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 71, NUMBER 3 *CONTENTS* **MARCH 2005**
PARTS A AND B

The Table of Contents is a total listing of Parts A and B.
Part A consists of pages 030301(R)–032724, and Part B pages 032901–039907(E).

PART A

RAPID COMMUNICATIONS

Quantum information

Simple experimental scheme of preparing a four-photon entangled state for the teleportation-based realization of a linear optical controlled-NOT gate *(4 pages)* . . . . . 030301(R)
Yuuki Tokunaga, Takashi Yamamoto, Masato Koashi, and Nobuyuki Imoto

Reexamination of entanglement and the quantum phase transition *(4 pages)* . . . . . 030302(R)
Min-Fong Yang

Atomic and molecular collisions and interactions

Optical tuning of the scattering length of cold alkaline-earth-metal atoms *(4 pages)* . . . . . 030701(R)
R. Ciuryło, E. Tiesinga, and P. S. Julienne

Atomic and molecular processes in external fields

Surface-plasma resonance in small rare-gas clusters by mixing ir and vuv laser pulses *(4 pages)* . . . . . 031401(R)
Christian Siedschlag and Jan M. Rost

Evaporative cooling of magnetically trapped atomic molybdenum *(3 pages)* . . . . . 031402(R)
Cindy I. Hancox, Matthew T. Hummon, Scott V. Nguyen, and John M. Doyle

Effects of orbital symmetries in dissociative ionization of molecules by few-cycle laser pulses *(4 pages)* . . . . . 031403(R)
A. S. Alnaser, C. M. Maharjan, X. M. Tong, B. Ulrich, P. Ranitovic, B. Shan, Z. Chang, C. D. Lin, C. L. Cocke, and I. V. Litvinyuk

Adiabatic quantum state manipulation of single trapped atoms *(4 pages)* . . . . . 031404(R)
M. Khudaverdyan, W. Alt, I. Dotsenko, L. Förster, S. Kuhr, D. Meschede, Y. Miroshnychenko, D. Schrader, and A. Rauschenbeutel

ARTICLES

Fundamental concepts

Quasirelativistic quasilocal finite wave-function collapse model *(8 pages)* 032101
Philip Pearle



Copyright 2005 by The American Physical Society



(Continued)

PHYSICAL REVIEW A THIRD SERIES, VOLUME 71, NUMBER 3 MARCH 2005

Steering distillation processes through quantum Zeno dynamics *(7 pages)* 032102
B. Militello, H. Nakazato, and A. Messina

Generation of entanglement in regular systems *(4 pages)* 032103
Marko Žnidarič and Tomaž Prosen

Detailed discussion of a linear electric field frequency shift induced in confined gases by a magnetic field gradient: Implications for neutron electric-dipole-moment experiments *(10 pages)* 032104
S. K. Lamoreaux and R. Golub

Pseudorelativistic operator for a two-electron ion *(8 pages)* 032105
D. H. Jakubaßa-Amundsen

Kinematic approach to off-diagonal geometric phases of nondegenerate and degenerate mixed states *(6 pages)* 032106
D. M. Tong, Erik Sjöqvist, Stefan Filipp, L. C. Kwek, and C. H. Oh

Multicomponent Bell inequality and its violation for continuous-variable systems *(5 pages)* 032107
Jing-Ling Chen, Chunfeng Wu, L. C. Kwek, D. Kaszlikowski, M. Żukowski, and C. H. Oh

Dynamics of an atomic electron and its electromagnetic field in a cavity *(12 pages)* 032108
D. Masiello, E. Deumens, and Y. Öhrn

Quantum information

Quantum key distribution using a series of quantum correlated photon pairs *(6 pages)* 032301
Kyo Inoue

Nonlinear mechanism of charge-qubit decoherence in a lossy cavity: Quasi-normal-mode approach *(7 pages)* 032302
Y. B. Gao, Y. D. Wang, and C. P. Sun

Quantum teleportation of an arbitrary two-qubit state and its relation to multipartite entanglement *(5 pages)* 032303
Gustavo Rigolin

Witnessing entanglement with second-order interference *(9 pages)* 032304
Magdalena Stobińska and Krzysztof Wódkiewicz

Coherent-state linear optical quantum computing gates using simplified diagonal superposition resource states *(9 pages)* 032305
A. P. Lund and T. C. Ralph

Probabilistic programmable quantum processors with multiple copies of program states *(7 pages)* 032306
Adam Brazier, Vladimír Bužek, and Peter L. Knight

Experimental demonstration of a quantum circuit using linear optics gates *(4 pages)* 032307
T. B. Pittman, B. C. Jacobs, and J. D. Franson

Generating a four-photon polarization-entangled cluster state *(4 pages)* 032308
XuBo Zou and W. Mathis

Quantum-state transfer via the ferromagnetic chain in a spatially modulated field *(5 pages)* 032309
Tao Shi, Ying Li, Zhi Song, and Chang-Pu Sun

Perfect state transfer, effective gates, and entanglement generation in engineered bosonic and fermionic networks *(6 pages)* 032310
Man-Hong Yung and Sougato Bose

(Continued)

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 71, NUMBER 3** **MARCH 2005**

Superconducting qubits coupled to nanoelectromechanical resonators: An architecture for solid-state quantum-information processing *(17 pages)* 032311
M. R. Geller and A. N. Cleland

Perfect transfer of arbitrary states in quantum spin networks *(11 pages)* 032312
Matthias Christandl, Nilanjana Datta, Tony C. Dorlas, Artur Ekert, Alastair Kay, and Andrew J. Landahl

Average fidelity between random quantum states *(11 pages)* 032313
Karol Życzkowski and Hans-Jürgen Sommers

Information-capacity description of spin-chain correlations *(12 pages)* 032314
Vittorio Giovannetti and Rosario Fazio

Security improvement by using a modified coherent state for quantum cryptography *(5 pages)* 032315
Y. J. Lu, Luobei Zhu, and Z. Y. Ou

Teleportation with insurance of an entangled atomic state via cavity decay *(11 pages)* 032316
Grzegorz Chimczak, Ryszard Tanaś, and Adam Miranowicz

Macroscopic entanglement of many-magnon states *(12 pages)* 032317
Tomoyuki Morimae, Ayumu Sugita, and Akira Shimizu

Unified derivations of measurement-based schemes for quantum computation *(14 pages)* 032318
Andrew M. Childs, Debbie W. Leung, and Michael A. Nielsen

Quantum state exchange between indirectly coupled modes *(10 pages)* 032319
A. S. M. de Castro, J. F. Peruzzo, and V. V. Dodonov

Frequency and temporal effects in linear optical quantum computing *(10 pages)* 032320
Peter P. Rohde and Timothy C. Ralph

Effects of the interplay between interaction and disorder in bipartite entanglement *(8 pages)* 032321
L. F. Santos and G. Rigolin

Implementing nonlocal gates with nonmaximally entangled states *(5 pages)* 032322
Berry Groisman and Benni Reznik

Optimal conclusive discrimination of two states can be achieved locally *(5 pages)* 032323
Zhengfeng Ji, Hongen Cao, and Mingsheng Ying

Perfect pattern formation of neutral atoms in an addressable optical lattice *(13 pages)* 032324
J. Vala, A. V. Thapliyal, S. Myrgren, U. Vazirani, D. S. Weiss, and K. B. Whaley

Quantum computing and hidden variables *(16 pages)* 032325
Scott Aaronson

Generation of long-living entanglement between two separate three-level atoms *(9 pages)* 032326
Özgür Çakir, Ho Trung Dung, Ludwig Knöll, and Dirk-Gunnar Welsch

Practical implementations of twirl operations *(7 pages)* 032327
M. S. Anwar, L. Xiao, A. J. Short, J. A. Jones, D. Blazina, S. B. Duckett, and H. A. Carteret

Nonadiabatic relaxation control of qubits strongly coupled to continuum edge *(7 pages)* 032328
S. Pellegrin and G. Kurizki

Synthesizing arbitrary two-photon polarization mixed states *(12 pages)* 032329
Tzu-Chieh Wei, Joseph B. Altepeter, David Branning, Paul M. Goldbart, D. F. V. James, Evan Jeffrey, Paul G. Kwiat, Swagatam Mukhopadhyay, and Nicholas A. Peters

(Continued)

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 71, NUMBER 3** **MARCH 2005**

Noise resistance of adiabatic quantum computation using random matrix theory *(9 pages)* 032330
Jérémie Roland and Nicolas J. Cerf

Nonmaximally entangled bases and their application in entanglement purification via swapping *(10 pages)* . . . 032331
Mátyás Koniorczyk and Vladimír Bužek

Characterization of distillability of entanglement in terms of positive maps *(4 pages)* 032332
Lieven Clarisse

Detecting multipartite entanglement *(9 pages)* 032333
Andrew C. Doherty, Pablo A. Parrilo, and Federico M. Spedalieri

Qubit channels that achieve capacity with two states *(9 pages)* 032334
Dominic W. Berry

Beam splitter entangler for light fields *(4 pages)* 032335
Xun-Li Feng, Ru-Xin Li, and Zhi-Zhan Xu

Distinguishing two single-mode Gaussian states by homodyne detection: An information-theoretic approach *(7 pages)* 032336
Hyunchul Nha and H. J. Carmichael

Solution to the king's problem with observables that are not mutually complementary *(5 pages)* 032337
Minoru Horibe, Akihisa Hayashi, and Takaaki Hashimoto

Multiple-copy two-state discrimination with individual measurements *(5 pages)* 032338
A. Acín, E. Bagan, M. Baig, Ll. Masanes, and R. Muñoz-Tapia

Quantifying the resource of sharing a reference frame *(8 pages)* 032339
S. J. van Enk

Exchange gate in solid-state spin-quantum computation: The applicability of the Heisenberg model *(12 pages)* 032340
V. W. Scarola and S. Das Sarma

Bounds on the entanglement attainable from unitary transformed thermal states in liquid-state nuclear magnetic resonance *(14 pages)* 032341
Terri M. Yu, Kenneth R. Brown, and Isaac L. Chuang

Improving teleportation of continuous variables by local operations *(9 pages)* 032342
Ladislav Mišta, Jr. and Radim Filip

Nonseparability and squeezing of continuous polarization variables *(5 pages)* 032343
Natalia Korolkova and Rodney Loudon

Liquid-state NMR simulations of quantum many-body problems *(11 pages)* 032344
C. Negrevergne, R. Somma, G. Ortiz, E. Knill, and R. Laflamme

Quantum and classical parallelism in parity algorithms for ensemble quantum computers *(6 pages)* 032345
Ralf Stadelhofer, Dieter Suter, and Wolfgang Banzhaf

Collective decoherence of the superpositional entangled states in the quantum Shor algorithm *(5 pages)* 032346
G. P. Berman, D. I. Kamenev, and V. I. Tsifrinovich

Quantum random walks do not need a coin toss *(6 pages)* 032347
Apoorva Patel, K. S. Raghunathan, and Pranaw Rungta

(Continued)

PHYSICAL REVIEW A THIRD SERIES, VOLUME 71, NUMBER 3 MARCH 2005

Multimode entanglement of light and atomic ensembles via off-resonant coherent forward scattering *(20 pages)* 032348
D. V. Kupriyanov, O. S. Mishina, I. M. Sokolov, B. Julsgaard, and E. S. Polzik

Unitarily localizable entanglement of Gaussian states *(11 pages)* 032349
Alessio Serafini, Gerardo Adesso, and Fabrizio Illuminati

Entanglement properties of multipartite entangled states under the influence of decoherence *(26 pages)* 032350
M. Hein, W. Dür, and H.-J. Briegel

Atomic and molecular structure and dynamics

X-ray energies of circular transitions and electron screening in kaonic atoms *(8 pages)* 032501
J. P. Santos, F. Parente, S. Boucard, P. Indelicato, and J. P. Desclaux

Degree of accuracy in determining the nuclear electric quadrupole moment of radium *(6 pages)* 032502
Jacek Bieroń and Pekka Pyykkö

Low-energy excitations of a linearly Jahn-Teller coupled orbital quintet *(12 pages)* 032503
Nicola Manini

Experimental and theoretical study of the $3d\ ^2D$–level lifetimes of $^{40}Ca^+$ *(12 pages)* 032504
A. Kreuter, C. Becher, G. P. T. Lancaster, A. B. Mundt, C. Russo, H. Häffner, C. Roos, W. Hänsel, F. Schmidt-Kaler, R. Blatt, and M. S. Safronova

Tests of time independence of the electron and nuclear masses with ultracold molecules *(7 pages)* 032505
S. Schiller and V. Korobov

Positron annihilation in the positron-helium ion $e^+[\mathrm{He}(2\ ^3S)]$ *(6 pages)* 032506
Alexei M. Frolov

Exact-exchange time-dependent density-functional theory for static and dynamic polarizabilities *(7 pages)* . . . 032507
So Hirata, Stanislav Ivanov, Rodney J. Bartlett, and Ireneusz Grabowski

Lamb shift in muonic hydrogen *(8 pages)* 032508
E. Borie

"Dressing" lines and vertices in calculations of matrix elements with the coupled-cluster method and determination of Cs atomic properties *(11 pages)* 032509
Andrei Derevianko and Sergey G. Porsev

Spectral properties and lifetimes of neutral fermions and bosons in a magnetic quadrupole trap *(10 pages)* . . . 032510
Igor Lesanovsky and Peter Schmelcher

Semiclassical nonadiabatic dynamics with quantum trajectories *(10 pages)* 032511
Vitaly A. Rassolov and Sophya Garashchuk

V^{N-M} approximation for atomic calculations *(6 pages)* 032512
V. A. Dzuba

Simple model for the spherically and system-averaged pair density: Results for two-electron atoms *(9 pages)* 032513
Paola Gori-Giorgi and Andreas Savin

Extended Hylleraas three-electron integral *(10 pages)* 032514
Krzysztof Pachucki and Mariusz Puchalski

N-representability and stationarity in time-dependent density-functional theory *(9 pages)* 032515
Morrel H. Cohen and Adam Wasserman

(Continued)

PHYSICAL REVIEW A THIRD SERIES, VOLUME 71, NUMBER 3 MARCH 2005

Atomic and molecular collisions and interactions

Theoretical study of the photoionization of the excited $1s^2 2s2p\ ^{1,3}P^o$ states of the Be-like B^+ ion *(12 pages)* 032701
Dae-Soung Kim and Steven T. Manson

Measurement of the x-ray mass attenuation coefficient and determination of the imaginary component of the atomic form factor of molybdenum over the 13.5–41.5-keV energy range *(16 pages)* 032702
Martin D. de Jonge, Chanh Q. Tran, Christopher T. Chantler, Zwi Barnea, Bipin B. Dhal, David J. Cookson, Wah-Keat Lee, and Ali Mashayekhi

Siegert pseudostates: Completeness and time evolution *(12 pages)* 032703
Robin Santra, Jeffrey M. Shainline, and Chris H. Greene

Superexcited states of oxygen studied by fast-electron impact *(6 pages)* 032704
Lan-Lan Fan, Zhi-Ping Zhong, Lin-Fan Zhu, Xiao-Jing Liu, Zhen-Sheng Yuan, Jian-Min Sun, and Ke-Zun Xu

Cross sections for charge-changing processes involving kilo-electron-volt H and H^+ with CO and CO_2 *(9 pages)* 032705
B. G. Lindsay, W. S. Yu, and R. F. Stebbings

Total and single differential cross sections for simple resonant collisions using a fully orthonormal continuum-distorted-wave basis *(6 pages)* 032706
J. Bradley, S. F. C. O'Rourke, and D. S. F. Crothers

Angular momentum partitioning and the subshell multipole moments in impulsively excited argon ions *(15 pages)* 032707
H. M. Al-Khateeb, B. G. Birdsey, and T. J. Gay

Triple differential cross sections of coplanar symmetric $(e,2e)$ processes on calcium at low energies *(5 pages)* 032708
Raj Kumar Chauhan, M. K. Srivastava, and Rajesh Srivastava

Higher-order C_n dispersion coefficients for hydrogen *(5 pages)* 032709
J. Mitroy and M. W. J. Bromley

Elastic and electron-capture processes in $H^+ + C_2H_4$ collisions below the 10-keV regime *(10 pages)* 032710
Reiko Suzuki, Sachchida N. Rai, Heinz-Peter Liebermann, Robert J. Buenker, Lukáš Pichl, and Mineo Kimura

Three-body fragmentation dynamics of amidogen and methylene radicals via dissociative recombination *(16 pages)* 032711
R. D. Thomas, F. Hellberg, A. Neau, S. Rosén, M. Larsson, C. R. Vane, M. E. Bannister, S. Datz, A. Petrignani, and W. J. van der Zande

Anisotropic van der Waals coefficients for $He(1\ ^1S)$–$He(2\ ^3P)$ *(5 pages)* 032712
J.-Y. Zhang, Z.-C. Yan, D. Vrinceanu, and H. R. Sadeghpour

Positronium formation in positron-Li and positron-Na collisions at low energies *(5 pages)* 032713
Anh-Thu Le, M. W. J. Bromley, and C. D. Lin

Selectivity in valence excitation processes of noble atoms studied by fast electron impact *(5 pages)* 032714
Hua-Dong Cheng, Lin-Fan Zhu, Xiao-Jing Liu, Zhen-Sheng Yuan, Wen-Bin Li, and Ke-Zun Xu

Computation of electron-impact *K*-shell ionization cross sections of atoms *(6 pages)* 032715
M. A. Uddin, A. K. F. Haque, M. Masum Billah, A. K. Basak, K. R. Karim, and B. C. Saha

(Continued)

PHYSICAL REVIEW A THIRD SERIES, VOLUME 71, NUMBER 3 MARCH 2005

Optimal reflection-free complex absorbing potentials for quantum propagation of wave packets *(8 pages)* 032716
Oded Shemer, Daria Brisker, and Nimrod Moiseyev

Electron and positron scattering from perfluorocyclobutane (c-C_4F_8) molecules *(6 pages)* 032717
C. Makochekanwa, O. Sueoka, M. Kimura, M. Kitajima, and H. Tanaka

Direct ionization of heavy noble gases by positron impact *(5 pages)* 032718
K. Bartschat

Tunneling of a diatomic molecule incident upon a potential barrier *(10 pages)* 032719
Glen L. Goodvin and Mark R.A. Shegelski

Electron scattering cross sections for SF_6 and SF_5CF_3 at intermediate and high energies (100–10000 eV) *(6 pages)* 032720
P. Limão-Vieira, F. Blanco, J. C. Oller, A. Muñoz, J. M. Pérez, M. Vinodkumar, G. García, and N. J. Mason

Off-shell Jost solution for scattering by a Coulomb field *(3 pages)* 032721
U. Laha and B. Kundu

Ultracold quantum dynamics: Spin-polarized $K+K_2$ collisions with three identical bosons or fermions *(10 pages)* 032722
Goulven Quéméner, Pascal Honvault, Jean-Michel Launay, Pavel Soldán, Daniel E. Potter, and Jeremy M. Hutson

Experimental study of μ-atomic and μ-molecular processes in pure helium and deuterium-helium mixtures *(12 pages)* 032723
V. M. Bystritsky, V. F. Boreiko, W. Czapliński, M. Filipowicz, V. V. Gerasimov, O. Huot, P. E. Knowles, F. Mulhauser, V. N. Pavlov, N. P. Popov, L. A. Schaller, H. Schneuwly, V. G. Sandukovsky, V. A. Stolupin, V. P. Volnykh, and J. Woźniak

Delbrück contribution in the elastic scattering of 1.115-MeV photons *(5 pages)* 032724
Bhakta Kunwar, Arunava Bhadra, Swapan K. Sen Gupta, J. P. J. Carney, and R. H. Pratt

PART B

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

Interference effects in electron capture from insulator surfaces *(8 pages)* 032901
M. S. Gravielle and J. E. Miraglia

Clusters (including fullerenes)

Atomic structures and covalent-to-metallic transition of lead clusters Pb_n (n=2–22) *(7 pages)* 033201
Baolin Wang, Jijun Zhao, Xiaoshuang Chen, Daning Shi, and Guanghou Wang

Statistical fragmentation of small neutral carbon clusters *(15 pages)* 033202
S. Díaz-Tendero, P.-A. Hervieux, M. Alcamí, and F. Martín

Energies and density distributions of $(^4He)_N$ clusters doped with $Br_2(X)$: A Hartree-like approach *(10 pages)* 033203
M. P. de Lara-Castells, D. López-Durán, G. Delgado-Barrio, P. Villarreal, C. Di Paola, F. A. Gianturco, and J. Jellinek

Resonant Auger spectroscopy of argon clusters at the 2p threshold *(7 pages)* 033204
A. Kivimäki, S. L. Sorensen, M. Tchaplyguine, M. Gisselbrecht, R. R.T. Marinho, R. Feifel, G. Öhrwall, S. Svensson, and O. Björneholm

(Continued)

PHYSICAL REVIEW A THIRD SERIES, VOLUME 71, NUMBER 3 MARCH 2005

Shape, polarizability, and metallicity in silicon clusters *(6 pages)* 033205
K. A. Jackson, M. Yang, I. Chaudhuri, and Th. Frauenheim

Atomic and molecular processes in external fields

Analysis of recombination in high-order harmonic generation in molecules *(6 pages)* 033401
B. Zimmermann, M. Lein, and J. M. Rost

Feshbach resonance cooling of trapped atom pairs *(4 pages)* 033402
Josh W. Dunn, D. Blume, Bogdan Borca, B. E. Granger, and Chris H. Greene

Inducing an optical Feshbach resonance via stimulated Raman coupling *(8 pages)* 033403
Gregor Thalhammer, Matthias Theis, Klaus Winkler, Rudolf Grimm, and Johannes Hecker Denschlag

Ultracold dimer association induced by a far-off-resonance optical lattice *(7 pages)* 033404
E. L. Bolda, E. Tiesinga, and P. S. Julienne

Proposed interpretation of microwave ionization of Rydberg alkali-metal atoms *(5 pages)* 033405
Luca Perotti

Double photoexcitation of He atoms by attosecond xuv pulses in the presence of intense few-cycle infrared lasers *(6 pages)* 033406
X. M. Tong and C. D. Lin

Nonsequential double ionization of molecules *(7 pages)* 033407
Jakub S. Prauzner-Bechcicki, Krzysztof Sacha, Bruno Eckhardt, and Jakub Zakrzewski

Above-threshold ionization beyond the dipole approximation *(7 pages)* 033408
Michael Klaiber, Karen Z. Hatsagortsyan, and Christoph H. Keitel

Mg in electromagnetic fields: Theoretical partial multiphoton cross sections *(8 pages)* 033409
L. A. A. Nikolopoulos

Induced dipole effect in strong-field photodetachment of atomic negative ions *(8 pages)* 033410
V. E. Chernov, I. Yu. Kiyan, H. Helm, and B. A. Zon

Quantum-mechanical properties of Bessel beams *(10 pages)* 033411
R. Jáuregui and S. Hacyan

Theory of light-induced drift. VI. Roles of accommodation of normal and tangential momenta in surface light-induced drift with positive spontaneous relaxation parameter *(6 pages)* 033412
Frank O. Goodman

Measurements of trap parameters of a magneto-optical trap by parametric resonance *(5 pages)* 033413
Kihwan Kim, Heung-Ryoul Noh, and Wonho Jhe

Simulations of the rf heating rates in a linear quadrupole ion trap *(4 pages)* 033414
Vladimir L. Ryjkov, XianZhen Zhao, and Hans A. Schuessler

Resonant enhancement of dielectronic recombination by a high-frequency microwave field *(5 pages)* 033415
E. S. Shuman and T. F. Gallagher

Electric-field-induced adiabaticity in the rovibrational motion of heteronuclear diatomic molecules *(12 pages)* 033416
R. González-Férez and P. Schmelcher

Quantum-mechanical cumulant dynamics near stable periodic orbits in phase space: Application to the classical-like dynamics of quantum accelerator modes *(20 pages)* 033417
R. Bach, K. Burnett, M. B. d'Arcy, and S. A. Gardiner

(Continued)

PHYSICAL REVIEW A THIRD SERIES, VOLUME 71, NUMBER 3 MARCH 2005

Two-photon excitation of the metastable 2*s* state of hydrogen assisted by laser-induced chirped Stark shifts and continuum structure *(10 pages)* 033418
L. P. Yatsenko, V. I. Romanenko, B. W. Shore, T. Halfmann, and K. Bergmann

Matter waves

Particle density distributions in Fermi gas superfluids: Differences between one- and two-channel models in the Bose-Einstein-condensation limit *(8 pages)* 033601
Jelena Stajic, Qijin Chen, and K. Levin

Tomographic reconstruction of quantum correlations in excited Bose-Einstein condensates *(12 pages)* 033602
Anders S. Mouritzen and Klaus Mølmer

Symmetry breaking induced by random fluctuations for Bose-Einstein condensates in a double-well trap *(9 pages)* 033603
J. Garnier and F. Kh. Abdullaev

Collapsing Bose-Einstein condensates beyond the Gross-Pitaevskii approximation *(8 pages)* 033604
S. Wüster, J. J. Hope, and C. M. Savage

Interaction of impurity atoms in Bose-Einstein condensates *(8 pages)* 033605
Alexander Klein and Michael Fleischhauer

Matter diffraction at oblique incidence: Higher resolution and the $^4He_3$ Efimov state *(17 pages)* 033606
Gerhard C. Hegerfeldt and Martin Stoll

Viscous relaxation and collective oscillations in a trapped Fermi gas near the unitarity limit *(10 pages)* 033607
P. Massignan, G. M. Bruun, and H. Smith

Phase diagram of ultracold atoms in optical lattices: Comparative study of slave fermion and slave boson approaches to Bose-Hubbard model *(6 pages)* 033608
Yue Yu and S. T. Chui

Effect of a potential step or impurity on the Bose-Einstein condensate mean field *(10 pages)* 033609
B. T. Seaman, L. D. Carr, and M. J. Holland

Low-temperature crossover in the momentum distribution of cold atomic gases in one dimension *(7 pages)* 033610
Vadim V. Cheianov, H. Smith, and M. B. Zvonarev

Two-fluid model for a rotating trapped Fermi gas in the BCS phase *(7 pages)* 033611
Michael Urban

Collective atomic recoil in a moving Bose-Einstein condensate: From superradiance to Bragg scattering *(8 pages)* 033612
L. Fallani, C. Fort, N. Piovella, M. Cola, F. S. Cataliotti, M. Inguscio, and R. Bonifacio

Exact $1/N$ and optimized perturbative evaluation of μ_c for homogeneous interacting Bose gases *(10 pages)* 033613
Jean-Loïc Kneur and Marcus B. Pinto

Self-consistent finite-temperature model of atom-laser coherence properties *(4 pages)* 033614
J. R. Fergusson, A. J. Geddes, and D. A. W. Hutchinson

Ground-state properties of a dilute homogeneous Bose gas of hard disks in two dimensions *(8 pages)* 033615
F. Mazzanti, A. Polls, and A. Fabrocini

(Continued)

PHYSICAL REVIEW A THIRD SERIES, VOLUME 71, NUMBER 3 MARCH 2005

Adiabatic cooling of fermions in an optical lattice *(6 pages)* 033616
P. B. Blakie and A. Bezett

Optically plugged quadrupole trap for Bose-Einstein condensates *(5 pages)* 033617
D. S. Naik and C. Raman

Exact solution of the Thomas-Fermi equation for a trapped Bose-Einstein condensate with dipole-dipole interactions *(12 pages)* 033618
Claudia Eberlein, Stefano Giovanazzi, and Duncan H. J. O'Dell

Maximal entanglement of two spinor Bose-Einstein condensates *(5 pages)* 033619
Michael W. Jack and Makoto Yamashita

Bragg spectroscopy of an accelerating condensate with solitary-wave behavior *(8 pages)* 033620
K. J. Challis and R. J. Ballagh

Molecule formation as a diagnostic tool for second-order correlations of ultracold gases *(12 pages)* 033621
D. Meiser, P. Meystre, and C. P. Search

Nonlinear band structure in Bose-Einstein condensates: Nonlinear Schrödinger equation with a Kronig-Penney potential *(9 pages)* 033622
B. T. Seaman, L. D. Carr, and M. J. Holland

First- and second-order superfluid–Mott-insulator phase transitions of spin-1 bosons with coupled ground states in optical lattices *(4 pages)* 033623
K. V. Krutitsky, M. Timmer, and R. Graham

Boson-fermion coherence in a spherically symmetric harmonic trap *(15 pages)* 033624
Takahiko Miyakawa and Pierre Meystre

Bulk and collective properties of a dilute Fermi gas in the BCS-BEC crossover *(6 pages)* 033625
N. Manini and L. Salasnich

Stationary vortex clusters in nonrotating Bose-Einstein condensates *(4 pages)* 033626
M. Möttönen, S. M. M. Virtanen, T. Isoshima, and M. M. Salomaa

An atom interferometer enabled by spontaneous decay *(7 pages)* 033627
R. A. Cornelussen, R. J. C. Spreeuw, and H. B. van Linden van den Heuvell

Double-slit interferometry with a Bose-Einstein condensate *(6 pages)* 033628
L. A. Collins, L. Pezzé, A. Smerzi, G. P. Berman, and A. R. Bishop

Mott-insulator–to–superfluid transition in the Bose-Hubbard model: A strong-coupling approach *(8 pages)* . . . 033629
K. Sengupta and N. Dupuis

Boson-fermion resonance model in one dimension *(8 pages)* 033630
A. Recati, J. N. Fuchs, and W. Zwerger

Path-integral mean-field description of the vortex state in the BEC-to-BCS crossover *(4 pages)* 033631
J. Tempere, M. Wouters, and J. T. Devreese

Quantum optics, physics of lasers, nonlinear optics

Stability analysis of the self-phase-locked divide-by-2 optical parametric oscillator *(15 pages)* 033801
Petra Groß and Klaus-Jochen Boller

Coherent manipulation of collective three-level systems *(16 pages)* 033802
Mihai Macovei, Jörg Evers, and Christoph H. Keitel

(Continued)

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 71, NUMBER 3** **MARCH 2005**

Diffraction effects on light–atomic-ensemble quantum interface *(12 pages)* 033803
J. H. Müller, P. Petrov, D. Oblak, C. L. Garrido Alzar, S. R. de Echaniz, and E. S. Polzik

Optical hyperparametric oscillations in a whispering-gallery-mode resonator: Threshold and phase diffusion *(10 pages)* 033804
Andrey B. Matsko, Anatoliy A. Savchenkov, Dmitry Strekalov, Vladimir S. Ilchenko, and Lute Maleki

Efficient and spectrally bright source of polarization-entangled photons *(7 pages)* 033805
Friedrich König, Elliott J. Mason, Franco N. C. Wong, and Marius A. Albota

Absorption spectrum of an atom strongly coupled to a high-temperature reservoir *(12 pages)* 033806
A. G. Kofman

Liouville-space pathways for spectral diffusion in photon statistics from single molecules *(14 pages)* 033807
František Šanda and Shaul Mukamel

Radiation properties of a Kerr nonlinear blackbody *(9 pages)* 033808
Ze Cheng

Squeezing and entanglement delay using slow light *(5 pages)* 033809
Amy Peng, Mattias Johnsson, W. P. Bowen, P. K. Lam, H.-A. Bachor, and J. J. Hope

Photon emission from a single-molecule source driven by an rf field *(4 pages)* 033810
Igor Rozhkov and E. Barkai

Detection of atomic entanglement and electromagnetically induced transparency in velocity-selective coherent population trapping *(8 pages)* 033811
M. Kiffner and K.-P. Marzlin

Design of an integrated optical source of twin photons *(9 pages)* 033812
Ivan Avrutsky and Alexander V. Sergienko

Entanglement of large atomic samples: A Gaussian-state analysis *(9 pages)* 033813
Jacob Sherson and Klaus Mølmer

Continuous-variable quantum-state sharing via quantum disentanglement *(11 pages)* 033814
Andrew M. Lance, Thomas Symul, Warwick P. Bowen, Barry C. Sanders, Tomáš Tyc, T. C. Ralph, and Ping Koy Lam

Direct measurement and reconstruction of nonclassical features of twin beams generated in spontaneous parametric down-conversion *(5 pages)* 033815
Ondřej Haderka, Jan Peřina, Jr., Martin Hamar, and Jan Peřina

Angular momentum and the geometrical gauge of localized photon states *(4 pages)* 033816
Margaret Hawton and William E. Baylis

Pulse retrieval and soliton formation in a nonstandard scheme for dynamic electromagnetically induced transparency *(7 pages)* 033817
Amy Peng, Mattias Johnsson, and Joseph J. Hope

Quantum polarization properties of two-mode energy eigenstates *(6 pages)* 033818
Anita Sehat, Jonas Söderholm, Gunnar Björk, Pedro Espinoza, Andrei B. Klimov, and Luis L. Sánchez-Soto

High-efficiency quantum-nondemolition single-photon-number-resolving detector *(4 pages)* 033819
W. J. Munro, Kae Nemoto, R. G. Beausoleil, and T. P. Spiller

Three-photon frequency down-conversion as an event-ready source of entangled states *(9 pages)* 033820
Alejandro A. Hnilo

(Continued)

PHYSICAL REVIEW A THIRD SERIES, VOLUME 71, NUMBER 3 MARCH 2005

BRIEF REPORTS

Fundamental concepts

Affine maps of density matrices *(2 pages)* 034101
Thomas F. Jordan

Time evolution of entanglement of two local spins interacting with itinerant electrons *(4 pages)* 034102
Yi Gao and Shi-Jie Xiong

Geometric conditions for violation of Bell's inequality *(4 pages)* 034103
Istok P. Mendaš

Relation between conventional and dynamical formalisms in the quantum Zeno effect *(3 pages)* 034104
Kazuki Koshino

Quantum information

Fine-grained entanglement loss along renormalization-group flows *(4 pages)* 034301
J. I. Latorre, C. A. Lütken, E. Rico, and G. Vidal

Entanglement and bifurcation in the integrable dimer *(4 pages)* 034302
Xi-Wen Hou, Jing-Hua Chen, and Bambi Hu

Steady-state entanglement of two atoms created by classical driving field *(4 pages)* 034303
Özgür Çakir, Alexander A. Klyachko, and Alexander S. Shumovsky

Scheme for implementing quantum dense coding in cavity QED *(3 pages)* 034304
Liu Ye and Guang-Can Guo

Generation of continuous-variable tripartite entanglement using cascaded nonlinearities *(4 pages)* 034305
Juan Guo, Hongxin Zou, Zehui Zhai, Junxiang Zhang, and Jiangrui Gao

Quantum entanglement as an interpretation of bosonic character in composite two-particle systems *(4 pages)* 034306
C. K. Law

Generation of a supersinglet of three three-level atoms in cavity QED *(3 pages)* 034307
Guang-Sheng Jin, Shu-Shen Li, Song-Lin Feng, and Hou-Zhi Zheng

Cluster states from Heisenberg interactions *(4 pages)* 034308
Massoud Borhani and Daniel Loss

Equation of state for entanglement in a Fermi gas *(4 pages)* 034309
Christian Lunkes, Časlav Brukner, and Vlatko Vedral

Bounds on classical information capacities for a class of quantum memory channels *(4 pages)* 034310
Garry Bowen, Igor Devetak, and Stefano Mancini

Thermal entanglement between alternate qubits of a four-qubit Heisenberg *XX* chain in a magnetic field *(4 pages)* 034311
Min Cao and Shiqun Zhu

Entanglement swapping without joint measurement *(3 pages)* 034312
Ming Yang, Wei Song, and Zhuo-Liang Cao

(Continued)

PHYSICAL REVIEW A THIRD SERIES, VOLUME 71, NUMBER 3 MARCH 2005

Atomic and molecular structure and dynamics

Vibrationally selected O^+-O^+ fragmentation of O_2 below the adiabatic double-ionization potential studied via electron-electron coincidence spectroscopy *(3 pages)* 034501
R. Feifel and J. H. D. Eland

Atomic and molecular collisions and interactions

Doubly differential cross sections for single and multiple ionization of Ne by electron impact *(4 pages)* 034701
A. C. F. Santos, A. Hasan, and R. D. DuBois

Electron capture by Ne^{4+} ions from atomic hydrogen *(4 pages)* 034702
C. C. Havener, R. Rejoub, C. R. Vane, H. F. Krause, D. W. Savin, M. Schnell, J. G. Wang, and P. C. Stancil

Charge and energy-dependence of the Gaussian description of the triply differential cross sections for equal-energy sharing photo-double-ionization of two-electrons ions *(4 pages)* 034703
S. Otranto and C. R. Garibotti

Clusters (including fullerenes)

Minimal mass size of a stable ^{3}He cluster *(2 pages)* 035201
R. Guardiola and J. Navarro

Matter waves

Modulational instability of two-component Bose-Einstein condensates in a quasi-one-dimensional geometry *(4 pages)* 035601
T. Soloman Raju, Prasanta K. Panigrahi, and K. Porsezian

Quantum optics, physics of lasers, nonlinear optics

Quantum correlations in soliton collisions *(4 pages)* 035801
Ray-Kuang Lee, Yinchieh Lai, and Yuri S. Kivshar

ERRATA

Publisher's Note: Decoherence and the quantum-classical limit in the presence of chaos [Phys. Rev. A **71**, 010101(R) (2005)] *(1 page)* . . . . . 039901(E)
F. Toscano, R. L. de Matos Filho, and L. Davidovich

Publisher's Note: Inducing an optical Feshbach resonance via stimulated Raman coupling [Phys. Rev. A **71**, 033403 (2005)] *(1 page)* . . . . . 039902(E)
Gregor Thalhammer, Matthias Theis, Klaus Winkler, Rudolf Grimm, and Johannes Hecker Denschlag

Erratum: Traveling waves and counterpropagating bright droplets as a result of tailoring the transverse dispersion relation in a multistable optical system [Phys. Rev. A **68**, 013821 (2003)] *(1 page)* . . . . . 039903(E)
S. Rankin, E. Yao, and F. Papoff

Erratum: Nonadiabatic transitions in a two-level quantum system: Pulse-shape dependence of the transition probability for a two-level atom driven by a pulsed radiation field [Physical Review A **57**, 79 (1998)] *(1 page)* . . . . . 039904(E)
P. R. Berman, L. Yan, K. Chiam, and R. Sung

(Continued)

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 71, NUMBER 3** **MARCH 2005**

Publisher's Note: Analytic pulse design for selective population transfer in many-level quantum systems: Maximizing the amplitude of population oscillations [Phys. Rev. A **70**, 043413 (2004)] *(1 page)* . . . . . 039905(E)
Duje Bonacci, S. D. Bosanac, and N. Došlić

Erratum: Sub-Riemannian geometry and time optimal control of three spin systems: Quantum gates and coherence transfer [Phys. Rev. A **65**, 032301 (2002)] *(1 page)* . . . . . 039906(E)
N. Khaneja, S. J. Glaser, and R. Brockett

Publisher's Note: Configuration-interaction-induced dynamic spin polarization of the $Ar^*(2p^{-1}_{1/2,3/2}4s_{1/2})_{J=1}$ resonant Auger decay [Phys. Rev. A **71**, 020701 (2005)] *(1 page)* . . . . . 039907(E)
B. Lohmann, B. Langer, G. Snell, U. Kleiman, S. Canton, M. Martins, U. Becker, and N. Berrah