PHYSICAL REVIEW A

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

PERIODICALS
Postmaster send address changes to:
American Institute of Physics
Suite 1NO1
2 Huntington Quadrangle
Melville, NY 11747-4502

THIRD SERIES, VOLUME 72, NUMBER 3
PARTS A AND B

CONTENTS

SEPTEMBER 2005

The Table of Contents is a total listing of Parts A and B.
Part A consists of pages 030301(R)-032901, and Part B pages 033201-039906.

PART A

RAPID COMMUNICATIONS

Quantum information

Spin chains as perfect quantum state mirrors *(4 pages)* . . . . . 030301(R)
Peter Karbach and Joachim Stolze

Atomic and molecular structure and dynamics

Open shells in reduced-density-matrix-functional theory *(4 pages)* . . . . . 030501(R)
N. N. Lathiotakis, N. Helbig, and E. K. U. Gross

Atomic and molecular collisions and interactions

Direct evidence of a strong isomer effect in electron-impact double ionization of C_3H_4 *(4 pages)* . . . . . 030701(R)
S. W. J. Scully, V. Senthil, J. A. Wyer, M. B. Shah, E. C. Montenegro, M. Kimura, and H. Tawara

Simultaneous real-time tracking of wave packets evolving on two different potential curves in H_2^+ and D_2^+ *(4 pages)* . . . . . 030702(R)
A. S. Alnaser, B. Ulrich, X. M. Tong, I. V. Litvinyuk, C. M. Maharjan, P. Ranitovic, T. Osipov, R. Ali, S. Ghimire, Z. Chang, C. D. Lin, and C. L. Cocke

Atomic and molecular processes in external fields

Simultaneous cooling and trapping of atoms by a single cavity-field mode *(4 pages)* . . . . . 031401(R)
A. Vukics and P. Domokos

Dimensional crossover in Bragg scattering from an optical lattice *(4 pages)* . . . . . 031402(R)
S. Slama, C. von Cube, A. Ludewig, M. Kohler, C. Zimmermann, and Ph. W. Courteille

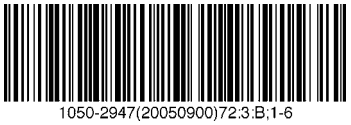
Diffraction-contrast imaging of cold atoms *(4 pages)* . . . . . 031403(R)
L. D. Turner, K. F. E. M. Domen, and R. E. Scholten

Matter waves

Dynamic response of trapped ultracold bosons on optical lattices *(4 pages)* . . . . . 031601(R)
G. G. Batrouni, F. F. Assaad, R. T. Scalettar, and P. J. H. Denteneer



Copyright 2005 by The American Physical Society



(Continued)

PHYSICAL REVIEW A THIRD SERIES, VOLUME 72, NUMBER 3 SEPTEMBER 2005

Fractional-filling Mott domains in two-dimensional optical superlattices *(4 pages)* . . . . . 031602(R)
P. Buonsante, V. Penna, and A. Vezzani

Bose-Einstein condensation on a permanent-magnet atom chip *(4 pages)* . . . . . 031603(R)
C. D. J. Sinclair, E. A. Curtis, I. Llorente Garcia, J. A. Retter, B. V. Hall, S. Eriksson, B. E. Sauer, and E. A. Hinds

Quantum phase transitions in the Fermi–Bose Hubbard model *(4 pages)* . . . . . 031604(R)
L. D. Carr and M. J. Holland

Super-Gaussian mirror for high-field-seeking molecules *(4 pages)* . . . . . 031605(R)
Guangjiong Dong, Sverker Edvadsson, Weiping Lu, and P. F. Barker

Limits to the flux of a continuous atom laser *(4 pages)* . . . . . 031606(R)
N. P. Robins, A. K. Morrison, J. J. Hope, and J. D. Close

Quantum optics, physics of lasers, nonlinear optics

Tunable whispering-gallery-mode resonators for cavity quantum electrodynamics *(4 pages)* . . . . . 031801(R)
Y. Louyer, D. Meschede, and A. Rauschenbeutel

Optically controlled delays for broadband pulses *(4 pages)* . . . . . 031802(R)
Qingqing Sun, Yuri V. Rostovtsev, Jonathan P. Dowling, Marlan O. Scully, and M. Suhail Zubairy

ARTICLES

Fundamental concepts

Complex modes in unstable quadratic bosonic forms *(5 pages)* 032101
R. Rossignoli and A. M. Kowalski

Brownian entanglement *(14 pages)* 032102
A. E. Allahverdyan, A. Khrennikov, and Th. M. Nieuwenhuizen

Adiabatic theorem for non-Hermitian time-dependent open systems *(11 pages)* 032103
Avner Fleischer and Nimrod Moiseyev

Entanglement of a bipartite multiparticle mesoscopic superposition *(6 pages)* 032104
A. N. Salgueiro

Semiclassical propagation of coherent states using complex and real trajectories *(10 pages)* 032105
Marcel Novaes and Marcus A. M. de Aguiar

Unstable particles as open quantum systems *(9 pages)* 032106
Paweł Caban, Jakub Rembieliński, Kordian A. Smoliński, and Zbigniew Walczak

Effective field theory program for conformal quantum anomalies *(6 pages)* 032107
Horacio E. Camblong, Luis N. Epele, Huner Fanchiotti, Carlos A. García Canal, and Carlos R. Ordóñez

Eigenstates of Möbius nanostructures including curvature effects *(5 pages)* 032108
J. Gravesen and M. Willatzen

Parity nonconservation in electron recombination of multiply charged ions *(9 pages)* 032109
G. F. Gribakin, F. J. Currell, M. G. Kozlov, and A. I. Mikhailov

Spontaneous emission of a photon: Wave-packet structures and atom-photon entanglement *(13 pages)* 032110
M. V. Fedorov, M. A. Efremov, A. E. Kazakov, K. W. Chan, C. K. Law, and J. H. Eberly

(Continued)

PHYSICAL REVIEW A THIRD SERIES, VOLUME 72, NUMBER 3 SEPTEMBER 2005

Quantum chaos and the double-slit experiment *(4 pages)* 032111
Giulio Casati and Tomaž Prosen

Ground-state van der Waals forces in planar multilayer magnetodielectrics *(16 pages)* 032112
Stefan Yoshi Buhmann, Dirk-Gunnar Welsch, and Thomas Kampf

Hydrodynamic quantization of mechanical systems *(24 pages)* 032113
Rafael J. Wysocki

Quantum information

Security of two quantum cryptography protocols using the same four qubit states *(18 pages)* 032301
Cyril Branciard, Nicolas Gisin, Barbara Kraus, and Valerio Scarani

Quantum-tomographic cryptography with a semiconductor single-photon source *(7 pages)* 032302
Dagomir Kaszlikowski, L. C. Kwek, Lim Jenn Yang, Loói Shiang Yong, and Frederick H. Willeboordse

Exact solution of the Z_2 Chern-Simons model on a triangular lattice *(7 pages)* 032303
B. Douçot and L. B. Ioffe

Volume of separable states is super-doubly-exponentially small in the number of qubits *(10 pages)* 032304
Stanislaw J. Szarek

Optimal classical-communication-assisted local model of *n*-qubit Greenberger-Horne-Zeilinger correlations *(5 pages)* 032305
Tracey E. Tessier, Carlton M. Caves, Ivan H. Deutsch, Bryan Eastin, and Dave Bacon

Quantum-gate characterization in an extended Hilbert space *(5 pages)* 032306
Peter P. Rohde, G. J. Pryde, J. L. O'Brien, and Timothy C. Ralph

Thresholds for linear optics quantum computing with photon loss at the detectors *(8 pages)* 032307
Marcus Silva, Martin Rötteler, and Christof Zalka

Generalization of quantum-state comparison *(7 pages)* 032308
M. Kleinmann, H. Kampermann, and D. Bruß

Entanglement observables and witnesses for interacting quantum spin systems *(5 pages)* 032309
L.-A. Wu, S. Bandyopadhyay, M. S. Sarandy, and D. A. Lidar

Minimax quantum-state discrimination *(5 pages)* 032310
Giacomo Mauro D'Ariano, Massimiliano Federico Sacchi, and Jonas Kahn

n-qubit-controlled phase gate with superconducting quantum-interference devices coupled to a resonator *(8 pages)* 032311
Chui-Ping Yang and Siyuan Han

Multimode entanglement and telecloning in a noisy environment *(12 pages)* 032312
Alessandro Ferraro and Matteo G. A. Paris

Entanglement distillation protocols and number theory *(17 pages)* 032313
H. Bombin and M. A. Martin-Delgado

Representation of complex rational numbers in quantum mechanics *(11 pages)* 032314
Paul Benioff

Compiling gate networks on an Ising quantum computer *(5 pages)* 032315
M. D. Bowdrey, J. A. Jones, E. Knill, and R. Laflamme

(Continued)

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 72, NUMBER 3** **SEPTEMBER 2005**

Quantum entanglement dynamics and decoherence wave in spin chains at finite temperatures *(7 pages)* 032316
S. D. Hamieh and M. I. Katsnelson

Quantum, classical, and total amount of correlations in a quantum state *(11 pages)* 032317
Berry Groisman, Sandu Popescu, and Andreas Winter

Quantum secret sharing schemes and reversibility of quantum operations *(7 pages)* 032318
Tomohiro Ogawa, Akira Sasaki, Mitsugu Iwamoto, and Hirosuke Yamamoto

Grover-algorithm-like operator using only single-qubit gates *(8 pages)* 032319
G. Kato

Security bound of two-basis quantum-key-distribution protocols using qudits *(10 pages)* 032320
Georgios M. Nikolopoulos and Gernot Alber

Higher-security thresholds for quantum key distribution by improved analysis of dark counts *(6 pages)* 032321
J.-C. Boileau, J. Batuwantudawe, and R. Laflamme

Better bound on the exponent of the radius of the multipartite separable ball *(12 pages)* 032322
Leonid Gurvits and Howard Barnum

Statistical properties of a quantum cellular automaton *(8 pages)* 032323
Norio Inui, Shuichi Inokuchi, Yoshihiro Mizoguchi, and Norio Konno

Local cloning of two product states *(5 pages)* 032324
Zhengfeng Ji, Yuan Feng, and Mingsheng Ying

Reexamination of optimal quantum state estimation of pure states *(5 pages)* 032325
A. Hayashi, T. Hashimoto, and M. Horibe

Error tolerance in an NMR implementation of Grover's fixed-point quantum search algorithm *(4 pages)* 032326
Li Xiao and Jonathan A. Jones

Entangling power of permutation-invariant quantum states *(6 pages)* 032327
Vladislav Popkov, Mario Salerno, and Gunter Schütz

Quasideterministic generation of maximally entangled states of two mesoscopic atomic ensembles by adiabatic quantum feedback *(7 pages)* 032328
Antonio Di Lisi, Silvio De Siena, Fabrizio Illuminati, and David Vitali

Scalable networks for discrete quantum random walks *(4 pages)* 032329
S. Fujiwara, H. Osaki, I. M. Buluta, and S. Hasegawa

Coulomb entangler and entanglement-testing network for waveguide qubits *(6 pages)* 032330
Linda E. Reichl and Michael G. Snyder

Broadcasting of entanglement at a distance using linear optics and telecloning of entanglement *(10 pages)* . . . 032331
Iulia Ghiu and Anders Karlsson

Fault-tolerant dissipative preparation of atomic quantum registers with fermions *(11 pages)* 032332
A. Griessner, A. J. Daley, D. Jaksch, and P. Zoller

Robust quantum gates on neutral atoms with cavity-assisted photon scattering *(4 pages)* 032333
L.-M. Duan, B. Wang, and H. J. Kimble

Gaussian measures of entanglement versus negativities: Ordering of two-mode Gaussian states *(13 pages)* . . . 032334
Gerardo Adesso and Fabrizio Illuminati

Probabilistic cloning with supplementary information *(6 pages)* 032335
Koji Azuma, Junichi Shimamura, Masato Koashi, and Nobuyuki Imoto

(Continued)

PHYSICAL REVIEW A THIRD SERIES, VOLUME 72, NUMBER 3 SEPTEMBER 2005

Inefficiency and classical communication bounds for conversion between partially entangled pure bipartite states *(7 pages)* 032336
Ben Fortescue and Hoi-Kwong Lo

Connection between entanglement and the speed of quantum evolution *(5 pages)* 032337
J. Batle, M. Casas, A. Plastino, and A. R. Plastino

Quantum detection with uncertain states *(11 pages)* 032338
Noam Elron and Yonina C. Eldar

Entanglement of bosonic modes in symmetric graphs *(9 pages)* 032339
M. Asoudeh and V. Karimipour

Robustness of a quantum key distribution with two and three mutually unbiased bases *(8 pages)* 032340
F. Caruso, H. Bechmann-Pasquinucci, and C. Macchiavello

Atomic and molecular structure and dynamics

Analytic evaluation of the amplitudes for orthopositronium decay to three photons to one-loop order *(11 pages)* 032501
Gregory S. Adkins

State-selective detection of near-dissociation ultracold KRb $X\,^1\Sigma^+$ and $a\,^3\Sigma^+$ molecules *(6 pages)* 032502
D. Wang, E. E. Eyler, P. L. Gould, and W. C. Stwalley

Expectation values of the e^+He($^3S^e$) system *(6 pages)* 032503
J. Mitroy

Exact and approximate exchange potentials investigated in terms of their matrix elements with the Kohn-Sham orbitals *(22 pages)* 032504
A. Holas and M. Cinal

Determination of wave-function functionals: The constrained-search variational method *(10 pages)* 032505
Xiao-Yin Pan, Viraht Sahni, and Lou Massa

Absolute frequency measurements in Yb with 0.08 ppb uncertainty: Isotope shifts and hyperfine structure in the 399-nm $^1S_0 \rightarrow {}^1P_1$ line *(7 pages)* 032506
Dipankar Das, Sachin Barthwal, Ayan Banerjee, and Vasant Natarajan

Application of relativistic coupled-cluster theory to heavy atomic systems with strongly interacting configurations: Hyperfine interactions in $^{207}Pb^+$ *(4 pages)* 032507
Bijaya K. Sahoo, Rajat K. Chaudhuri, B. P. Das, Holger Merlitz, and Debashis Mukherjee

Exact solutions for perturbed confined hydrogen atoms: Polarizabilities and nuclear shielding factors *(6 pages)* 032508
B. L. Burrows and M. Cohen

Spontaneous emission of a cesium atom near a nanofiber: Efficient coupling of light to guided modes *(7 pages)* 032509
Fam Le Kien, S. Dutta Gupta, V. I. Balykin, and K. Hakuta

Variational two-electron reduced density matrix theory for many-electron atoms and molecules: Implementation of the spin- and symmetry-adapted T_2 condition through first-order semidefinite programming *(11 pages)* 032510
David A. Mazziotti

Signature of chaos in high-lying doubly excited states of the helium atom *(14 pages)* 032511
Anh-Thu Le, Toru Morishita, X.-M. Tong, and C. D. Lin

(Continued)

PHYSICAL REVIEW A THIRD SERIES, VOLUME 72, NUMBER 3 SEPTEMBER 2005

Relativistic multireference many-body perturbation calculations on multi-valence-electron systems: Benchmarks on Zn-like ions *(10 pages)* 032512
Marius J. Vilkas and Yasuyuki Ishikawa

Atomic and molecular collisions and interactions

Wave-packet study of the products formed in dissociative recombination of HeH^+ *(13 pages)* 032701
Å. Larson and A. E. Orel

Exchange distortion and postcollision interaction for intermediate-energy electron-impact ionization of argon *(6 pages)* 032702
A. Prideaux, D. H. Madison, and K. Bartschat

Polarizabilities of Sc and Ti atoms and dispersion coefficients for their interaction with helium atoms *(5 pages)* 032703
Xi Chu, Alexander Dalgarno, and Gerrit C. Groenenboom

Control of mixed-state quantum systems by a train of short pulses *(10 pages)* 032704
D. Sugny, A. Keller, O. Atabek, D. Daems, C. M. Dion, S. Guérin, and H. R. Jauslin

$(e,2e)$ and $(e,3-1e)$ studies on double processes of He at large momentum transfer *(11 pages)* 032705
N. Watanabe, Y. Khajuria, M. Takahashi, Y. Udagawa, P. S. Vinitsky, Yu. V. Popov, O. Chuluunbaatar, and K. A. Kouzakov

Dissociation dynamics of excited neutral fragments of gaseous $SiCl_4$ following Si $2p$ and Cl $2p$ core-level excitations *(4 pages)* 032706
J. M. Chen, K. T. Lu, J. M. Lee, S. C. Ho, and H. W. Chang

Ionization cross sections of small cationic carbon clusters in high-energy collisions with helium atoms and stability of multiply charged species *(7 pages)* 032707
F. Mezdari, K. Wohrer-Béroff, M. Chabot, G. Martinet, S. Della Negrâ, P. Désesquelles, H. Hamrita, and A. LePadellec

H_2 and N_2 ionization and dissociative ionization by C^- and O^- ions at intermediate velocities: Direct and electron loss channels *(5 pages)* 032708
A. L. F. de Barros, S. Martínez, F. Zappa, S. Suárez, G. Bernardi, Ginette Jalbert, L. F. S. Coelho, and N. V. de Castro Faria

Solution for boson-diboson elastic scattering at zero energy in the shape-independent model *(9 pages)* 032709
J. H. Macek, Serge Ovchinnikov, and Gustavo Gasaneo

Manifestations of the Efimov effect for three identical bosons *(9 pages)* 032710
J. P. D'Incao and B. D. Esry

Young-type interference pattern in molecular inner-shell excitations by electron impact *(6 pages)* 032711
Mario Barbatti, Alexandre B. Rocha, and Carlos E. Bielschowsky

Scattering theory for arbitrary potentials *(7 pages)* 032712
A. S. Kadyrov, I. Bray, A. M. Mukhamedzhanov, and A. T. Stelbovics

Electron-impact ionization of Pb^{q+} ions for $q=1-10$ *(11 pages)* 032713
S. D. Loch, J. A. Ludlow, M. S. Pindzola, F. Scheuermann, K. Kramer, B. Fabian, K. Huber, and E. Salzborn

Distorted-wave theory for positron-hydrogen collisions *(20 pages)* 032714
Arijit Ghoshal and Puspajit Mandal

(Continued)

PHYSICAL REVIEW A THIRD SERIES, VOLUME 72, NUMBER 3 SEPTEMBER 2005

Electron-impact ionization of hydrogen and lithiumlike systems *(8 pages)* 032715
M. A. Uddin, A. K. F. Haque, A. K. Basak, K. R. Karim, and B. C. Saha

Effect of the Rydberg states on the time evolution of nonstationary states below or just above the ionization threshold *(7 pages)* 032716
Yannis Komninos and Cleanthes A. Nicolaides

Long-range scattering resonances in strong-field-seeking states of polar molecules *(8 pages)* 032717
Christopher Ticknor and John L. Bohn

Final state selection in the 4*p* photoemission of Rb by combining laser spectroscopy with soft-x-ray photoionization *(4 pages)* 032718
J. Schulz, M. Tchaplyguine, T. Rander, H. Bergersen, A. Lindblad, G. Öhrwall, S. Svensson, S. Heinäsmäki, R. Sankari, S. Osmekhin, S. Aksela, and H. Aksela

Charge transfer between S^{2+} and He: A comparative study of quantal and semiclassical approaches *(9 pages)* 032719
L. B. Zhao, P. C. Stancil, J.-P. Gu, G. Hirsch, R. J. Buenker, T. W. Imai, and M. Kimura

Matrix elements of many-body operators and density correlations *(11 pages)* 032720
Christian Brouder

Interference effects for low-energy electron-impact ionization of nitrogen molecules *(5 pages)* 032721
Junfang Gao, D. H. Madison, and J. L. Peacher

Nonequilibrium distribution functions for general rigid bodies in axially symmetric environments *(10 pages)* 032722
M. Thachuk

Photodetachment of the outer shell of C^- in the excited ^2D state *(12 pages)* 032723
H.-L. Zhou, S. T. Manson, A. Hibbert, L. Vo Ky, and N. Feautrier

Metastable trapping of low-energy positrons by cubane: A computational experiment *(11 pages)* 032724
F. A. Gianturco, P. Nichols, T. L. Gibson, and R. R. Lucchese

Charge-exchange-produced *K*-shell x-ray emission from Ar^{16+} in a tokamak plasma with neutral-beam injection *(4 pages)* 032725
P. Beiersdorfer, M. Bitter, M. Marion, and R. E. Olson

Diffraction in resonant electron scattering from helical macromolecules: Effects of the DNA backbone *(6 pages)* 032726
Laurent Caron and Léon Sanche

Near-threshold behavior of angular anisotropy parameters in negative-ion photodetachment *(7 pages)* 032727
M. Ya. Amusia, A. S. Baltenkov, L. V. Chernysheva, Z. Felfli, and A. Z. Msezane

Three bosons in one dimension with short-range interactions: Zero-range potentials *(12 pages)* 032728
Nirav P. Mehta and James R. Shepard

Electron-impact ionization of Mo^+ *(7 pages)* 032729
J. A. Ludlow, S. D. Loch, and M. S. Pindzola

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

Ionization distances of Rydberg atoms approaching solid surfaces in the presence of weak electric fields *(13 pages)* 032901
N. N. Nedeljković and Lj. D. Nedeljković

(Continued)

PHYSICAL REVIEW A THIRD SERIES, VOLUME 72, NUMBER 3 SEPTEMBER 2005

PART B

Clusters (including fullerenes)

Hyperangular momenta and energy partitions in multidimensional many-particle classical mechanics: The invariance approach to cluster dynamics *(28 pages)* 033201
Mikhail B. Sevryuk, Andrea Lombardi, and Vincenzo Aquilanti

Atomic and molecular processes in external fields

Fourth-rank hypermagnetizability of medium-size planar conjugated molecules and fullerene *(8 pages)* 033401
G. I. Pagola, S. Pelloni, M. C. Caputo, M. B. Ferraro, and P. Lazzeretti

Free-electron quantum signatures in intense laser fields *(7 pages)* 033402
Mohammad Mahmoudi, Yousef I. Salamin, and Christoph H. Keitel

Creation of arbitrary coherent superposition states by stimulated Raman adiabatic passage *(10 pages)* 033403
Z. Kis, N. V. Vitanov, A. Karpati, C. Barthel, and K. Bergmann

Autoresonant excitation and control of molecular degrees of freedom in three dimensions *(9 pages)* 033404
Gilad Marcus, Lazar Friedland, and Arie Zigler

Classical calculation of radiative lifetimes of atomic hydrogen in a homogeneous magnetic field *(5 pages)* 033405
M. W. Horbatsch, E. A. Hessels, and M. Horbatsch

Multidimensional laser cooling of broad- and narrow-line $0 \leftrightarrow 1$ dipole transitions *(8 pages)* 033406
Daniel J. Phalen, Colin C. Young, Su Yi, and Han Pu

High-order harmonic generation in the presence of a static electric field *(9 pages)* 033407
S. Odžak and D. B. Milošević

Model for collisions in ultracold-atom mixtures *(9 pages)* 033408
M. Anderlini, D. Ciampini, D. Cossart, E. Courtade, M. Cristiani, C. Sias, O. Morsch, and E. Arimondo

Optical lattice clock with atoms confined in a shallow trap *(8 pages)* 033409
Pierre Lemonde and Peter Wolf

Selection rules for laser-assisted electron-atom collisions with the laser field normal to the scattering plane *(9 pages)* 033410
K. M. Dunseath, M. Terao-Dunseath, and G. Bourhis

Evaporative cooling of a guided rubidium atomic beam *(9 pages)* 033411
T. Lahaye, Z. Wang, G. Reinaudi, S. P. Rath, J. Dalibard, and D. Guéry-Odelin

Alignment dependence of high-order harmonic generation from N_2 and O_2 molecules in intense laser fields *(7 pages)* 033412
XiaoXin Zhou, X. M. Tong, Z. X. Zhao, and C. D. Lin

Intense laser dissociation of D_2^+: From experiment to theory *(9 pages)* 033413
V. Serov, A. Keller, O. Atabek, H. Figger, and D. Pavicic

Field-ionization processes in high Rydberg states of Rb under a rotating electric field *(8 pages)* 033414
S. Yamada, H. Funahashi, M. Shibata, K. Kominato, Y. Kishimoto, M. Tada, T. Haseyama, I. Ogawa, S. Matsuki, and K. Yamamoto

Sub-Doppler cooling in reduced-period optical lattice geometries *(11 pages)* 033415
P. R. Berman, G. Raithel, R. Zhang, and V. S. Malinovsky

(Continued)

PHYSICAL REVIEW A THIRD SERIES, VOLUME 72, NUMBER 3 SEPTEMBER 2005

N-electron giant dipole states in crossed electric and magnetic fields *(18 pages)* 033416
Sascha Zöllner, Hans-Dieter Meyer, and Peter Schmelcher

Amplitude- versus frequency-modulated pumping light for coherent population trapping resonances at high buffer-gas pressure *(17 pages)* 033417
A. B. Post, Y.-Y. Jau, N. N. Kuzma, and W. Happer

Incorporation of a wave-packet propagation method into the *S*-matrix framework: Investigation of the effects of excited state dynamics on intense-field ionization *(14 pages)* 033418
Manabu Kanno, Tsuyoshi Kato, Hirohiko Kono, Yuichi Fujimura, and Farhad H. M. Faisal

Asymptotic symmetries in an optical lattice *(3 pages)* 033419
Giuseppe Gaeta

Matter waves

Outcoupling from a Bose-Einstein condensate with squeezed light to produce entangled-atom laser beams *(10 pages)* 033601
S. A. Haine and J. J. Hope

Period doubling, two-color lattices, and the growth of swallowtails in Bose-Einstein condensates *(10 pages)* 033602
B. T. Seaman, L. D. Carr, and M. J. Holland

Fingerprints of classical chaos in manipulation of cold atoms in the dynamical tunneling experiments *(13 pages)* 033603
Shmuel Osovski and Nimrod Moiseyev

Quantum and thermal fluctuations of trapped Bose-Einstein condensates *(13 pages)* 033604
V. I. Kruglov, M. K. Olsen, and M. J. Collett

Resonance solutions of the nonlinear Schrödinger equation: Tunneling lifetime and fragmentation of trapped condensates *(8 pages)* 033605
Nimrod Moiseyev and Lorenz S. Cederbaum

Laser cooling down to molecular condensate *(7 pages)* 033606
J. Dziarmaga and Maciej Lewenstein

Quantum-noise properties of matter-wave gap solitons *(6 pages)* 033607
Ray-Kuang Lee, Elena A. Ostrovskaya, Yuri S. Kivshar, and Yinchieh Lai

Modified semiclassical approximation for trapped Bose gases *(6 pages)* 033608
V. I. Yukalov

Holstein model and Peierls instability in one-dimensional boson-fermion lattice gases *(5 pages)* 033609
E. Pazy and A. Vardi

Measurement of the Casimir-Polder force through center-of-mass oscillations of a Bose-Einstein condensate *(6 pages)* 033610
D. M. Harber, J. M. Obrecht, J. M. McGuirk, and E. A. Cornell

Exact soliton solutions and nonlinear modulation instability in spinor Bose-Einstein condensates *(11 pages)* 033611
Lu Li, Zaidong Li, Boris A. Malomed, Dumitru Mihalache, and W. M. Liu

Quantum squeezing and entanglement in a two-mode Bose-Einstein condensate with time-dependent Josephson-like coupling *(10 pages)* 033612
S. Choi and N. P. Bigelow

(Continued)

PHYSICAL REVIEW A THIRD SERIES, VOLUME 72, NUMBER 3 SEPTEMBER 2005

Exact ground state of finite Bose-Einstein condensates on a ring *(14 pages)* 033613
Kaspar Sakmann, Alexej I. Streltsov, Ofir E. Alon, and Lorenz S. Cederbaum

Matter-wave solitons of collisionally inhomogeneous condensates *(9 pages)* 033614
G. Theocharis, P. Schmelcher, P. G. Kevrekidis, and D. J. Frantzeskakis

Management of matter waves in optical lattices by means of the Feshbach resonance *(16 pages)* 033615
V. A. Brazhnyi and V. V. Konotop

Ultracold atoms confined in an optical lattice plus parabolic potential: A closed-form approach *(17 pages)* . . . 033616
Ana Maria Rey, Guido Pupillo, Charles W. Clark, and Carl J. Williams

Gap-Townes solitons and localized excitations in low-dimensional Bose-Einstein condensates in optical lattices *(12 pages)* 033617
Fatkhulla Kh. Abdullaev and Mario Salerno

Dark soliton past a finite-size obstacle *(14 pages)* 033618
Nicolas Bilas and Nicolas Pavloff

Dynamic structure factor of the one-dimensional Bose gas near the Tonks-Girardeau limit *(4 pages)* 033619
Joachim Brand and Alexander Yu. Cherny

Symbiotic solitons in heteronuclear multicomponent Bose-Einstein condensates *(5 pages)* 033620
Víctor M. Pérez-García and Juan Belmonte Beitia

Quantum optics, physics of lasers, nonlinear optics

Two-photon-state generation via four-wave mixing in optical fibers *(9 pages)* 033801
Jun Chen, Xiaoying Li, and Prem Kumar

Generation and detection of magnified images via illumination by entangled photon pairs *(5 pages)* 033802
Ivan F. Santos, Leonardo Neves, G. Lima, C. H. Monken, and S. Pádua

How focused pumping affects type-II spontaneous parametric down-conversion *(5 pages)* 033803
P. S. K. Lee, M. P. van Exter, and J. P. Woerdman

Wideband pulse propagation: Single-field and multifield approaches to Raman interactions *(5 pages)* 033804
P. Kinsler and G. H. C. New

Theory of a single-atom laser including light forces *(10 pages)* 033805
Thomas Salzburger, Peter Domokos, and Helmut Ritsch

Entangled photon pair generation by spontaneous parametric down-conversion in finite-length one-dimensional photonic crystals *(11 pages)* 033806
M. Centini, J. Peřina, Jr., L. Sciscione, C. Sibilia, M. Scalora, M. J. Bloemer, and M. Bertolotti

Breakdown of the Born approximation in laser phase-noise to amplitude-noise conversion *(3 pages)* 033807
J. J. Townsend, J. G. Coffer, and J. C. Camparo

Model for passive mode locking in semiconductor lasers *(13 pages)* 033808
Andrei G. Vladimirov and Dmitry Turaev

Squeezing in a Λ-type three-level atom via spontaneously generated coherence *(13 pages)* 033809
Isabel Gonzalo, M. A. Antón, F. Carreño, and Oscar G. Calderón

Maps of the dynamics of an optically injected solid-state laser *(8 pages)* 033810
Simo Valling, Thomas Fordell, and Åsa Marie Lindberg

(Continued)

PHYSICAL REVIEW A THIRD SERIES, VOLUME 72, NUMBER 3 SEPTEMBER 2005

Effects of injected atomic coherence in broad-area lasers *(7 pages)* 033811
Oscar G. Calderón, Eduardo Cabrera, F. Carreño, M. A. Antón, Sonia Melle, and J. M. Guerra

Beat-note interferometer for direct phase measurement of photonic information *(4 pages)* 033812
Yong-Fan Chen, Yu-Chen Liu, Zen-Hsiang Tsai, Shih-Hao Wang, and Ite A. Yu

Distance-based degrees of polarization for a quantum field *(7 pages)* 033813
A. B. Klimov, L. L. Sánchez-Soto, E. C. Yustas, J. Söderholm, and G. Björk

Phase-space reconstruction of an atomic chaotic system *(6 pages)* 033814
Hugo L. D. de Souza Cavalcante, Carlos Renato de Carvalho, and Jean Claude Garreau

Quantum random walk of the field in an externally driven cavity *(6 pages)* 033815
G. S. Agarwal and P. K. Pathak

Optically induced forces and torques: Interactions between nanoparticles in a laser beam *(14 pages)* 033816
David S. Bradshaw and David L. Andrews

Generation of a strong attosecond pulse train with an orthogonally polarized two-color laser field *(7 pages)* 033817
Chul Min Kim, I Jong Kim, and Chang Hee Nam

Measuring the quality factor of a microwave cavity using superconducting qubit devices *(8 pages)* 033818
Yu-xi Liu, L. F. Wei, and Franco Nori

Slow-light dynamics of large-bandwidth pulses in warm rubidium vapor *(5 pages)* 033819
Mark Bashkansky, Guy Beadie, Zachary Dutton, Fredrik K. Fatemi, John Reintjes, and Michael Steiner

Quantum analysis of the nondegenerate optical parametric oscillator with injected signal *(11 pages)* 033820
B. Coutinho dos Santos, K. Dechoum, A. Z. Khoury, L. F. da Silva, and M. K. Olsen

Thermal emission and absorption of radiation in finite inverted-opal photonic crystals *(9 pages)* 033821
Marian Florescu, Hwang Lee, Andrew J. Stimpson, and Jonathan Dowling

Conditional generation of arbitrary single-mode quantum states of light by repeated photon subtractions *(11 pages)* 033822
Jaromír Fiurášek, Raúl García-Patrón, and Nicolas J. Cerf

Light intensity-voltage correlations and leakage-current excess noise in a single-mode semiconductor laser *(11 pages)* 033823
I. Maurin, I. Protsenko, J.-P. Hermier, A. Bramati, P. Grangier, and E. Giacobino

Off-resonant preparation of a vibrational coherence for enhanced stimulated Raman scattering *(13 pages)* 033824
S. Gundry, M. P. Anscombe, A. M. Abdulla, S. D. Hogan, E. Sali, J. W. G. Tisch, and J. P. Marangos

Intensity spiral patterns in a semiconductor microresonator *(6 pages)* 033825
Ye. Larionova, O. Egorov, E. Cabrera-Granado, and A. Esteban-Martin

BRIEF REPORTS

Fundamental concepts

Generating optimal states for a homodyne Bell test *(4 pages)* 034101
Sonja Daffer and Peter L. Knight

Surface screening in the Casimir force *(4 pages)* 034102
Ana M. Contreras-Reyes and W. Luis Mochán

(Continued)

PHYSICAL REVIEW A THIRD SERIES, VOLUME 72, NUMBER 3 SEPTEMBER 2005

Decoherence induced by a composite environment *(4 pages)* 034103
Fernando C. Lombardo and Paula I. Villar

Vacuum force on an atom in a magnetodielectric cavity *(4 pages)* 034104
M. S. Tomaš

Two-level quantum dynamics, integrability, and unitary NOT gates *(4 pages)* 034105
Renato M. Angelo and Walter F. Wreszinski

Quantum information

Multipartite entanglement preparation and quantum communication with atomic ensembles *(4 pages)* 034301
Chao Han, Peng Xue, and Guang-Can Guo

Thermal entanglement in a two-qubit Heisenberg *XXZ* spin chain under an inhomogeneous magnetic field *(4 pages)* 034302
Guo-Feng Zhang and Shu-Shen Li

Unmodulated spin chains as universal quantum wires *(3 pages)* 034303
Antoni Wójcik, Tomasz Łuczak, Paweł Kurzyński, Andrzej Grudka, Tomasz Gdala, and Małgorzata Bednarska

Generation of entangled states in cavity QED *(4 pages)* 034304
Liu Ye, Long-Bao Yu, and Guang-Can Guo

Using weak nonlinearity under decoherence for macroscopic entanglement generation and quantum computation *(4 pages)* 034305
Hyunseok Jeong

Simple scheme for the two-qubit Grover search in cavity QED *(4 pages)* 034306
Z. J. Deng, M. Feng, and K. L. Gao

Quantum nondemolition measurement saturates fidelity trade-off *(4 pages)* 034307
Ladislav Mišta, Jr. and Radim Filip

Atomic and molecular structure and dynamics

Suggested search for ^{207}Pb nuclear Schiff moment in $PbTiO_3$ ferroelectric *(4 pages)* 034501
T. N. Mukhamedjanov and O. P. Sushkov

Atomic and molecular collisions and interactions

Scaling law for total electron-impact ionization cross sections of Li-like ions *(4 pages)* 034701
L. U. Ancarani and P.-A. Hervieux

Triple photodetachment from the Cl^- ion *(3 pages)* 034702
J. Sandström, I. Alvarez, D. Calabrese, C. Cisneros, A. M. Covington, V. T. Davis, M. S. Gulley, M. Halka, D. Hanstorp, F. S. Schlachter, J. S. Thompson, and D. J. Pegg

Atomic and molecular processes in external fields

Circular dichroism in classical Coulomb scattering involving bremsstrahlung *(4 pages)* 035401
A. A. Krylovetsky, N. L. Manakov, S. I. Marmo, and Anthony F. Starace

Quantum optics, physics of lasers, nonlinear optics

Spontaneously generated coherence and dark states *(4 pages)* 035801
P. R. Berman

(Continued)

PHYSICAL REVIEW A THIRD SERIES, VOLUME 72, NUMBER 3 SEPTEMBER 2005

COMMENTS

Comment on "Quantum teleportation of an arbitrary two-qubit state and its relation to multipartite entanglement" *(2 pages)* 036301
Fu-Guo Deng

Comment on "Quantum secret sharing based on reusable Greenberger-Horne-Zeilinger states as secure carriers" *(2 pages)* 036302
Fei Gao, Fen-Zhuo Guo, Qiao-Yan Wen, and Fu-Chen Zhu

Comment on "Large enhancement of four-wave mixing by suppression of photon absorption from electromagnetically induced transparency" *(3 pages)* 037801
Roberto Buffa, Stefano Cavalieri, and Marco V. Tognetti

Reply to "Comment on 'Large enhancement of four-wave mixing by suppression of photon absorption from electromagnetically induced transparency' " *(2 pages)* 037802
Ying Wu, Joseph Saldana, and Yifu Zhu

ERRATA

Erratum: Anisotropic pseudopotential for polarized dilute quantum gases [Phys. Rev. A **67**, 033607 (2003)] *(2 pages)* . . . . . 039901(E)
Andrei Derevianko

Erratum: Quantum logic gate operation and entanglement with superconducting quantum interference devices in a cavity via a Raman transition [Phys. Rev. A **71**, 052310 (2005)] *(2 pages)* . . . . . 039902(E)
Ke-Hui Song, Zheng-Wei Zhou, and Guang-Can Guo

Publisher's Note: Realization of positive-operator-valued measures using measurement-assisted programmable quantum processors [Phys. Rev. **72**, 022343 (2005)] *(1 page)* . . . . . 039903(E)
Mário Ziman and Vladimír Bužek

Erratum: Mean field dynamics of superfluid-insulator phase transition in a gas of ultra cold atoms [Phys. Rev. A **71**, 043601 (2005)] *(1 page)* . . . . . 039904(E)
Jakub Zakrzewski

Erratum: Arbitrarily accurate composite pulse sequences [Phys. Rev. A **70**, 052318 (2004)] *(1 page)* . . . . . 039905(E)
Kenneth R. Brown, Aram W. Harrow, and Isaac L. Chuang

Publisher's Note: Quantum-gate characterization in an extended Hilbert space [Phys. Rev. **72**, 032306 (2005)] *(1 page)* 039906
Peter P. Rohde, G. J. Pryde, J. L. O'Brien, and Timothy C. Ralph