T. Jahnke, J. B. Williams, D. Ray, A. Landers, R. Dörner, and A. Belkacem

Matter waves and collective properties of cold atoms and molecules

Three-body bound states in a lattice *(4 pages)* . . . . . 011601(R)
Manuel Valiente, David Petrosyan, and Alejandro Saenz

Transverse mode imaging of guided matter waves *(4 pages)* . . . . . 011602(R)
R. G. Dall, S. S. Hodgman, M. T. Johnsson, K. G. H. Baldwin, and A. G. Truscott

Fermion-mediated long-range interactions of bosons in the one-dimensional Bose-Fermi-Hubbard model *(4 pages)* . . . . . 011603(R)
Alexander Mering and Michael Fleischhauer

Supersymmetric response of a Bose-Fermi mixture to photoassociation *(4 pages)* . . . . . 011604(R)
T. Shi, Yue Yu, and C. P. Sun

Improving the efficiency of ultracold dipolar molecule formation by first loading onto an optical lattice *(4 pages)* . . . . . 011605(R)
J. K. Freericks, M. M. Maśka, Anzi Hu, Thomas M. Hanna, C. J. Williams, P. S. Julienne, and R. Lemański

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

Photon shuttle: Landau-Zener-Stückelberg dynamics in an optomechanical system *(4 pages)* . . . . . 011801(R)
Georg Heinrich, J. G. E. Harris, and Florian Marquardt

Resonant interaction of a single atom with single photons from a down-conversion source *(4 pages)* . . . . . 011802(R)
C. Schuck, F. Rohde, N. Piro, M. Almendros, J. Huwer, M. W. Mitchell, M. Hennrich, A. Haase, F. Dubin, and J. Eschner

Modulated phase matching and high-order harmonic enhancement mediated by the carrier-envelope phase *(4 pages)* . . . . . 011803(R)
Daniele Faccio, Carles Serrat, José M. Cela, Albert Farrés, Paolo Di Trapani, and Jens Biegert

Perfect imaging with positive refraction in three dimensions *(4 pages)* . . . . . 011804(R)
Ulf Leonhardt and Thomas G. Philbin

Compression of ultrashort UV pulses in a self-defocusing gas *(4 pages)* . . . . . 011805(R)
Luc Bergé, Christian Köhler, and Stefan Skupin

Transverse radiation force in a tailored optical fiber *(4 pages)* . . . . . 011806(R)
Iver Brevik and Simen Å. Ellingsen

(Continued)

PHYSICAL REVIEW A THIRD SERIES, VOLUME 81, NUMBER 1 JANUARY 2010

ARTICLES

Fundamental concepts

Non-negative Wigner functions for orbital angular momentum states *(4 pages)* 012101
I. Rigas, L. L. Sánchez-Soto, A. B. Klimov, J. Řeháček, and Z. Hradil

Speed of Markovian relaxation toward the ground state *(10 pages)* 012102
Malte Vogl, Gernot Schaller, and Tobias Brandes

Complete characterization of post-selected quantum statistics using weak measurement tomography *(5 pages)* . . . 012103
Holger F. Hofmann

Direct observation of geometric phases using a three-pinhole interferometer *(4 pages)* 012104
H. Kobayashi, S. Tamate, T. Nakanishi, K. Sugiyama, and M. Kitano

Entangling two unequal atoms through a common bath *(9 pages)* 012105
F. Benatti, R. Floreanini, and U. Marzolino

Composite system in deformed space with minimal length *(8 pages)* 012106
C. Quesne and V. M. Tkachuk

Quantum position diffusion and its implications for the quantum linear Boltzmann equation *(8 pages)* 012107
I. Kamleitner and J. Cresser

Casimir-Polder interaction between an atom and an infinite boundary in a thermal bath *(6 pages)* 012108
Wuying She, Hongwei Yu, and Zhiying Zhu

Fair-sampling assumption is not necessary for testing local realism *(11 pages)* 012109
Dominic W. Berry, Hyunseok Jeong, Magdalena Stobińska, and Timothy C. Ralph

Hermitian conjugate measurement *(9 pages)* 012110
Hiroaki Terashima and Masahito Ueda

Bounds on probability of transformations between multipartite pure states *(14 pages)* 012111
Wei Cui, Wolfram Helwig, and Hoi-Kwong Lo

Separation of transitions with two quantum jumps from cascades *(8 pages)* 012112
Ulrich D. Jentschura

Maximally entangled states via mutual unbiased collective bases *(7 pages)* 012113
M. Revzen

Probing macroscopic quantum states with a sub-Heisenberg accuracy *(17 pages)* 012114
Haixing Miao, Stefan Danilishin, Helge Müller-Ebhardt, Henning Rehbein,
Kentaro Somiya, and Yanbei Chen

Magic wavelengths for terahertz clock transitions *(7 pages)* 012115
Xiaoji Zhou, Xia Xu, Xuzong Chen, and Jingbiao Chen

Separable states and geometric phases of an interacting two-spin system *(6 pages)* 012116
C. W. Niu, G. F. Xu, Longjiang Liu, L. Kang, D. M. Tong, and L. C. Kwek

Thermal equilibrium of two quantum Brownian particles *(7 pages)* 012117
D. M. Valente and A. O. Caldeira

(Continued)

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 81, NUMBER 1** **JANUARY 2010**

Relativistic massless harmonic oscillator *(6 pages)* 012118
K. Kowalski and J. Rembieliński

Casimir forces in the time domain: Applications *(10 pages)* 012119
Alexander P. McCauley, Alejandro W. Rodriguez, John D. Joannopoulos, and Steven G. Johnson

Simulating local measurements on a quantum many-body system with stochastic matrix product states *(6 pages)* 012120
Søren Gammelmark and Klaus Mølmer

Simple model of self-supported deformed states of isolated atoms *(9 pages)* 012121
Iwo Bialynicki-Birula and Zofia Bialynicka-Birula

Quantum information

Nonclassical photon streams using rephased amplified spontaneous emission *(5 pages)* 012301
Patrick M. Ledingham, William R. Naylor, Jevon J. Longdell, Sarah E. Beavan, and Matthew J. Sellars

Witnessing entanglement in phase space using inefficient detectors *(4 pages)* 012302
Seung-Woo Lee, Hyunseok Jeong, and Dieter Jaksch

Generic two-qubit photonic gates implemented by number-resolving photodetection *(5 pages)* 012303
Dmitry B. Uskov, A. Matthew Smith, and Lev Kaplan

Information-transferring ability of the different phases of a finite *XXZ* spin chain *(11 pages)* 012304
Abolfazl Bayat and Sougato Bose

Experimental estimation of one-parameter qubit gates in the presence of phase diffusion *(7 pages)* 012305
Davide Brivio, Simone Cialdi, Stefano Vezzoli, Berihu Teklu Gebrehiwot, Marco G. Genoni, Stefano Olivares, and Matteo G. A. Paris

Multifrequency control pulses for multilevel superconducting quantum circuits *(9 pages)* 012306
Anne M. Forney, Steven R. Jackson, and Frederick W. Strauch

Fighting decoherence in a continuous two-qubit odd- or even-parity measurement with a closed-loop setup *(9 pages)* 012307
Anne E. B. Nielsen

Channel capacities versus entanglement measures in multiparty quantum states *(6 pages)* 012308
Aditi Sen(De) and Ujjwal Sen

Optimized dynamical decoupling for power-law noise spectra *(9 pages)* 012309
S. Pasini and G. S. Uhrig

Fidelity threshold for long-range entanglement in quantum networks *(7 pages)* 012310
Sébastien Perseguers

Scaling of entanglement entropy in a quantum phase transition in the transverse Ising model induced by a quench *(5 pages)* 012311
Priyadarshi Majumdar and Pratul Bandyopadhyay

Transferring elements of a density matrix *(9 pages)* 012312
Armen E. Allahverdyan and Karen V. Hovhannisyan

(Continued)

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 81, NUMBER 1** **JANUARY 2010**

Linear assignment maps for correlated system-environment states *(5 pages)* 012313
César A. Rodríguez-Rosario, Kavan Modi, and Alán Aspuru-Guzik

Dirac equation with an ultraviolet cutoff and a quantum walk *(10 pages)* 012314
Fumihito Sato and Makoto Katori

Efficient optimal minimum error discrimination of symmetric quantum states *(4 pages)* 012315
Antonio Assalini, Gianfranco Cariolaro, and Gianfranco Pierobon

Entanglement and parametric resonance in driven quantum systems *(9 pages)* 012316
V. M. Bastidas, J. H. Reina, C. Emary, and T. Brandes

Deterministic transformations of multipartite entangled states with tensor rank 2 *(11 pages)* 012317
S. Turgut, Y. Gül, and N. K. Pak

Practical issues in quantum-key-distribution postprocessing *(15 pages)* 012318
Chi-Hang Fred Fung, Xiongfeng Ma, and H. F. Chau

Topological color codes on Union Jack lattices: a stable implementation of the whole Clifford group *(6 pages)* . . . 012319
Helmut G. Katzgraber, H. Bombin, Ruben S. Andrist, and M. A. Martin-Delgado

Quantum logic with weakly coupled qubits *(5 pages)* 012320
Michael R. Geller, Emily J. Pritchett, Andrei Galiautdinov, and John M. Martinis

Experimental preparation of two-photon Knill-Laflamme-Milburn states *(4 pages)* 012321
Karel Lemr, Antonín Černoch, Jan Soubusta, and Jaromír Fiurášek

Experimental demonstration of deterministic one-way quantum computation on a NMR quantum computer *(5 pages)* 012322
Chenyong Ju, Jing Zhu, Xinhua Peng, Bo Chong, Xianyi Zhou, and Jiangfeng Du

Generation of two-mode Gaussian-type entangled states of light via a quantum beat laser *(7 pages)* 012323
Ai-ping Fang, Yi-long Chen, Fu-li Li, Hong-rong Li, and Pei Zhang

Entanglement detection via tighter local uncertainty relations *(5 pages)* 012324
Cheng-Jie Zhang, Hyunchul Nha, Yong-Sheng Zhang, and Guang-Can Guo

Environment-assisted quantum-information correction for continuous variables *(9 pages)* 012325
Metin Sabuncu, Radim Filip, Gerd Leuchs, and Ulrik L. Andersen

Polynomial method to study the entanglement of pure N-qubit states *(6 pages)* 012326
H. Mäkelä and A. Messina

Tunneling qubit operation on a protected Josephson junction array *(7 pages)* 012327
Zhi Yin, Sheng-Wen Li, and Yi-Xin Chen

Squash operator and symmetry *(4 pages)* 012328
Toyohiro Tsurumaru

Entanglement and bistability in coupled quantum dots inside a driven cavity *(11 pages)* 012329
Arnab Mitra and Reeta Vyas

Relativistic quantum channel of communication through field quanta *(9 pages)* 012330
M. Cliche and A. Kempf

(Continued)

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 81, NUMBER 1** **JANUARY 2010**

Universal dynamical decoupling: Two-qubit states and beyond *(9 pages)* 012331
Musawwadah Mukhtar, Thuan Beng Saw, Wee Tee Soh, and Jiangbin Gong

Estimation of quantum finite mixtures *(12 pages)* 012332
J. I. de Vicente, J. Calsamiglia, R. Muñoz-Tapia, and E. Bagan

Realistic continuous-variable quantum teleportation with non-Gaussian resources *(12 pages)* 012333
F. Dell'Anno, S. De Siena, and F. Illuminati

Derivation and experimental test of fidelity benchmarks for remote preparation of arbitrary qubit states *(12 pages)* 012334
N. Killoran, D. N. Biggerstaff, R. Kaltenbaek, K. J. Resch, and N. Lütkenhaus

Atomic and molecular structure and dynamics

Synchrotron-radiation-based determination of Xe L-subshell Coster-Kronig yields: A reexamination via high-resolution x-ray spectroscopy *(6 pages)* 012501
W. Cao, J.-Cl. Dousse, J. Hoszowska, M. Žitnik, M. Kavčič, and K. Bučar

Self-energy correction to the hyperfine splitting and the electron g factor in hydrogenlike ions *(14 pages)* 012502
Vladimir A. Yerokhin and Ulrich D. Jentschura

QED corrections of order $\alpha(Z\alpha)^2 E_F$ to the hyperfine splitting of $P_{1/2}$ and $P_{3/2}$ states in hydrogenlike ions *(10 pages)* 012503
Ulrich D. Jentschura and Vladimir A. Yerokhin

$K\beta$ satellite and forbidden transitions in elements with $12 \leqslant Z \leqslant 30$ induced by electron impact *(10 pages)* 012504
Silvina P. Limandri, Alejo C. Carreras, Rita D. Bonetto, and Jorge C. Trincavelli

X-ray spectroscopy of $E2$ and $M3$ transitions in Ni-like W *(6 pages)* 012505
J. Clementson, P. Beiersdorfer, and M. F. Gu

Magnetic dipole transitions in $4d^N$ configurations of tungsten ions *(9 pages)* 012506
V. Jonauskas, R. Kisielius, A. Kynienė, S. Kučas, and P. H. Norrington

Spatially dependent Rabi oscillations: An approach to sub-diffraction-limited coherent anti-Stokes Raman-scattering microscopy *(4 pages)* 012507
Willem P. Beeker, Chris J. Lee, Klaus-Jochen Boller, Petra Groß, Carsten Cleff, Carsten Fallnich, Herman L. Offerhaus, and Jennifer L. Herek

Adiabatic connection at negative coupling strengths *(9 pages)* 012508
Michael Seidl and Paola Gori-Giorgi

Casimir-Polder interaction between an atom and a small magnetodielectric sphere *(9 pages)* 012509
Agnes Sambale, Stefan Yoshi Buhmann, and Stefan Scheel

Time-resolved Fourier-transform infrared emission spectroscopy of Au in the 1800–4000-cm^{-1} region: Rydberg transitions *(7 pages)* 012510
S. Civiš, I. Matulková, J. Cihelka, K. Kawaguchi, V. E. Chernov, and E. Yu. Buslov

Capture of negative muons by hydrogen atoms at low collision energies *(7 pages)* 012511
Kazuhiro Sakimoto

(Continued)

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 81, NUMBER 1** **JANUARY 2010**

Self-energy correction to the bound-electron g factor of P states *(7 pages)* 012512
Ulrich D. Jentschura

Atomic and molecular collisions and interactions

Inelastic collisions in ultracold gases confined by one-dimensional optical lattices *(7 pages)* 012701
Zhiying Li

Evidence for double incoherent Raman scattering in binary gas mixtures: SF_6-N_2 *(7 pages)* 012702
I. A. Verzhbitskiy, M. Chrysos, F. Rachet, and A. P. Kouzov

Resonant Raman scattering of polarized and unpolarized x-ray radiation from Mg, Al, and Si *(9 pages)* 012703
D. Sokaras, M. Müller, M. Kolbe, B. Beckhoff, Ch. Zarkadas, and A. G. Karydas

Measurement of kinetic energy release in CO fragmentation by charge-changing collisions of fast heavy ions *(6 pages)* 012704
T. Mizuno, T. Yamada, H. Tsuchida, Y. Nakai, and A. Itoh

Angle-differential Stokes parameters for spin-polarized electron-impact excitation of the Hg $6s6p\ ^3P_1$ state at 25-eV scattering energy *(6 pages)* 012705
F. Jüttemann, G. F. Hanne, O. Zatsarinny, K. Bartschat, R. Srivastava, R. K. Gangwar, and A. D. Stauffer

Elastic electron scattering in krypton in the energy range from 5 to 10 eV *(7 pages)* 012706
Ireneusz Linert, Brygida Mielewska, George C. King, and Mariusz Zubek

Charge transfer and association of protons colliding with potassium from very low to intermediate energies *(8 pages)* 012707
C. H. Liu, Y. Z. Qu, J. G. Wang, Y. Li, and R. J. Buenker

Atom-ion quantum gate *(13 pages)* 012708
Hauke Doerk, Zbigniew Idziaszek, and Tommaso Calarco

Cross sections for electron scattering by carbon disulfide in the low- and intermediate-energy range *(6 pages)* 012709
L. M. Brescansin, I. Iga, L. E. Machado, S. E. Michelin, and M.-T. Lee

Aharonov-Bohm effect on Aharonov-Casher scattering *(9 pages)* 012710
Qiong-Gui Lin (林琼桂)

20–150-keV proton-impact-induced ionization of uracil: Fragmentation ratios and branching ratios for electron capture and direct ionization *(10 pages)* 012711
J. Tabet, S. Eden, S. Feil, H. Abdoul-Carime, B. Farizon, M. Farizon, S. Ouaskit, and T. D. Märk

Near-threshold vibrational excitation of acetylene by positron impact *(6 pages)* 012712
Eliane M. de Oliveira, Marco A. P. Lima, Sergio d'A. Sanchez, and Márcio T. do N. Varella

Measurement of inelastic losses in a sample of ultracold ^{85}Rb *(4 pages)* 012713
P. A. Altin, N. P. Robins, R. Poldy, J. E. Debs, D. Döring, C. Figl, and J. D. Close

Importance of Thomas single-electron transfer in fast p-He collisions *(4 pages)* 012714
D. Fischer, M. Gudmundsson, Z. Berényi, N. Haag, H. A. B. Johansson, D. Misra, P. Reinhed, A. Källberg, A. Simonsson, K. Støchkel, H. Cederquist, and H. T. Schmidt

(Continued)

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 81, NUMBER 1** **JANUARY 2010**

Positronium cooling in porous silica measured via Doppler spectroscopy *(12 pages)* 012715
D. B. Cassidy, P. Crivelli, T. H. Hisakado, L. Liszkay, V. E. Meligne, P. Perez, H. W. K. Tom, and A. P. Mills Jr.

Clusters (including fullerenes)

Optimal control of the strong-field ionization of silver clusters in helium droplets *(7 pages)* 013201
N. X. Truong, P. Hilse, S. Göde, A. Przystawik, T. Döppner, Th. Fennel, Th. Bornath, J. Tiggesbäumker, M. Schlanges, G. Gerber, and K. H. Meiwes-Broer

Photoionization of Xe inside C_{60}: Atom-fullerene hybridization, giant cross-section enhancement, and correlation confinement resonances *(8 pages)* 013202
Mohamed E. Madjet, Thomas Renger, Dale E. Hopper, Matthew A. McCune, Himadri S. Chakraborty, Jan-M. Rost, and Steven T. Manson

PART B

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

Half-cycle-pulse-train induced state redistribution of Rydberg atoms *(6 pages)* 013401
P. K. Mandal and A. Speck

Construction of localized wave functions for a disordered optical lattice and analysis of the resulting Hubbard model parameters *(9 pages)* 013402
S. Q. Zhou and D. M. Ceperley

Symmetry for the nonadiabatic transition in Floquet states *(7 pages)* 013403
Keigo Hijii and Seiji Miyashita

Light scattering by ultracold atoms in an optical lattice *(12 pages)* 013404
Stefan Rist, Chiara Menotti, and Giovanna Morigi

Trap loss in a metastable helium-rubidium magneto-optical trap *(4 pages)* 013405
L. J. Byron, R. G. Dall, and A. G. Truscott

Photoelectron angular distribution and linear magnetic dichroism in the $4p$ photoemission from Rb atoms *(7 pages)* 013406
J. Niskanen, S. Urpelainen, K. Jänkälä, J. Schulz, S. Heinäsmäki, S. Fritzsche, N. M. Kabachnik, S. Aksela, and H. Aksela

Purely-long-range krypton molecules in singly and doubly excited binding potentials *(7 pages)* 013407
Z. S. Smith, A. Harmon, J. Banister, R. Norman, K. Hoogeboom-Pot, and M. Walhout

Enhanced ionization of hydrogen molecular ions in an intense laser field via a multiphoton resonance *(6 pages)* 013408
Ying-Jun Jin, Xiao-Min Tong, and Nobuyuki Toshima

Inducing elliptically polarized high-order harmonics from aligned molecules with linearly polarized femtosecond pulses *(6 pages)* 013409
Adam Etches, Christian Bruun Madsen, and Lars Bojer Madsen

(Continued)

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 81, NUMBER 1** **JANUARY 2010**

Laser control of a multilevel quantum system as static parameter optimization with the help of effective decomposition *(6 pages)* 013410
M. Sugawara

Intense field ionization of diatomic molecules: Two-center interference and tunneling *(6 pages)* 013411
Y. J. Chen and Bambi Hu

H_2^+ photodissociation by an intense pulsed photonic Fock state *(10 pages)* 013412
Amit K. Paul, Satrajit Adhikari, Michael Baer, and Roi Baer

Transient response of nonlinear magneto-optic rotation in a paraffin-coated Rb vapor cell *(5 pages)* 013413
M. Ummal Momeen, G. Rangarajan, and Vasant Natarajan

Lorentz force on an electron in a strong plane-wave laser field and the low-frequency limit for ionization *(6 pages)* 013414
Jarosław H. Bauer

Detecting antiferromagnetism of atoms in an optical lattice via optical Bragg scattering *(9 pages)* 013415
T. A. Corcovilos, S. K. Baur, J. M. Hitchcock, E. J. Mueller, and R. G. Hulet

Dynamics stabilization and transport coherency in a rocking ratchet for cold atoms *(7 pages)* 013416
A. B. Kolton and F. Renzoni

Dependence of interatomic decay widths on the symmetry of the decaying state: Analytical expressions and *ab initio* results *(12 pages)* 013417
K. Gokhberg, S. Kopelke, N. V. Kryzhevoi, P. Kolorenč, and L. S. Cederbaum

Molecular heat pump for rotational states *(10 pages)* 013418
C. Lazarou, M. Keller, and B. M. Garraway

Deceleration of molecules in a supersonic beam by the optical field in a low-finesse cavity *(5 pages)* 013419
Zhihao Lan, Yongkai Zhao, Peter F. Barker, and Weiping Lu

Characterization of ion Coulomb crystals in a linear Paul trap *(10 pages)* 013420
K. Okada, M. Wada, T. Takayanagi, S. Ohtani, and H. A. Schuessler

Internal-conversion process in superintense ultrashort x-ray pulses *(7 pages)* 013421
Dániel Kis, Péter Kálmán, Tamás Keszthelyi, and János Szívós

Optical–radio-frequency resonances free from power broadening *(6 pages)* 013422
W. Chalupczak, P. Josephs-Franks, S. Pustelny, and W. Gawlik

Molecular Feshbach dissociation as a source for motionally entangled atoms *(12 pages)* 013423
Clemens Gneiting and Klaus Hornberger

All-optical control of molecular fluorescence *(5 pages)* 013424
David S. Bradshaw and David L. Andrews

Matter waves and collective properties of cold atoms and molecules

Stability of low-dimensional multicomponent dilute Bose gases *(6 pages)* 013601
Alexei K. Kolezhuk

(Continued)

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 81, NUMBER 1** **JANUARY 2010**

Shapiro-like resonance in ultracold molecule production via an oscillating magnetic field *(8 pages)* 013602
Bin Liu, Li-Bin Fu, and Jie Liu

Dynamical quantum phase transition of a two-component Bose-Einstein condensate in an optical lattice *(8 pages)* 013603
Anssi Collin, Jani-Petri Martikainen, and Jonas Larson

Bose-Fermi mixtures of self-assembled filaments of fermionic polar molecules *(5 pages)* 013604
M. Klawunn, J. Duhme, and L. Santos

Efimov physics in ^{6}Li atoms *(14 pages)* 013605
Eric Braaten, H.-W. Hammer, Daekyoung Kang, and Lucas Platter

Nonlinear modes in a complex parabolic potential *(7 pages)* 013606
Dmitry A. Zezyulin, Georgy L. Alfimov, and Vladimir V. Konotop

Simulating and detecting artificial magnetic fields in trapped atoms *(13 pages)* 013607
Matthias Rosenkranz, Alexander Klein, and Dieter Jaksch

Bloch band and Bloch waves of superfluid Fermi gases in optical lattices *(7 pages)* 013608
Wei Qi and Ju-Kui Xue

Quantum vortex dynamics in two-dimensional neutral superfluids *(12 pages)* 013609
C.-C. Joseph Wang, R. A. Duine, and A. H. MacDonald

Nonequilibrium dynamics of vortex arrest in a finite-temperature Bose-Einstein condensate *(9 pages)* 013610
T. M. Wright, A. S. Bradley, and R. J. Ballagh

Finite-size effects for the gap in the excitation spectrum of the one-dimensional Hubbard model *(12 pages)* 013611
M. Colomé-Tatché, S. I. Matveenko, and G. V. Shlyapnikov

Low-dimensional weakly interacting Bose gases: Nonuniversal equations of state *(10 pages)* 013612
G. E. Astrakharchik, J. Boronat, I. L. Kurbakov, Yu. E. Lozovik, and F. Mazzanti

Mesoscopic effects in quantum phases of ultracold quantum gases in optical lattices *(13 pages)* 013613
L. D. Carr, M. L. Wall, D. G. Schirmer, R. C. Brown, J. E. Williams, and Charles W. Clark

Localization by bichromatic potentials versus Anderson localization *(8 pages)* 013614
Mathias Albert and Patricio Leboeuf

Imprinting light phase on matter-wave gratings in superradiance scattering *(7 pages)* 013615
Xiaoji Zhou, Fan Yang, Xuguang Yue, T. Vogt, and Xuzong Chen

Magnetic structure of an imbalanced Fermi gas in an optical lattice *(10 pages)* 013616
B. Wunsch, L. Fritz, N. T. Zinner, E. Manousakis, and E. Demler

Double diffraction in an atomic gravimeter *(5 pages)* 013617
N. Malossi, Q. Bodart, S. Merlet, T. Lévèque, A. Landragin, and F. Pereira Dos Santos

Experimental comparison of Raman and rf outcouplers for high-flux atom lasers *(7 pages)* 013618
J. E. Debs, D. Döring, P. A. Altin, C. Figl, J. Dugué, M. Jeppesen, J. T. Schultz,
N. P. Robins, and J. D. Close

Matter-wave bistability in coupled atom-molecule quantum gases *(6 pages)* 013619
Lei Jiang, Han Pu, Andrew Robertson, and Hong Y. Ling

(Continued)

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 81, NUMBER 1** **JANUARY 2010**

Background atoms and decoherence in optical lattices *(9 pages)* 013620
Krzysztof Pawłowski and Kazimierz Rzążewski

Breakdown of macroscopic quantum self-trapping in coupled mesoscopic one-dimensional Bose gases *(16 pages)* 013621
Rafael Hipolito and Anatoli Polkovnikov

Probing phase separation in Bose-Fermi mixtures by the critical superfluid velocity *(6 pages)* 013622
Jacob Linder and Asle Sudbø

Trap- and population-imbalanced two-component Fermi gas in the Bose-Einstein-condensate limit *(5 pages)* 013623
S. A. Silotri

Solitons in combined linear and nonlinear lattice potentials *(9 pages)* 013624
Hidetsugu Sakaguchi and Boris A. Malomed

Nonlinear patterns in Bose-Einstein condensates in dissipative optical lattices *(8 pages)* 013625
Yu. V. Bludov and V. V. Konotop

Loading atom lasers by collectivity-enhanced optical pumping *(5 pages)* 013626
Mihai A. Macovei and Jörg Evers

Symmetry-breaking magnetization dynamics of spinor dipolar Bose-Einstein condensates *(5 pages)* 013627
Shoichi Hoshi and Hiroki Saito

Phase separation in optical lattices in a spin-dependent external potential *(6 pages)* 013628
A-Hai Chen and Gao Xianlong

Constructing a classical field for a Bose-Einstein condensate in an arbitrary trapping potential:
Quadrupole oscillations at nonzero temperatures *(9 pages)* 013629
Tomasz Karpiuk, Mirosław Brewczyk, Mariusz Gajda, and Kazimierz Rzążewski

Mixtures of Bose gases confined in concentrically coupled annular traps *(6 pages)* 013630
F. Malet, G. M. Kavoulakis, and S. M. Reimann

Transport of ultracold Bose gases beyond the Gross-Pitaevskii description *(12 pages)* 013631
Thomas Ernst, Tobias Paul, and Peter Schlagheck

Achieving ground-state polar molecular condensates by chainwise atom-molecule adiabatic passage *(7 pages)* . . . 013632
Jing Qian, Weiping Zhang, and Hong Y. Ling

Two-dimensional discrete solitons in dipolar Bose-Einstein condensates *(13 pages)* 013633
Goran Gligorić, Aleksandra Maluckov, Milutin Stepić, Ljupčo Hadžievski, and Boris A. Malomed

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

Dyakonov-Tamm waves guided by the interface between two structurally chiral materials that differ only in handedness *(8 pages)* 013801
Jun Gao, Akhlesh Lakhtakia, and Mingkai Lei

Hamiltonian chaos in a coupled BEC–optomechanical-cavity system *(6 pages)* 013802
K. Zhang, W. Chen, M. Bhattacharya, and P. Meystre

(Continued)

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 81, NUMBER 1** **JANUARY 2010**

Gating attosecond pulse train generation using multicolor laser fields *(5 pages)* 013803
H.-C. Bandulet, D. Comtois, E. Bisson, A. Fleischer, H. Pépin, J.-C. Kieffer, P. B. Corkum, and D. M. Villeneuve

Efficient all-optical routing using dynamically induced transparency windows and photonic band gaps *(4 pages)* 013804
Jin-Wei Gao, Jin-Hui Wu, Nuo Ba, Cui-Li Cui, and Xing-Xia Tian

Localized modes in defect-free two-dimensional circular photonic crystals *(6 pages)* 013805
Wei Zhong and Xiangdong Zhang

Scattering of electromagnetic waves from two-dimensional randomly rough perfectly conducting surfaces: The full angular intensity distribution *(13 pages)* 013806
Ingve Simonsen, Alexei A. Maradudin, and Tamara A. Leskova

Ultrashort pulse propagation in a cubic medium including the Raman effect *(6 pages)* 013807
Ajit Kumar

Limits of heralded single-photon sources based on parametric photon-pair generation *(5 pages)* 013808
Stéphane Virally, Suzanne Lacroix, and Nicolas Godbout

Polarization and phase pulse shaping applied to structural contrast in nonlinear microscopy imaging *(11 pages)* 013809
Peter Schön, Martin Behrndt, Dora Aït-Belkacem, Hervé Rigneault, and Sophie Brasselet

Spectral phase shifts in femtosecond parametric down-conversion with media dispersion *(11 pages)* 013810
Ping Qiu, Ke Wang, Heyuan Zhu, and Liejia Qian

Entanglement between collective fields via atomic coherence effects *(9 pages)* 013811
Xiu Zhang and Xiangming Hu

Propagation of a strong x-ray pulse: Pulse compression, stimulated Raman scattering, amplified spontaneous emission, lasing without inversion, and four-wave mixing *(11 pages)* 013812
Yu-Ping Sun, Ji-Cai Liu, Chuan-Kui Wang, and Faris Gel'mukhanov

Glucose concentration measured by the hybrid coherent anti-Stokes Raman-scattering technique *(6 pages)* 013813
Xi Wang, Aihua Zhang, Miaochan Zhi, Alexei V. Sokolov, and George R. Welch

Observation of squeezed states with strong photon-number oscillations *(7 pages)* 013814
Moritz Mehmet, Henning Vahlbruch, Nico Lastzka, Karsten Danzmann, and Roman Schnabel

Stability of multipole-mode solitons in thermal nonlinear media *(4 pages)* 013815
Liangwei Dong and Fangwei Ye

Quantum interference of V-type three-level atom in structures made of left-handed materials and mirrors *(8 pages)* 013816
Jing-ping Xu and Ya-ping Yang

Multifilamentation of powerful optical pulses in silica *(10 pages)* 013817
L. Bergé, S. Mauger, and S. Skupin

Finite-size behavior of quantum collective spin systems *(8 pages)* 013818
Giuseppe Liberti, Franco Piperno, and Francesco Plastina

(Continued)

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 81, NUMBER 1** **JANUARY 2010**

Optical pulse propagation with minimal approximations *(12 pages)* 013819
Paul Kinsler

Engineering optical soliton bistability in colloidal media *(5 pages)* 013820
Michał Matuszewski

Fundamental modes of a trapped probe photon in optical fibers conveying periodic pulse trains *(5 pages)* 013821
Alain M. Dikandé

Enhancement and suppression of opto-acoustic parametric interactions using optical feedback *(7 pages)* 013822
Zhongyang Zhang, Chunnong Zhao, L. Ju, and D. G. Blair

Enhancement of phase-conjugate reflectivity using Zeeman coherence in highly degenerate molecular systems *(11 pages)* 013823
Nandini Mukherjee

Optimal waveform estimation for classical and quantum systems via time-symmetric smoothing. II. Applications to atomic magnetometry and Hardy's paradox *(11 pages)* 013824
Mankei Tsang

Two-photoactive-center model applied to photorefractiveself-focusing in biased $LiNbO_3$ *(6 pages)* 013825
Fabrice Devaux, Jassem Safioui, Mathieu Chauvet, and Rémy Passier

Measuring arbitrary-order coherences: Tomography of single-mode multiphoton polarization-entangled states *(5 pages)* 013826
U. Schilling, J. von Zanthier, and G. S. Agarwal

Quantum fluctuations in very small laser diodes *(11 pages)* 013827
Kaushik Roy-Choudhury and A. F. J. Levi

Spatial two-photon coherence of the entangled field produced by down-conversion using a partially spatially coherent pump beam *(7 pages)* 013828
Anand Kumar Jha and Robert W. Boyd

Phase-dependent propagation in a two-level system with intermediate states *(6 pages)* 013829
A. V. Sharypov, A. Eilam, A. D. Wilson-Gordon, and H. Friedmann

Manipulating harmonic emission with excited states of N_2 *(8 pages)* 013830
Yuquan Wang (王玉铨), Deying Chen (陈德应), Yuanqin Xia (夏元钦),
Rongwei Fan (樊荣伟), and Faming Lu (卢发铭)

Entanglement measurement of the quadrature components without homodyne detection in the bright, spatially multimode far field *(8 pages)* 013831
T. Golubeva, Yu. Golubev, K. Samburskaya, C. Fabre, N. Treps, and M. Kolobov

Broadband continuous-variable entanglement source using a chirped poling nonlinear crystal *(5 pages)* 013832
J. S. Zhao, L. Sun, X. Q. Yu, J. F. Wang, H. Y. Leng, Z. D. Xie, Y. L. Yin, P. Xu, and S. N. Zhu

Coherent-population-trapping resonances with linearly polarized light for all-optical miniature atomic clocks *(7 pages)* 013833
Sergei A. Zibrov, Irina Novikova, David F. Phillips, Ronald L. Walsworth, Alexander S. Zibrov,
Vladimir L. Velichansky, Alexey V. Taichenachev, and Valery I. Yudin

(Continued)

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 81, NUMBER 1** **JANUARY 2010**

Experimental study of Bloch vector analysis in nonlinear, finite, dissipative systems *(6 pages)* 013834
G. D'Aguanno, M. C. Larciprete, N. Mattiucci, A. Belardini, M. J. Bloemer, E. Fazio, O. Buganov, M. Centini, and C. Sibilia

Dynamics of a movable micromirror in a nonlinear optical cavity *(5 pages)* 013835
Tarun Kumar, Aranya B. Bhattacherjee, and ManMohan

Photon wave-packet manipulation via dynamic electromagnetically induced transparency in multilayer structures *(11 pages)* 013836
Francesco Bariani and Iacopo Carusotto

Tunable entanglement, antibunching, and saturation effects in dipole blockade *(5 pages)* 013837
J. Gillet, G. S. Agarwal, and T. Bastin

All-optical delay line based on a cavity soliton laser with injection *(8 pages)* 013838
C. McIntyre, A. M. Yao, G.-L. Oppo, F. Prati, and G. Tissoni

BRIEF REPORTS

Fundamental concepts

Non-Markovian effect on the quantum discord *(4 pages)* 014101
Bo Wang, Zhen-Yu Xu, Ze-Qian Chen, and Mang Feng

Geometry-induced potential on a two-dimensional section of a wormhole: Catenoid *(4 pages)* 014102
Rossen Dandoloff, Avadh Saxena, and Bjørn Jensen

Angular performance measure for tighter uncertainty relations *(4 pages)* 014103
Z. Hradil, J. Řeháček, A. B. Klimov, I. Rigas, and L. L. Sánchez-Soto

Quantum information

Tensor rank of the tripartite state $|W\rangle^{\otimes n}$ *(3 pages)* 014301
Nengkun Yu, Eric Chitambar, Cheng Guo, and Runyao Duan

Quench dynamics of entanglement in an open anisotropic spin-$\frac{1}{2}$ Heisenberg chain *(4 pages)* 014302
Jie Ren and Shiqun Zhu

Exploration of nonlocalities in ensembles consisting of bipartite quantum states *(4 pages)* 014303
Ming-Yong Ye, Yan-Kui Bai, Xiu-Min Lin, and Z. D. Wang

Atomic and molecular structure and dynamics

Approximations for the interparticle interaction energy in an exactly solvable two-electron model atom *(3 pages)* 014501
I. Nagy and J. Pipek

Pauli potential in terms of kinetic energy density and electron density in the leading Coulombic term of the nonrelativistic $1/Z$ expansion of spherical atomic ions *(2 pages)* 014502
N. H. March and Á. Nagy

(Continued)

PHYSICAL REVIEW A THIRD SERIES, VOLUME 81, NUMBER 1 JANUARY 2010

Atomic and molecular collisions and interactions

Isotope effects in complex scattering lengths for He collisions with molecular hydrogen *(4 pages)* 014701
J. L. Nolte, B. H. Yang, P. C. Stancil, Teck-Ghee Lee, N. Balakrishnan, R. C. Forrey, and A. Dalgarno

Polarization degree differences for the $3p\,^2P_{3/2}$–$3s\,^2S_{1/2}$ transition of $N^{4+}(3p\,^2P_{3/2})$ produced in N^{5+}-He and N^{5+}-H_2 collisions *(4 pages)* 014702
L. Liu, Y. Q. Zhao, J. G. Wang, R. K. Janev, and H. Tanuma

Matter waves and collective properties of cold atoms and molecules

Finite number of trapped bosons interacting through the harmonic Calogero interaction in one dimension *(4 pages)* 015601
Barnali Chakrabarti and Tapan Kumar Das

Domain-wall solutions of spinor Bose-Einstein condensates in an optical lattice *(4 pages)* 015602
Zai-Dong Li (李再东), Qiu-Yan Li (李秋艳), Peng-Bin He (贺鹏斌), J.-Q. Liang (梁九卿), W. M. Liu (刘伍明), and Guangsheng Fu (傅广生)

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

Band-gap structures of surface-plasmon polaritons in a subwavelength metal slit filled with periodic dielectrics *(4 pages)* 015801
Yun-Song Zhou, Ben-Yuan Gu, and Huai-Yu Wang

Capillary waves in the subcritical nonlinear Schrödinger equation *(2 pages)* 015802
G. Kozyreff

Optical precursors with self-induced transparency *(4 pages)* 015803
Bruno Macke and Bernard Ségard

Generation of two-mode squeezed states for two separated atomic ensembles via coupled cavities *(4 pages)* 015804
Shi-Biao Zheng, Zhen-Biao Yang, and Yan Xia

Scattering of two coherent photons inside a one-dimensional coupled-resonator waveguide *(4 pages)* 015805
Moorad Alexanian

COMMENTS

Fundamental concepts

Comment on "Full quantum reconstruction of vortex states" *(1 page)* 016101
João P. S. Bizarro

ERRATA

Publisher's Note: Hidden symmetry and nonlinear paraxial atom optics [Phys. Rev. A **80**, 063617 (2009)] *(1 page)* 019901(E)
François Impens

Erratum: Nuclear spin qubits in a trapped-ion quantum computer [Phys. Rev. A **79**, 052331 (2009)] *(1 page)* . . . . . 019902(E)
M. Feng, Y. Y. Xu, F. Zhou, and D. Suter

(Continued)

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 81, NUMBER 1** **JANUARY 2010**

Erratum: Pulsating behavior of an optical beam induced by initial phase-front curvature in strongly nonlocal media [Phys. Rev. A **76**, 043833 (2007)] *(1 page)* . . . . . 019903(E)
Huafeng Zhang, Lu Li, and Suotang Jia

Erratum: Structure and dynamics of cluster plasmas created by ultrashort intense laser fields [Phys. Rev. A **73**, 031201 (2006)] *(1 page)* . . . . . 019904(E)
Yuji Fukuda, Yasuaki Kishimoto, Tomohiro Masaki, and Koichi Yamakawa