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 66, NUMBER 1 ***CONTENTS*** **JULY 2002**

Announcement iii
Physical Review A Editorial Policies and Practices v
Physical Review A Information for Contributors ix
Guidelines for PRA Section Selection xii
Guidelines for Estimating Length xv

RAPID COMMUNICATIONS

Quantum information

Quantum computing of molecular magnet Mn_{12} *(3 pages)* ..... 010301(R)
Bin Zhou, Ruibao Tao, Shun-Qing Shen, and Jiu-Qing Liang
Quantum search with two-atom collisions in cavity QED *(4 pages)* ..... 010302(R)
F. Yamaguchi, P. Milman, M. Brune, J. M. Raimond, and S. Haroche

Atomic and molecular structure and dynamics

Stability of the (m^{2+},e^-,e^-,e^+) system *(3 pages)* ..... 010501(R)
J. Mitroy
Resonances of positronium complexes *(4 pages)* ..... 010502(R)
J. Usukura and Y. Suzuki

Atomic and molecular collisions and interactions

Control of Feshbach resonances by quantum interference *(4 pages)* ..... 010701(R)
S. E. Harris
Photoelectron angular distribution of 3*s* photoionization of atomic chlorine *(4 pages)* ..... 010702(R)
H. P. Saha
Rescattering of photodetached electrons from a polar molecule in a static electric field: Spatial distribution *(4 pages)* ..... 010703(R)
Ilya I. Fabrikant

Atomic and molecular processes in external fields

Dynamics in a two-level atom magneto-optical trap *(4 pages)* ..... 011401(R)
Xinye Xu, Thomas H. Loftus, Matthew J. Smith, John L. Hall, Alan Gallagher, and Jun Ye

Copyright 2002 by The American Physical Society

(Continued)

1050-2947(200207)66:1;1-U

PHYSICAL REVIEW A THIRD SERIES, VOLUME 66, NUMBER 1 JULY 2002

Matter waves

Single-mode approximation in a spinor-1 atomic condensate *(4 pages)* . . . . . 011601(R)
S. Yi, Ö. E. Müstecaplıoğlu, C. P. Sun, and L. You
Collapse dynamics of trapped Bose-Einstein condensates *(4 pages)* . . . . . 011602(R)
L. Santos and G. V. Shlyapnikov
Pairing instability and mechanical collapse of a Bose gas with an attractive interaction *(4 pages)* . . . . . 011603(R)
Gun Sang Jeon, Lan Yin, Sung Wu Rhee, and David J. Thouless
Dynamics of a Bose-Einstein condensate at finite temperature in an atom-optical coherence filter *(4 pages)* . . . . . 011604(R)
F. Ferlaino, P. Maddaloni, S. Burger, F. S. Cataliotti, C. Fort, M. Modugno, and M. Inguscio

Quantum optics, physics of lasers, nonlinear optics

Synthesis and tomographic characterization of the displaced Fock state of light *(4 pages)* . . . . . 011801(R)
A. I. Lvovsky and S. A. Babichev

ARTICLES

Fundamental concepts

Zeno and anti-Zeno effects in multimode parametric down-conversion *(5 pages)* 012101
Alfredo Luis
Euclidean resonance and quantum tunneling *(12 pages)* 012102
B. I. Ivlev
Quantum-state discrimination *(4 pages)* 012103
Luis Roa, Juan Carlos Retamal, and Carlos Saavedra
Revivals in an infinite square well in the presence of a δ well *(7 pages)* 012104
G. A. Vugalter, A. K. Das, and V. A. Sorokin
Influence of the detector's temperature on the quantum Zeno effect *(7 pages)* 012105
Julius Ruseckas
Entanglement creation using quantum interrogation *(7 pages)* 012106
A. Gilchrist, A. G. White, and W. J. Munro
Relating the Lorentzian and exponential: Fermi's approximation, the Fourier transform, and causality *(11 pages)* 012107
A. Bohm, N. L. Harshman, and H. Walther
Non-Markovian stochastic Schrödinger equations: Generalization to real-valued noise using quantum-measurement theory *(17 pages)* 012108
Jay Gambetta and H. M. Wiseman
Quantum transitions in interacting fields *(17 pages)* 012109
E. Karpov, G. Ordonez, T. Petrosky, and I. Prigogine
Quantum Zeno tomography *(8 pages)* 012110
P. Facchi, Z. Hradil, G. Krenn, S. Pascazio, and J. Řeháček
Electric dipole moments of Hg, Xe, Rn, Ra, Pu, and TlF induced by the nuclear Schiff moment and limits on time-reversal violating interactions *(7 pages)* 012111
V. A. Dzuba, V. V. Flambaum, J. S. M. Ginges, and M. G. Kozlov
Understanding the destruction of nth-order quantum coherence in terms of multipath interference *(9 pages)* 012112
D. L. Zhou, P. Zhang, and C. P. Sun

(Continued)

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 66, NUMBER 1** **JULY 2002**

Quantum information

Optimal teleportation based on bell measurements *(4 pages)* 012301
Sergio Albeverio, Shao-Ming Fei, and Wen-Li Yang
Self-consistent non-Markovian theory of a quantum-state evolution for quantum-information processing *(4 pages)* 012302
Doyeol Ahn, Jinhyoung Lee, M. S. Kim, and S. W. Hwang
Qudit quantum-state tomography *(6 pages)* 012303
R. T. Thew, K. Nemoto, A. G. White, and W. J. Munro
Improving the fidelity of continuous-variable teleportation via local operations *(8 pages)* 012304
Jaromír Fiurášek
Optimal simulation of two-qubit Hamiltonians using general local operations *(16 pages)* 012305
C. H. Bennett, J. I. Cirac, M. S. Leifer, D. W. Leung, N. Linden, S. Popescu, and G. Vidal
Read-only-memory-based quantum computation: Experimental explorations using nuclear magnetic resonance and future prospects *(11 pages)* 012306
D. R. Sypher, I. M. Brereton, H. M. Wiseman, B. L. Hollis, and B. C. Travaglione
Quantum control via encoded dynamical decoupling *(10 pages)* 012307
Lorenza Viola
Optimal information extraction in probabilistic teleportation *(6 pages)* 012308
Li-Yi Hsu
Quantum erasers and probing classifications of entanglement via nuclear magnetic resonance *(10 pages)* 012309
G. Teklemariam, E. M. Fortunato, M. A. Pravia, Y. Sharf, T. F. Havel, D. G. Cory, A. Bhattaharyya, and J. Hou
Simulation of the diffusion equation on a type-II quantum computer *(8 pages)* 012310
G. P. Berman, A. A. Ezhov, D. I. Kamenev, and J. Yepez
Nature and location of quantum information *(15 pages)* 012311
Robert B. Griffiths
Gate errors in solid-state quantum-computer architectures *(6 pages)* 012312
Xuedong Hu and S. Das Sarma
Near-optimal two-mode spin squeezing via feedback *(10 pages)* 012313
Dominic W. Berry and Barry C. Sanders
Generalized quantum search Hamiltonian *(2 pages)* 012314
Joonwoo Bae and Younghun Kwon

Atomic and molecular structure and dynamics

Photoionization of mercury: A relativistic time-dependent density-functional-theory approach *(16 pages)* 012501
D. Toffoli, M. Stener, and P. Decleva
Coherent spectroscopy of degenerate two-level systems in Cs *(12 pages)* 012502
C. Andreeva, S. Cartaleva, Y. Dancheva, V. Biancalana, A. Burchianti, C. Marinelli, E. Mariotti, L. Moi, and K. Nasyrov
Fourth-order perturbative extension of the single-double excitation coupled-cluster method *(12 pages)* 012503
Andrei Derevianko and Erik D. Emmons
Coupled-cluster calculations using local potentials *(14 pages)* 012504
C. Gutlé, J. L. Heully, J. B. Krieger, and A. Savin
Anisotropic and isotropic light scattering in gaseous low-temperature helium *(6 pages)* 012505
C. Guillot-Noël, Y. Le Duff, F. Rachet, and M. Chrysos
Representation of a complex Green function on a real basis: Series representation *(12 pages)* 012506
Robin Shakeshaft

(Continued)

PHYSICAL REVIEW A THIRD SERIES, VOLUME 66, NUMBER 1 JULY 2002

Direct measurement of the metastable $^3P_2$ decay rate in krypton *(4 pages)* 012507
J. Lefers, N. Miller, D. Rupke, D. Tong, and M. Walhout

Atomic and molecular collisions and interactions

Comparison of the double- to single-photoionization ratio of Li with He *(4 pages)* 012701
R. Wehlitz, J. B. Bluett, and S. B. Whitfield
Shape resonances and nonadiabatic dynamics in $O(^3P_j)+He$ collisions at cold and ultracold temperatures *(9 pages)* 012702
R. V. Krems and A. Dalgarno
Dielectronic recombination resonances in F^{6+} *(13 pages)* 012703
M. Tokman, N. Eklöw, P. Glans, E. Lindroth, R. Schuch, G. Gwinner, D. Schwalm, A. Wolf, A. Hoffknecht, A. Müller, and S. Schippers
Dissociation of deuteromethane following carbon 1*s* core ionization *(10 pages)* 012704
E. Kukk, J. Rius i Riu, M. Stankiewicz, P. A. Hatherly, P. Erman, E. Rachlew, P. Winiarczyk, M. Huttula, and S. Aksela
Efimov resonances in atom-diatom scattering *(7 pages)* 012705
E. Nielsen, H. Suno, and B. D. Esry
Electron spectroscopy of Na-like autoionizing metastable ions *(5 pages)* 012706
M. Lu and R. A. Phaneuf
Calculation of electron-impact total-ionization cross sections *(10 pages)* 012707
Philip L. Bartlett and Andris T. Stelbovics
Ionization of carbon, nitrogen, and oxygen by electron impact *(12 pages)* 012708
Yong-Ki Kim and Jean-Paul Desclaux
Investigation of complex ionization amplitudes in xenon by $(e,2e)$ spectroscopy *(5 pages)* 012709
J. G. Childers and N. L. S. Martin
Two-center convergent close-coupling approach to positron-hydrogen collisions *(13 pages)* 012710
Alisher S. Kadyrov and Igor Bray
Two-center continuum approximation with correct boundary conditions for single-electron emission in e^-+H_2 collisions *(8 pages)* 012711
P. F. Weck, O. A. Fojón, B. Joulakian, C. R. Stia, J. Hanssen, and R. D. Rivarola
Diffusion of hydrogen atoms in helium gas and helium atoms in hydrogen gas *(3 pages)* 012712
H-K. Chung and A. Dalgarno
Electron recombination with multicharged ions via chaotic many-electron states *(7 pages)* 012713
V. V. Flambaum, A. A. Gribakina, G. F. Gribakin, and C. Harabati
Electron emission characteristics in p-H$(1s)$ collisions from numerical solutions of the time-dependent Schrödinger equation *(13 pages)* 012714
Michal Chassid and Marko Horbatsch
Measurements of the electron-impact double-to-single ionization ratio using trapped lithium *(7 pages)* 012715
M.-T. Huang, L. Zhang, S. Hasegawa, S. H. Southworth, and L. Young
Electron loss from heavy heliumlike projectiles in ultrarelativistic collisions with many-electron atomic targets *(8 pages)* 012716
C. Müller, A. B. Voitkiv, and N. Grün
Chemi-ionization of mercury atoms: Potential curves and estimates of the total ionization cross sections *(18 pages)* 012717
James S. Cohen, Richard L. Martin, and Lee A. Collins
Fourier transform method of calculating total cross sections using the time-dependent close-coupling theory *(5 pages)* 012718
J. Colgan, M. S. Pindzola, and F. Robicheaux

(Continued)

PHYSICAL REVIEW A THIRD SERIES, VOLUME 66, NUMBER 1 JULY 2002

Measurements of *L*-shell x-ray production cross sections of W, Pt, and Au by 10–30-keV electrons *(9 pages)* 012719
C. S. Campos, M. A. Z. Vasconcellos, X. Llovet, and F. Salvat
Theoretical study on electron–free-radical scattering: An application to CF *(7 pages)* 012720
M.-T. Lee, I. Iga, L. M. Brescansin, L. E. Machado, and F. B. C. Machado

Clusters (including fullerenes)

Simulation of the interaction of high-energy C_{60} cluster ions with amorphous targets *(10 pages)* 013201
E. Nardi, Z. Zinamon, T. A. Tombrello, and N. M. Tanushev
Photoelectron spectroscopy of sodium iodide clusters containing single hydroxyl ions or water molecules *(4 pages)* 013202
D. J. Fatemi and L. A. Bloomfield
Formation of gas-phase oxygen-carbon OC_n^{2-} dianions by sputtering *(4 pages)* 013203
Hubert Gnaser
Laser disintegration of Van der Waals clusters of carbon-containing molecules *(9 pages)* 013204
E. S. Toma and H. G. Muller
X-ray emission after laser disintegration of clusters of carbon-containing molecules *(7 pages)* 013205
E. S. Toma and H. G. Muller
Scissor modes in triaxial metal clusters *(8 pages)* 013206
P.-G. Reinhard, V. O. Nesterenko, E. Suraud, S. El Gammal, and W. Kleinig
Formalism for multiphoton plasmon excitation in jellium clusters *(16 pages)* 013207
Jean-Patrick Connerade and Andrey V. Solov'yov
Liquid-drop model for the size-dependent melting of low-dimensional systems *(8 pages)* 013208
K. K. Nanda, S. N. Sahu, and S. N. Behera
Core dependence of electron emission in slow collisions of highly charged ions (Ar^{16+},Kr^{16+},Xe^{16+}) with C_{60} *(7 pages)* 013209
J. Bernard, R. Brédy, S. Martin, L. Chen, J. Désesquelles, and M. C. Buchet-Poulizac
Dependence of the π-electron eigenvalue sum on the number of atoms in almost spherical C cages *(5 pages)* 013210
C. Amovilli, I. A. Howard, D. J. Klein, and N. H. March

Atomic and molecular processes in external fields

Optical shielding of cold collisions in blue-detuned near-resonant optical lattices *(9 pages)* 013401
J. Piilo and K.-A. Suominen
High-order harmonic generation in a driven two-level atom: Periodic level crossings and three-step processes *(15 pages)* 013402
C. Figueira de Morisson Faria and I. Rotter
Effective-scattering-length model of ultracold atomic collisions and Feshbach resonances in tight harmonic traps *(7 pages)* 013403
E. L. Bolda, E. Tiesinga, and P. S. Julienne
Thermal properties of trapped ions: A Green's-function method *(5 pages)* 013404
Hong-Min Zhao, Wei Li, and Jia-tih Lin
Electric-field-induced relativistic Larmor-frequency reduction *(6 pages)* 013405
P. Krekora, Q. Su, and R. Grobe
Laser-induced continuum structure in the two ionization continua of xenon *(10 pages)* 013406
K. Böhmer, T. Halfmann, L. P. Yatsenko, D. Charalambidis, A. Horsmans, and K. Bergmann
Nonstationary behavior of a high-spin molecule in a bifrequency alternating current magnetic field *(7 pages)* 013407
I. D. Tokman and G. A. Vugalter

(Continued)

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 66, NUMBER 1** **JULY 2002**

Chaotic dynamics of a single two-level atom in the field of a plane standing electromagnetic wave *(5 pages)* 013408
V. Gubernov
Comparison of intense-field ionization of diatomic molecules and rare-gas atoms *(12 pages)* 013409
E. Wells, Merrick J. DeWitt, and R. R. Jones
Closed-orbit theory for molecules in fields *(17 pages)* 013410
A. Matzkin, P. A. Dando, and T. S. Monteiro
Magnetic trapping of ytterbium and the alkaline-earth metals *(5 pages)* 013411
T. Loftus, J. R. Bochinski, and T. W. Mossberg
Formation process of large ion Coulomb crystals in linear Paul traps *(12 pages)* 013412
L. Hornekær and M. Drewsen
Cavity-enhanced optical bottle beam as a mechanical amplifier *(8 pages)* 013413
Tim Freegarde and Kishan Dholakia
Dynamical symmetries of time-periodic Hamiltonians *(5 pages)* 013414
Ofir E. Alon

Matter waves

Three particles in an external trap: Nature of the complete $J=0$ spectrum *(8 pages)* 013601
D. Blume and Chris H. Greene
Bifurcation effects in coupled Bose-Einstein condensates *(4 pages)* 013602
Michael E. Kellman and Vivian Tyng
Scenario of strongly nonequilibrated Bose-Einstein condensation *(7 pages)* 013603
Natalia G. Berloff and Boris V. Svistunov
Loop structure of the lowest Bloch band for a Bose-Einstein condensate *(4 pages)* 013604
Dmitri Diakonov, L. M. Jensen, C. J. Pethick, and H. Smith
Bistability and macroscopic quantum coherence in a Bose-Einstein condensate of ^{7}Li *(8 pages)* 013605
A. Montina and F. T. Arecchi
Superfluid pairing in a polarized dipolar Fermi gas *(10 pages)* 013606
M. A. Baranov, M. S. Mar'enko, Val. S. Rychkov, and G. V. Shlyapnikov
Probing dipolar effects with condensate shape oscillation *(4 pages)* 013607
S. Yi and L. You
Breathing modes of Bose-Einstein condensates in highly asymmetric traps *(5 pages)* 013608
Takashi Kimura
External Josephson effect in Bose-Einstein condensates with a spin degree of freedom *(10 pages)* 013609
Sahel Ashhab and Carlos Lobo
Breakdown of superfluidity of an atom laser past an obstacle *(8 pages)* 013610
Nicolas Pavloff
Mean-field description of collapsing and exploding Bose-Einstein condensates *(8 pages)* 013611
Sadhan K. Adhikari
Boundary of two mixed Bose-Einstein condensates *(6 pages)* 013612
R. A. Barankov
Trapped rotating two-dimensional six-boson system with hard-core repulsion and the origin of magic numbers *(5 pages)* 013613
C. G. Bao and T. Y. Shi
Structure and stability of trapped atomic boson-fermion mixtures *(12 pages)* 013614
Robert Roth
Low dimensional Bose gases *(15 pages)* 013615
U. Al Khawaja, J. O. Andersen, N. P. Proukakis, and H. T. C Stoof
Vortex-vortex interaction in two-component Bose-Einstein condensates *(5 pages)* 013616
P. Öhberg and L. Santos

(Continued)

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 66, NUMBER 1** **JULY 2002**

Method to create a vortex in a Bose-Einstein condensate *(7 pages)* 013617
Shin-Ichiro Ogawa, Mikko Möttönen, Mikio Nakahara, Tetsuo Ohmi, and Hisanori Shimada

Random-phase approximation study of collective excitations in the Bose-Fermi mixed condensate of alkali-metal gases *(12 pages)* 013618
T. Sogo, T. Miyakawa, T. Suzuki, and H. Yabu

ζ-function regularization and the interacting Bose gas at low temperature *(8 pages)* 013619
David J. Toms

Demixing in mesoscopic boson-fermion clouds inside cylindrical harmonic traps: Quantum phase diagram and role of temperature *(8 pages)* 013620
Z. Akdeniz, A. Minguzzi, P. Vignolo, and M. P. Tosi

Quantum optics, physics of lasers, nonlinear optics

Entangled-photon generation from parametric down-conversion in media with inhomogeneous nonlinearity *(17 pages)* 013801
Giovanni Di Giuseppe, Mete Atatüre, Matthew D. Shaw, Alexander V. Sergienko, Bahaa E. A. Saleh, and Malvin C. Teich

Wavelength dependence of nonlinear circular dichroism in a chiral ruthenium-tris(bipyridyl) solution *(9 pages)* 013802
H. Mesnil, M. C. Schanne-Klein, F. Hache, M. Alexandre, G. Lemercier, and C. Andraud

Resonantly enhanced nonlinear optics in semiconductor quantum wells: An application to sensitive infrared detection *(5 pages)* 013803
S. F. Yelin and P. R. Hemmer

Nonlinear interferometer as a resource for maximally entangled photonic states: Application to interferometry *(8 pages)* 013804
Christopher C. Gerry, Adil Benmoussa, and R. A. Campos

Narrowing of electromagnetically induced transparency resonance in a Doppler-broadened medium *(4 pages)* 013805
Ali Javan, Olga Kocharovskaya, Hwang Lee, and Marlan O. Scully

Degree of polarization in quantum optics *(8 pages)* 013806
Alfredo Luis

Bayesian feedback versus Markovian feedback in a two-level atom *(9 pages)* 013807
H. M. Wiseman, Stefano Mancini, and Jin Wang

Class-*A* lasers with injected signal: Bifurcation set and Lyapunov–potential function *(12 pages)* 013808
Catalina Mayol, Raúl Toral, Claudio R. Mirasso, and Mario A. Natiello

Quantum properties of transverse pattern formation in second-harmonic generation *(17 pages)* 013809
M. Bache, P. Scotto, R. Zambrini, M. San Miguel, and M. Saffman

Measuring the elements of the optical density matrix *(6 pages)* 013810
K. L. Pregnell and D. T. Pegg

Simplified field wave equations for the nonlinear propagation of extremely short light pulses *(10 pages)* 013811
V. G. Bespalov, S. A. Kozlov, Yu. A. Shpolyanskiy, and I. A. Walmsley

Transient photon-number correlations of interacting solitons *(5 pages)* 013812
F. König, M. A. Zielonka, and A. Sizmann

(Continued)

PHYSICAL REVIEW A THIRD SERIES, VOLUME 66, NUMBER 1 JULY 2002

BRIEF REPORTS

Fundamental concepts

Canonically conjugate pairs and phase operators *(4 pages)* 014101
K. Schönhammer
Generation of entangled photon states by using linear optical elements *(4 pages)* 014102
XuBo Zou, K. Pahlke, and W. Mathis
Quantum nonlocality for a three-particle nonmaximally entangled state without inequalities *(3 pages)* 014103
Shi-Biao Zheng
Bound states in bottomless potentials *(2 pages)* 014104
Tanmay Vachaspati

Quantum information

Symmetric scheme for superdense coding between multiparties *(2 pages)* 014301
Andrzej Grudka and Antoni Wójcik
Cost of exactly simulating a Bell pair using classical communication *(3 pages)* 014302
János A. Csirik
Distillable entanglement of multiple copies of Bell states *(2 pages)* 014303
Yi-Xin Chen and Dong Yang
Engineering entanglement between two cavity modes *(4 pages)* 014304
Manzoor Ikram and Farhan Saif

Atomic and molecular collisions and interactions

Low-energy electron-hexafluoropropene (C_3F_6) scattering *(4 pages)* 014701
Czesław Szmytkowski, Stanisław Kwitnewski, Paweł Możejko, and Elżbieta Ptasińska-Denga

Matter waves

Pseudopotential operator for hard-sphere interactions in any-dimensional space *(3 pages)* 015601
Mingzhe Li, Haixiang Fu, Yu-Zhu Wang, Jincan Chen, Lixuan Chen, and Chuanhong Chen
Interaction-driven effects on two-component Bose-Einstein condensates *(4 pages)* 015602
D. M. Jezek and P. Capuzzi

Quantum optics, physics of lasers, nonlinear optics

Encoding the quantum state of cavity mode into an atomic beam *(4 pages)* 015801
Jaromír Fiurášek
Electromagnetically induced transparency and controlled group velocity in a multilevel system *(4 pages)* 015802
E. Paspalakis and P. L. Knight

ERRATA

Erratum: Surface-plasmon-assisted electron-capture mechanism in low-energy $He^+(1s)$-Al(111) collisions [Phys. Rev. A **63**, 052901 (2001)] *(1 page)* . . . . . 019901(E)
H. Jouin, F. A. Gutierrez, and C. Harel
Erratum: Graded extension of so(2,1) Lie algebra and the search for exact solutions of the Dirac equation by point canonical transformations [Phys. Rev. A **65**, 042109 (2002)] *(1 page)* . . . . . 019902(E)
A. D. Alhaidari

(Continued)

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 66, NUMBER 1** **JULY 2002**

Erratum: Decoherence in Grover's quantum algorithm: Perturbative approach [Phys. Rev. A **65**, 042311 (2002)] *(2 pages)* . . . . . 019903(E)
Hiroo Azuma

Selected Abstracts From Other Physical Review Journals xvii
Cumulative Author Index xviii