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 82, NUMBER 6
PARTS A AND B

CONTENTS

DECEMBER 2010

The Table of Contents is a total listing of Parts A and B.
Part A consists of pages 060101(R)-062903, and Part B pages 063401-069904(E).

RAPID COMMUNICATIONS

Fundamental concepts

Distillation by repeated measurements: Continuous spectrum case *(4 pages)* . . . . . 060101(R)
Bruno Bellomo, Giuseppe Compagno, Hiromichi Nakazato, and Kazuya Yuasa

Quantum information

Topological one-way quantum computation on verified logical cluster states *(4 pages)* . . . . . 060301(R)
Keisuke Fujii and Katsuji Yamamoto

Simulation of classical thermal states on a quantum computer: A transfer-matrix approach *(4 pages)* . . . . . 060302(R)
Man-Hong Yung, Daniel Nagaj, James D. Whitfield, and Alán Aspuru-Guzik

Atomic and molecular structure and dynamics

Progress toward the electron electric-dipole-moment search: Theoretical study of the PbF molecule *(4 pages)* . . . . 060501(R)
K. I. Baklanov, A. N. Petrov, A. V. Titov, and M. G. Kozlov

Atomic and molecular collisions and interactions

Revised Born-Oppenheimer approach and a reprojection method for inelastic collisions *(4 pages)* . . . . . 060701(R)
Andrey K. Belyaev

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

Measuring the absolute carrier-envelope phase of many-cycle laser fields *(4 pages)* . . . . . 061401(R)
P. Tzallas, E. Skantzakis, and D. Charalambidis

Single-ion nonlinear mechanical oscillator *(4 pages)* . . . . . 061402(R)
N. Akerman, S. Kotler, Y. Glickman, Y. Dallal, A. Keselman, and R. Ozeri

Matter waves and collective properties of cold atoms and molecules

Macroscopic two-state systems in trapped atomic condensates *(4 pages)* . . . . . 061601(R)
Dmitry Solenov and Dmitry Mozyrsky

Copyright 2010 by The American Physical Society

(Continued)

1050-2947(201012)82:6:A;1-Z

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

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 82, NUMBER 6** **DECEMBER 2010**

Precisely mapping the magnetic field gradient in vacuum with an atom interferometer *(4 pages)* . . . . . 061602(R)
Min-Kang Zhou, Zhong-Kun Hu, Xiao-Chun Duan, Bu-Liang Sun, Jin-Bo Zhao, and Jun Luo

Itinerant ferromagnetism in a Fermi gas with contact interaction: Magnetic properties in a dilute Hubbard model *(4 pages)* . . . . . 061603(R)
Chia-Chen Chang, Shiwei Zhang, and David M. Ceperley

Spontaneous interlayer superfluidity in bilayer systems of cold polar molecules *(4 pages)* . . . . . 061604(R)
Roman M. Lutchyn, Enrico Rossi, and S. Das Sarma

Quantitative comparison between theoretical predictions and experimental results for Bragg spectroscopy of a strongly interacting Fermi superfluid *(4 pages)* . . . . . 061605(R)
Peng Zou, Eva D. Kuhnle, Chris J. Vale, and Hui Hu

Detection of small atom numbers through image processing *(4 pages)* . . . . . 061606(R)
C. F. Ockeloen, A. F. Tauschinsky, R. J. C. Spreeuw, and S. Whitlock

Dynamical revival of phase coherence in a many-boson system *(4 pages)* . . . . . 061607(R)
Shi-Jie Yang and Sumin Nie

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

Nanometric resolution using far-field optical tomographic microscopy in the multiple scattering regime *(4 pages)* 061801(R)
Jules Girard, Guillaume Maire, Hugues Giovannini, Anne Talneau, Kamal Belkebir, Patrick C. Chaumet, and Anne Sentenac

Stopped light with a cryogenic ensemble of ^{173}Yb atoms *(4 pages)* . . . . . 061802(R)
Mei-Ju Lu, Franklin Jose, and Jonathan D. Weinstein

Tailoring the filamentation of intense femtosecond laser pulses with periodic lattices *(4 pages)* . . . . . 061803(R)
P. Panagiotopoulos, N. K. Efremidis, D. G. Papazoglou, A. Couairon, and S. Tzortzakis

Measuring nanomechanical motion with an imprecision below the standard quantum limit *(4 pages)* . . . . . 061804(R)
G. Anetsberger, E. Gavartin, O. Arcizet, Q. P. Unterreithmeier, E. M. Weig, M. L. Gorodetsky, J. P. Kotthaus, and T. J. Kippenberg

ARTICLES

Fundamental concepts

Nonlocality and entanglement in the XY model *(5 pages)* 062101
J. Batle and M. Casas

Quantum N-body problem with a minimal length *(4 pages)* 062102
Fabien Buisseret

Control-free control: Manipulating a quantum system using only a limited set of measurements *(6 pages)* 062103
S. Ashhab and Franco Nori

Reconstruction of time-dependent coefficients: A check of approximation schemes for non-Markovian convolutionless dissipative generators *(10 pages)* 062104
Bruno Bellomo, Antonella De Pasquale, Giulia Gualdi, and Ugo Marzolino

(Continued)

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

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 82, NUMBER 6** **DECEMBER 2010**

Time-dependent self-trapping of Bose-Einstein condensates in a double-well potential *(6 pages)* 062105
B. Cui, L. C. Wang, and X. X. Yi

Quantum dynamics of spatial decoherence of two atoms in a ring cavity *(7 pages)* 062106
Li Zheng, Chui-Ping Yang, and Franco Nori

Dynamics of quantum-classical hybrid systems: Effect of matter-wave pressure *(9 pages)* 062107
J. Shen, X. L. Huang, X. X. Yi, Chunfeng Wu, and C. H. Oh

Geometric phase of mixed states for three-level open systems *(6 pages)* 062108
Yanyan Jiang, Y. H. Ji, Hualan Xu, Li-yun Hu, Z. S. Wang, Z. Q. Chen, and L. P. Guo

Self-consistent input-output formulation of quantum feedback *(7 pages)* 062109
M. Yanagisawa and J. J. Hope

Polarization of the electron and positron produced in combined Coulomb and strong laser fields *(7 pages)* 062110
A. Di Piazza, A. I. Milstein, and C. Müller

Modal approach to Casimir forces in periodic structures *(12 pages)* 062111
P. S. Davids, F. Intravaia, F. S. S. Rosa, and D. A. R. Dalvit

Adiabatically steered open quantum systems: Master equation and optimal phase *(7 pages)* 062112
J. Salmilehto, P. Solinas, J. Ankerhold, and M. Möttönen

Detection of genuinely entangled and nonseparable *n*-partite quantum states *(7 pages)* 062113
Ting Gao and Yan Hong

Initial correlations in open-systems dynamics: The Jaynes-Cummings model *(10 pages)* 062114
Andrea Smirne, Heinz-Peter Breuer, Jyrki Piilo, and Bassano Vacchini

Two-qubit Bell inequality for which positive operator-valued measurements are relevant *(6 pages)* 062115
T. Vértesi and E. Bene

Maximal overlap with a fully separable state and translational invariance for multipartite entangled states *(16 pages)* 062116
H. T. Cui (崔海涛), Di Yuan (袁地), and J. L. Tian (田俊龙)

Complementary contributions of indeterminism and signaling to quantum correlations *(5 pages)* 062117
Michael J. W. Hall

Hückel versus Möbius aromaticity: The particle in a cylinder versus a Möbius strip *(6 pages)* 062118
Evangelos Miliordos

Quantum discord for a central two-qubit system coupled to an *XY*-spin-chain environment *(7 pages)* 062119
Ben-Qiong Liu, Bin Shao, and Jian Zou

Dynamical decoupling of qubits in a spin bath under periodic quantum control *(10 pages)* 062120
Jun-Ting Kao, Jo-Tzu Hung, Pochung Chen, and Chung-Yu Mou

Time scales of tunneling decay of a localized state *(8 pages)* 062121
Yue Ban, E. Ya. Sherman, J. G. Muga, and M. Büttiker

(Continued)

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

PHYSICAL REVIEW A THIRD SERIES, VOLUME 82, NUMBER 6 DECEMBER 2010

Quantum information

Tomography, control, and characterization of entanglement in a three-level atomic system *(10 pages)* 062301
S. N. Sandhya and V. Ravishankar

Multipartite entanglement in fermionic systems via a geometric measure *(9 pages)* 062302
Behzad Lari, P. Durganandini, and Pramod S. Joag

Measurement-based quantum phase estimation algorithm for finding eigenvalues of non-unitary matrices *(7 pages)* 062303
Hefeng Wang, Lian-Ao Wu, Yu-xi Liu, and Franco Nori

Fundamental quantitative security in quantum key generation *(11 pages)* 062304
Horace P. Yuen

Information-disturbance tradeoff in estimating a unitary transformation *(8 pages)* 062305
Alessandro Bisio, Giulio Chiribella, Giacomo Mauro D'Ariano, and Paolo Perinotti

Information-preserving structures: A general framework for quantum zero-error information *(25 pages)* 062306
Robin Blume-Kohout, Hui Khoon Ng, David Poulin, and Lorenza Viola

Probabilistic cloning of three symmetric states *(9 pages)* 062307
O. Jiménez, J. Bergou, and A. Delgado

State reconstruction of finite-dimensional compound systems via local projective measurements and one-way classical communication *(7 pages)* 062308
F. E. S. Steinhoff and M. C. de Oliveira

Experimental quantum-cryptography scheme based on orthogonal states *(5 pages)* 062309
Alessio Avella, Giorgio Brida, Ivo Pietro Degiovanni, Marco Genovese, Marco Gramegna, and Paolo Traina

Identifying the quantum correlations in light-harvesting complexes *(12 pages)* 062310
Kamil Brádler, Mark M. Wilde, Sai Vinjanampathy, and Dmitry B. Uskov

Experimentally feasible security check for n-qubit quantum secret sharing *(4 pages)* 062311
Stefan Schauer, Marcus Huber, and Beatrix C. Hiesmayr

Negative entanglement measure for bipartite separable mixed states *(5 pages)* 062312
Cheng-Jie Zhang, Yong-Jian Han, Yong-Sheng Zhang, Yu-Chun Wu, Xiang-Fa Zhou, and Guang-Can Guo

Multipartite entanglement and quantum phase transitions in the one-, two-, and three-dimensional transverse-field Ising model *(6 pages)* 062313
Afshin Montakhab and Ali Asadian

Optimal entanglement transformations among N-qubit W-class states *(6 pages)* 062314
Wei Cui, Eric Chitambar, and Hoi-Kwong Lo

Quantum secret sharing with qudit graph states *(11 pages)* 062315
Adrian Keet, Ben Fortescue, Damian Markham, and Barry C. Sanders

Distillation of mixed-state continuous-variable entanglement by photon subtraction *(12 pages)* 062316
Sheng Li Zhang and Peter van Loock

(Continued)

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

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 82, NUMBER 6** **DECEMBER 2010**

Protecting two-qubit quantum states by π-phase pulses *(5 pages)* 062317
Jia-Zhong Hu, Xiang-Bin Wang, and Leong Chuan Kwek

Optimal quantum state estimation with use of the no-signaling principle *(3 pages)* 062318
Yeong-Deok Han, Joonwoo Bae, Xiang-Bin Wang, and Won-Young Hwang

Measurement-induced quantum operations on multiphoton states *(11 pages)* 062319
Chiara Vitelli, Nicolò Spagnolo, Fabio Sciarrino, and Francesco De Martini

Qubit-oscillator system: An analytical treatment of the ultrastrong coupling regime *(14 pages)* 062320
Johannes Hausinger and Milena Grifoni

Mapping the spatial distribution of entanglement in optical lattices *(5 pages)* 062321
Emilio Alba, Géza Tóth, and Juan José García-Ripoll

Optimization of the transmission of observable expectation values and observable statistics in continuous-variable teleportation *(13 pages)* 062322
L. Albano Farias and J. Stephany

Toward scalable information processing with ultracold polar molecules in an electric field: A numerical investigation *(12 pages)* 062323
Laëtitia Bomble, Philippe Pellegrini, Pierre Ghesquière, and Michèle Desouter-Lecomte

Quantum-capacity-approaching codes for the detected-jump channel *(5 pages)* 062324
Markus Grassl, Zhengfeng Ji, Zhaohui Wei, and Bei Zeng

Entangled coherent states versus entangled photon pairs for practical quantum-information processing *(8 pages)* 062325
Kimin Park and Hyunseok Jeong

Multiqubit tunable phase gate of one qubit simultaneously controlling n qubits in a cavity *(13 pages)* 062326
Chui-Ping Yang, Shi-Biao Zheng, and Franco Nori

Evolution equation for entanglement of multiqubit systems *(6 pages)* 062327
Michael Siomau and Stephan Fritzsche

Multiparticle entanglement in a one-dimensional optical lattice using Rydberg-atom interactions *(5 pages)* 062328
Zhanchun Zuo and Ken'ichi Nakagawa

Teleportation of squeezing: Optimization using non-Gaussian resources *(9 pages)* 062329
Fabio Dell'Anno, Silvio De Siena, Gerardo Adesso, and Fabrizio Illuminati

Information flow of quantum states interacting with closed timelike curves *(5 pages)* 062330
T. C. Ralph and C. R. Myers

Atomic and molecular structure and dynamics

Dynamical Casimir-Polder force on a partially dressed atom near a conducting wall *(6 pages)* 062501
Riccardo Messina, Ruggero Vasile, and Roberto Passante

Molecular isotopic effects on coupled electronic and nuclear fluxes *(7 pages)* 062502
A. Kenfack, I. Barth, F. Marquardt, and B. Paulus

(Continued)

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

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 82, NUMBER 6** **DECEMBER 2010**

Quantum electrodynamic corrections for the valence shell in heavy many-electron atoms *(10 pages)* 062503
C. Thierfelder and P. Schwerdtfeger

Ground-state configurations and unresolved transition arrays in extreme ultraviolet spectra of lanthanide ions *(6 pages)* 062504
D. Kilbane and G. O'Sullivan

^{87}Rb D_1 isoclinic point *(11 pages)* 062505
N. P. Wells and J. C. Camparo

Interaction of an atom with layered dielectrics *(17 pages)* 062506
Claudia Eberlein and Robert Zietal

Measurement of dynamic Stark polarizabilities by analyzing spectral line shapes of forbidden transitions *(11 pages)* 062507
D. R. Dounas-Frazer, K. Tsigutkin, A. Family, and D. Budker

Nonadiabatic couplings from the Kohn-Sham derivative matrix: Formulation by time-dependent density-functional theory and evaluation in the pseudopotential framework *(9 pages)* 062508
Chunping Hu, Osamu Sugino, Hirotoshi Hirai, and Yoshitaka Tateyama

Ionization potential for excited *S* states of the lithium atom *(7 pages)* 062509
M. Puchalski, D. Kędziera, and K. Pachucki

Convergent conductivity corrections to the Casimir force via exponential basis functions *(6 pages)* 062510
Song Cui and Yeng Chai Soh

Competing decay-channel fluorescence, dissociation, and ionization in superexcited levels of H_2 *(13 pages)* 062511
M. Glass-Maujean, Ch. Jungen, G. Reichardt, A. Balzer, H. Schmoranzer, A. Ehresmann, I. Haar, and P. Reiss

Halving the Casimir force with conductive oxides: Experimental details *(11 pages)* 062512
S. de Man, K. Heeck, and D. Iannuzzi

Hyperfine-mediated static polarizabilities of monovalent atoms and ions *(6 pages)* 062513
V. A. Dzuba, V. V. Flambaum, K. Beloy, and A. Derevianko

Relativistic fine-structure oscillator strengths for Li-like ions *(7 pages)* 062514
L. Natarajan, A. Natarajan, and R. Kadrekar

Validity of analytical formulas for autoionization and dielectronic capture rates used in collisional-radiative models *(8 pages)* 062515
Cheng Gao and Jiaolong Zeng

X-ray-spectroscopy analysis of electron-cyclotron-resonance ion-source plasmas *(10 pages)* 062516
J. P. Santos, A. M. Costa, J. P. Marques, M. C. Martins, P. Indelicato, and F. Parente

Discrimination of the effects of saturation and optical pumping in velocity-dependent pump-probe spectroscopy of rubidium: A simple analytical study *(8 pages)* 062517
Heung-Ryoul Noh, Geol Moon, and Wonho Jhe

Isotope-selective trapping of doubly charged Yb ions *(6 pages)* 062518
M. M. Schauer, J. R. Danielson, D. Feldbaum, M. S. Rahaman, L.-B. Wang, J. Zhang, X. Zhao, and J. R. Torgerson

(Continued)

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

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 82, NUMBER 6** **DECEMBER 2010**

Extreme-ultraviolet spectra of highly charged Pt ions with several valence-shell electrons: Observation and accurate calculations *(6 pages)* 062519
Elmar Träbert, Joel Clementson, Peter Beiersdorfer, Juan A. Santana, and Yasuyuki Ishikawa

Determination of a silane intermolecular force field potential model from an *ab initio* calculation *(5 pages)* 062520
Arvin Huang-Te Li, Sheng D. Chao, and Chien-Cheng Chang

Adiabatic hyperspherical study of weakly bound helium–helium–alkali-metal triatomic systems *(9 pages)* 062521
Hiroya Suno and B. D. Esry

Casimir-Polder potential in a dielectric medium out of thermal equilibrium *(6 pages)* 062522
Justo J. Rodriguez and A. Salam

Atomic and molecular collisions and interactions

Reaction dynamics in double ionization of helium by electron impact *(8 pages)* 062701
M. F. Ciappina, M. Schulz, and T. Kirchner

Electron-atom bremsstrahlung: Double-differential cross section and polarization correlations *(12 pages)* 062702
Vladimir A. Yerokhin and Andrey Surzhykov

Electron collisions with copper atoms: Elastic scattering and electron-impact excitation of the $(3d^{10}4s)^2S \rightarrow (3d^{10}4p)^2P$ resonance transition *(5 pages)* 062703
Oleg Zatsarinny and Klaus Bartschat

p-wave optical Feshbach resonances in ^{171}Yb *(7 pages)* 062704
Krittika Goyal, Iris Reichenbach, and Ivan Deutsch

Out-of-plane $(e,2e)$ angular distributions and energy spectra of helium $L = 0,1,2$ autoionizing levels *(6 pages)* . . . 062705
B. A. deHarak, K. Bartschat, and N. L. S. Martin

Atom-dimer scattering length for fermions with different masses: Analytical study of limiting cases *(11 pages)* 062706
F. Alzetto, R. Combescot, and X. Leyronas

Threshold photoelectron source for the study of low-energy electron scattering: Total cross section for electron scattering from krypton in the energy range from 14 meV to 20 eV *(10 pages)* 062707
M. Kurokawa, M. Kitajima, K. Toyoshima, T. Odagiri, H. Kato, H. Kawahara, M. Hoshino, H. Tanaka, and K. Ito

Two-center convergent close-coupling calculations for positron-lithium collisions *(6 pages)* 062708
A. V. Lugovskoy, A. S. Kadyrov, I. Bray, and A. T. Stelbovics

Low-energy electron scattering from C_4H_9OH isomers *(5 pages)* 062709
M. H. F. Bettega, C. Winstead, and V. McKoy

Electron-impact study of the NH radical using the R-matrix method *(8 pages)* 062710
Jasmeet Singh Rajvanshi and K. L. Baluja

Electron collisions with the BH_2 radical using the R-matrix method *(8 pages)* 062711
Song Bin Zhang, Jian Guo Wang, R. K. Janev, and Xiang Jun Chen

Scattering amplitude of ultracold atoms near the p-wave magnetic Feshbach resonance *(11 pages)* 062712
Peng Zhang, Pascal Naidon, and Masahito Ueda

(Continued)

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

PHYSICAL REVIEW A THIRD SERIES, VOLUME 82, NUMBER 6 DECEMBER 2010

Confinement-induced p-wave resonances from s-wave interactions *(17 pages)* 062713
Yusuke Nishida and Shina Tan

Constraints on anomalous spin-spin interactions from spin-exchange collisions *(5 pages)* 062714
D. F. Jackson Kimball, Alec Boyd, and D. Budker

Electron-impact dissociation of ozone cations O_3^+ *(4 pages)* 062715
S. H. M. Deng, C. R. Vane, M. E. Bannister, and M. Fogle

Elastic scattering of intermediate-energy electrons from C_{60} molecules *(6 pages)* 062716
L. R. Hargreaves, B. Lohmann, C. Winstead, and V. McKoy

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

Charging of insulators by multiply-charged-ion impact probed by slowing down of fast binary-encounter electrons *(7 pages)* 062901
E. De Filippo, G. Lanzanó, F. Amorini, G. Cardella, E. Geraci, L. Grassi, E. La Guidara, I. Lombardo, G. Politi, F. Rizzo, P. Russotto, C. Volant, S. Hagmann, and H. Rothard

Rumpling of LiF(001) surface from fast atom diffraction *(10 pages)* 062902
A. Schüller, S. Wethekam, D. Blauth, H. Winter, F. Aigner, N. Simonović, B. Solleder, J. Burgdörfer, and L. Wirtz

Ion guiding accompanied by formation of neutrals in polyethylene terephthalate polymer nanocapillaries: Further insight into a self-organizing process *(7 pages)* 062903
Z. Juhász, B. Sulik, R. Rácz, S. Biri, R. J. Bereczky, K. Tőkési, Á. Kövér, J. Pálinkás, and N. Stolterfoht

PART B

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

Spin nutation induced by atomic motion in a magnetic lattice *(5 pages)* 063401
Y. Kobayashi, Y. Shiraishi, and A. Hatakeyama

Photoionization of Ca in a static electric field *(12 pages)* 063402
T. K. Fang, J. I. Lo, T. S. Yih, and T. N. Chang

Quasistationary resonances induced by intense infrared fields in HD^+ and their decay *(12 pages)* 063403
Bibhas Dutta and S. S. Bhattacharyya

Collective photon emission from symmetric states created with Rydberg atoms on a ring lattice *(8 pages)* 063404
B. Olmos and I. Lesanovsky

Angular distributions of photoelectrons and interatomic-Coulombic-decay electrons from helium dimers: Strong dependence on the internuclear distance *(5 pages)* 063405
T. Havermeier, K. Kreidi, R. Wallauer, S. Voss, M. Schöffler, S. Schössler, L. Foucar, N. Neumann, J. Titze, H. Sann, M. Kühnel, J. Voigtsberger, N. Sisourat, W. Schöllkopf, H. Schmidt-Böcking, R. E. Grisenti, R. Dörner, and T. Jahnke

Photoionization rates of Cs Rydberg atoms in a 1064-nm far-off-resonance trap *(6 pages)* 063406
J. Tallant, D. Booth, and J. P. Shaffer

(Continued)

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

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 82, NUMBER 6** **DECEMBER 2010**

Observation of resonant symmetry lifting by an effective bias field in a parametrically modulated atomic trap *(5 pages)* 063407
Yonghee Kim, Myoung-Sun Heo, Geol Moon, Ji-Hyoun Kim, Heung-Ryoul Noh, and Wonho Jhe

Double K-shell photoionization and hypersatellite x-ray transitions of $12 \leqslant Z \leqslant 23$ atoms *(14 pages)* 063408
J. Hoszowska, J.-Cl. Dousse, W. Cao, K. Fennane, Y. Kayser, M. Szlachetko, J. Szlachetko, and M. Kavčič

Controlled dipole-dipole interactions between K Rydberg atoms in a laser-chopped effusive beam *(9 pages)* 063409
M. R. Kutteruf and R. R. Jones

Strong-field ionization of a heteronuclear diatomic molecule *(8 pages)* 063410
Xianghe Ren and Takashi Nakajima

Efficient photoassociation with a slowly-turned-on and rapidly-turned-off laser field *(4 pages)* 063411
Wei Zhang, Yin Huang, Ting Xie, Gao-Ren Wang, and Shu-Lin Cong

Tunable high-power terahertz radiation generation in three-level atomic and molecular systems *(5 pages)* 063412
H. K. Avetissian, B. R. Avchyan, and G. F. Mkrtchian

Validity of the Wannier threshold law for angular correlation width in double photoionization of atoms *(7 pages)* 063413
Vladislav V. Serov and Tatyana A. Sergeeva

Inducing changes in the bond length of diatomic molecules by time-symmetric chirped pulses *(5 pages)* 063414
Bo Y. Chang, Seokmin Shin, and Ignacio R. Sola

Absorbing boundaries in the mean-field approximation *(6 pages)* 063415
Chirag Jhala, Ingo Dreissigacker, and Manfred Lein

Angular distributions of photoelectrons from free Na clusters *(10 pages)* 063416
P. Wopperer, B. Faber, P. M. Dinh, P.-G. Reinhard, and E. Suraud

Quantitative rescattering theory of correlated two-electron momentum spectra for strong-field nonsequential double ionization of helium *(14 pages)* 063417
Zhangjin Chen, Yaqiu Liang, and C. D. Lin

Geometric versus numerical optimal control of a dissipative spin-$\frac{1}{2}$ particle *(7 pages)* 063418
M. Lapert, Y. Zhang, M. Braun, S. J. Glaser, and D. Sugny

Optimization of Yb^+ fluorescence and hyperfine-qubit detection *(18 pages)* 063419
S. Ejtemaee, R. Thomas, and P. C. Haljan

Projection of diffraction patterns for use in cold-neutral-atom trapping *(7 pages)* 063420
Katharina Gillen-Christandl and Glen D. Gillen

Electric-field-dependent dynamic polarizability and state-insensitive conditions for optical trapping of diatomic polar molecules *(6 pages)* 063421
Svetlana Kotochigova and David DeMille

Frictionless atom cooling in harmonic traps: A time-optimal approach *(8 pages)* 063422
Dionisis Stefanatos, Justin Ruths, and Jr-Shin Li

(Continued)

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

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 82, NUMBER 6** **DECEMBER 2010**

Dependence of the correlated-momentum patterns in double ionization on the carrier-envelope phase and intensity of a few-cycle laser pulse *(8 pages)* 063423
G. G. Xin, D. F. Ye, and J. Liu

Matter waves and collective properties of cold atoms and molecules

Nonlinear resonant tunneling of Bose-Einstein condensates in tilted optical lattices *(7 pages)* 063601
K. Rapedius, C. Elsen, D. Witthaut, S. Wimberger, and H. J. Korsch

Phase diagram of spin-$\frac{1}{2}$ bosons in a one-dimensional optical lattice *(9 pages)* 063602
L. de Forges de Parny, M. Traynard, F. Hébert, V. G. Rousseau, R. T. Scalettar, and G. G. Batrouni

Emergence of coherence in the Mott-insulator–superfluid quench of the Bose-Hubbard model *(4 pages)* 063603
Patrick Navez and Ralf Schützhold

Crossover between Kelvin-Helmholtz and counter-superflow instabilities in two-component Bose-Einstein condensates *(9 pages)* 063604
Naoya Suzuki, Hiromitsu Takeuchi, Kenichi Kasamatsu, Makoto Tsubota, and Hiroki Saito

Nonequilibrium dynamics of bosonic atoms in optical lattices: Decoherence of many-body states due to spontaneous emission *(15 pages)* 063605
H. Pichler, A. J. Daley, and P. Zoller

Fluctuations and correlations in rotating Bose-Einstein condensates *(8 pages)* 063606
Soheil Baharian and Gordon Baym

Effects of three-body scattering processes on BCS-BEC crossover *(5 pages)* 063607
Raka Dasgupta

Effect of scattering lengths on the dynamics of a two-component Bose-Einstein condensate *(9 pages)* 063608
Gábor Csire, Dániel Schumayer, and Barnabás Apagyi

Gradient corrections to the local-density approximation for trapped superfluid Fermi gases *(12 pages)* 063609
András Csordás, Orsolya Almásy, and Péter Szépfalusy

Ground-state energy of the interacting Bose gas in two dimensions: An explicit construction *(12 pages)* 063610
Silas R. Beane

Efficient production of large ^{39}K Bose-Einstein condensates *(6 pages)* 063611
Robert L. D. Campbell, Robert P. Smith, Naaman Tammuz, Scott Beattie, Stuart Moulder, and Zoran Hadzibabic

Few-body resonances of unequal-mass systems with infinite interspecies two-body s-wave scattering length *(15 pages)* 063612
D. Blume and K. M. Daily

Momentum-space engineering of gaseous Bose-Einstein condensates *(12 pages)* 063613
Mark Edwards, Brandon Benton, Jeffrey Heward, and Charles W. Clark

Polaronic slowing of fermionic impurities in lattice Bose-Fermi mixtures *(11 pages)* 063614
A. Privitera and W. Hofstetter

(Continued)

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

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 82, NUMBER 6** **DECEMBER 2010**

Population imbalance and pairing in the BCS-BEC crossover of three-component ultracold fermions *(12 pages)* 063615
Tomoki Ozawa and Gordon Baym

Dynamics of a quantum quench in an ultracold atomic BCS superfluid *(5 pages)* 063616
Chih-Chun Chien and Bogdan Damski

Cold atoms in a rotating optical lattice with nearest-neighbor interactions *(6 pages)* 063617
Rashi Sachdeva, Sonika Johri, and Sankalpa Ghosh

Application of the static fluctuation approximation to the computation of the thermodynamic properties of an interacting trapped two-dimensional hard-sphere Bose gas *(16 pages)* 063618
Asaad R. Sakhel, Saleem I. Qashou, Roger R. Sakhel, and Humam B. Ghassib

Low-temperature thermodynamics of the unitary Fermi gas: Superfluid fraction, first sound, and second sound *(7 pages)* 063619
Luca Salasnich

Quantum localization and bound-state formation in Bose-Einstein condensates *(5 pages)* 063620
Roberto Franzosi, Salvatore M. Giampaolo, and Fabrizio Illuminati

Heating and cooling in adiabatic mixing process *(5 pages)* 063621
Jing Zhou, Zi Cai, Xu-Bo Zou, and Guang-Can Guo

Dynamical generation of phase-squeezed states in two-component Bose-Einstein condensates *(6 pages)* 063622
G. R. Jin, Y. An, T. Yan, and Z. S. Lu

Robust mesoscopic superposition of strongly correlated ultracold atoms *(7 pages)* 063623
David W. Hallwood, Thomas Ernst, and Joachim Brand

Anisotropic superfluidity in the two-species polar Fermi gas *(4 pages)* 063624
Renyuan Liao and Joachim Brand

Condensed ground states of frustrated Bose-Hubbard models *(13 pages)* 063625
G. Möller and N. R. Cooper

Beyond standard two-mode dynamics in bosonic Josephson junctions *(6 pages)* 063626
B. Juliá-Díaz, J. Martorell, M. Melé-Messeguer, and A. Polls

Kelvin-Tkachenko waves of few-vortex arrays in trapped Bose-Einstein condensates *(5 pages)* 063627
T. P. Simula and K. Machida

Cooper pairing and BCS-BEC evolution in mixed-dimensional Fermi gases *(8 pages)* 063628
M. Iskin and A. L. Subaşı

Dissipative fluid dynamics for the dilute Fermi gas at unitarity: Free expansion and rotation *(11 pages)* 063629
T. Schäfer

Condensation of N bosons: Microscopic approach to fluctuations in an interacting Bose gas *(9 pages)* 063630
Anatoly A. Svidzinsky and Marlan O. Scully

Using off-diagonal confinement as a cooling method *(5 pages)* 063631
V. G. Rousseau, K. Hettiarachchilage, M. Jarrell, J. Moreno, and D. E. Sheehy

(Continued)

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

PHYSICAL REVIEW A THIRD SERIES, VOLUME 82, NUMBER 6 DECEMBER 2010

Functional renormalization-group approach to interacting bosons at zero temperature *(16 pages)* 063632
Andreas Sinner, Nils Hasselmann, and Peter Kopietz

Confinement-induced resonance in quasi-one-dimensional systems under transversely anisotropic confinement *(6 pages)* 063633
Shi-Guo Peng, Seyyed S. Bohloul, Xia-Ji Liu, Hui Hu, and Peter D. Drummond

Finite-size effects in Anderson localization of one-dimensional Bose-Einstein condensates *(6 pages)* 063634
J. C. C. Cestari, A. Foerster, and M. A. Gusmão

Manipulation of a Bose-Einstein condensate by a time-averaged orbiting potential using phase jumps of the rotating field *(10 pages)* 063635
P. W. Cleary, T. W. Hijmans, and J. T. M. Walraven

Equilibrium and off-equilibrium trap-size scaling in one-dimensional ultracold bosonic gases *(22 pages)* 063636
Massimo Campostrini and Ettore Vicari

Polarized entangled Bose-Einstein condensation *(11 pages)* 063637
Jinlong Wang and Yu Shi

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

Probing the quantum phase transition in the Dicke model through mechanical vibrations *(6 pages)* 063801
J. P. Santos, F. L. Semião, and K. Furuya

Influence of laser beam profile on electromagnetically induced absorption *(8 pages)* 063802
S. M. Ćuk, M. Radonjić, A. J. Krmpot, S. N. Nikolić, Z. D. Grujić, and B. M. Jelenković

Indistinguishable near-infrared single photons from an individual organic molecule *(5 pages)* 063803
Jean-Baptiste Trebbia, Philippe Tamarat, and Brahim Lounis

Generation of intense ultrashort midinfrared pulses by laser-plasma interaction in the bubble regime *(8 pages)* . . . 063804
C.-H. Pai, Y.-Y. Chang, L.-C. Ha, Z.-H. Xie, M.-W. Lin, J.-M. Lin, Y.-M. Chen, G. Tsaur, H.-H. Chu, S.-H. Chen, J.-Y. Lin, J. Wang, and S.-Y. Chen

Coherent radiation by a spherical medium of resonant atoms *(21 pages)* 063805
Sudhakar Prasad and Roy J. Glauber

Optical Cherenkov radiation in ultrafast cascaded second-harmonic generation *(14 pages)* 063806
M. Bache, O. Bang, B. B. Zhou, J. Moses, and F. W. Wise

Polarization dynamics and polarization time of random three-dimensional electromagnetic fields *(8 pages)* 063807
Timo Voipio, Tero Setälä, Andriy Shevchenko, and Ari T. Friberg

Soliton dynamics in modulated Bessel photonic lattices *(9 pages)* 063808
Adrian Ruelas, Servando Lopez-Aguayo, and Julio C. Gutiérrez-Vega

Photonic crystal cavity modes in the visible range characterized by scattering spectroscopy *(7 pages)* 063809
A. Avoine, C. Vion, J. Laverdant, S. Bonnefont, O. Gauthier-Lafaye, L. Coolen, and A. Maître

Light effects in the atomic-motion-induced Ramsey narrowing of dark resonances in wall-coated cells *(7 pages)* 063810
E. Breschi, G. Kazakov, C. Schori, G. Di Domenico, G. Mileti, A. Litvinov, and B. Matisov

(Continued)

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

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 82, NUMBER 6** **DECEMBER 2010**

Some properties of point processes in statistical optics *(8 pages)* 063811
B. Picinbono and C. Bendjaballah

QED with a spherical mirror *(10 pages)* 063812
G. Hétet, L. Slodička, A. Glätzle, M. Hennrich, and R. Blatt

Arrayed and checkerboard optical waveguides controlled by the electromagnetically induced transparency *(6 pages)* 063813
Yongyao Li, Boris A. Malomed, Mingneng Feng, and Jianying Zhou

Ghost imaging for a reflected object with a rough surface *(4 pages)* 063814
Chunfang Wang, Dawei Zhang, Yanfeng Bai, and Bin Chen

Measuring photon-photon interactions via photon detection *(4 pages)* 063815
Mihai A. Macovei

Waveguide QED: Many-body bound-state effects in coherent and Fock-state scattering from a two-level system *(10 pages)* 063816
Huaixiu Zheng, Daniel J. Gauthier, and Harold U. Baranger

Adiabatically driven frequency conversion towards short extreme-ultraviolet radiation pulses *(8 pages)* 063817
Shrabana Chakrabarti, Holger Muench, and Thomas Halfmann

Dissipative vortex solitons in two-dimensional lattices *(5 pages)* 063818
C. Mejía-Cortés, J. M. Soto-Crespo, Mario I. Molina, and Rodrigo A. Vicencio

Energy conservation in partially coherent wave fields from polarization and magnetization *(5 pages)* 063819
Ohheum Bak and S. M. Kim

Complex source beam: A tool to describe highly focused vector beams analytically *(10 pages)* 063820
S. Orlov and U. Peschel

Input-output formalism for few-photon transport in one-dimensional nanophotonic waveguides coupled to a qubit *(9 pages)* 063821
Shanhui Fan, Şükrü Ekin Kocabaş, and Jung-Tsung Shen

Precision frequency measurements with interferometric weak values *(4 pages)* 063822
David J. Starling, P. Ben Dixon, Andrew N. Jordan, and John C. Howell

Coherent nonlinear single-molecule microscopy *(6 pages)* 063823
I. Gerhardt, G. Wrigge, J. Hwang, G. Zumofen, and V. Sandoghdar

Steady-state *ab initio* laser theory: Generalizations and analytic results *(15 pages)* 063824
Li Ge, Y. D. Chong, and A. Douglas Stone

Angular momenta and spin-orbit interaction of nonparaxial light in free space *(7 pages)* 063825
Konstantin Y. Bliokh, Miguel A. Alonso, Elena A. Ostrovskaya, and Andrea Aiello

Interaction-free all-optical switching via the quantum Zeno effect *(13 pages)* 063826
Yu-Ping Huang, Joseph B. Altepeter, and Prem Kumar

Thermal and vacuum friction acting on rotating particles *(10 pages)* 063827
A. Manjavacas and F. J. García de Abajo

(Continued)

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

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 82, NUMBER 6** **DECEMBER 2010**

Nondeterministic amplifier for two-photon superpositions *(7 pages)* 063828
John Jeffers

Solitons in weakly nonlocal media with cubic-quintic nonlinearity *(9 pages)* 063829
Eduard N. Tsoy

Generation of frequency-correlated narrowband biphotons from four-wave mixing in cold atoms *(5 pages)* 063830
Sujun Yun, Jianming Wen, P. Xu, Min Xiao, and S.-N. Zhu

Investigation of the phase-locking behavior by utilizing self-phase- and cross-phase-modulation in cubic susceptibility medium: Theory and experiment *(11 pages)* 063831
Liang Zhao and Junqiang Sun

Intangible pointlike tracers for liquid-crystal-based microsensors *(6 pages)* 063832
Etienne Brasselet and Saulius Juodkazis

Non-Gaussianity of quantum states: An experimental test on single-photon-added coherent states *(5 pages)* 063833
Marco Barbieri, Nicolò Spagnolo, Marco G. Genoni, Franck Ferreyrol, Rémi Blandino, Matteo G. A. Paris, Philippe Grangier, and Rosa Tualle-Brouri

Dynamic evolution of temporal dissipative-soliton molecules in large normal path-averaged dispersion fiber lasers *(6 pages)* 063834
Xueming Liu

Numerical study of amplified spontaneous emission and lasing in random media *(10 pages)* 063835
Jonathan Andreasen and Hui Cao

Spin-orbit optical cross-phase-modulation *(4 pages)* 063836
Etienne Brasselet

Entanglement created by spontaneously generated coherence *(11 pages)* 063837
Zhao-hong Tang, Gao-xiang Li, and Zbigniew Ficek

Theoretical exploration of laser-parameter effects on the generation of an isolated attosecond pulse from two-color high-order harmonic generation *(7 pages)* 063838
Tianjiao Shao, Guangjiu Zhao, Bin Wen, and Huan Yang

Fully quantum-mechanical dynamic analysis of single-photon transport in a single-mode waveguide coupled to a traveling-wave resonator *(10 pages)* 063839
Edwin E. Hach III, Ali W. Elshaari, and Stefan F. Preble

Unified single-photon and single-electron counting statistics: From cavity QED to electron transport *(8 pages)* . . . 063840
Neill Lambert, Yueh-Nan Chen, and Franco Nori

Excitability in semiconductor microring lasers: Experimental and theoretical pulse characterization *(9 pages)* 063841
L. Gelens, L. Mashal, S. Beri, W. Coomans, G. Van der Sande, J. Danckaert, and G. Verschaffelt

BRIEF REPORTS

Fundamental concepts

Geometrical phase imprinted on eigenfunctions near an exceptional point *(4 pages)* 064101
Soo-Young Lee

(Continued)

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

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 82, NUMBER 6** **DECEMBER 2010**

Three-dimensional Dirac-like fermions in an optical lattice *(4 pages)* 064102
Mou Yang and Shi-Liang Zhu

Range criterion for separability *(3 pages)* 064103
Kil-Chan Ha

Quantum information

Bell diagonal states with maximal Abelian symmetry *(4 pages)* 064301
Dariusz Chruściński and Andrzej Kossakowski

Demonstration of Deutsch's algorithm on a stable linear optical quantum computer *(4 pages)* 064302
Pei Zhang, Rui-Feng Liu, Yun-Feng Huang, Hong Gao, and Fu-Li Li

Addendum to "Single-photon logic gates using minimum resources" *(4 pages)* 064303
Qing Lin and Bing He

Atomic and molecular structure and dynamics

Parity-relevant zitterbewegung and quantum simulation by a single trapped ion *(4 pages)* 064501
Kunling Wang, Tao Liu, Mang Feng, Wanli Yang, and Kelin Wang

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

Low-energy fine-structure resonances in photoionization of O II *(4 pages)* 065401
Sultana N. Nahar, Maximiliano Montenegro, Werner Eissner, and Anil K. Pradhan

Constructive and destructive interferences of Stark resonances induced by an ac field in atomic hydrogen *(4 pages)* 065402
Mariusz Pawlak, Mirosław Bylicki, Nimrod Moiseyev, and Milan Šindelka

Matter waves and collective properties of cold atoms and molecules

Observation of Stückelberg oscillations in accelerated optical lattices *(4 pages)* 065601
A. Zenesini, D. Ciampini, O. Morsch, and E. Arimondo

Structural and dynamical aspects of avoided-crossing resonances in a three-level Λ system *(4 pages)* 065602
I. Lizuain, J. Echanobe, A. Ruschhaupt, J. G. Muga, and D. A. Steck

Perturbative correction to the ground-state properties of one-dimensional strongly interacting bosons in a harmonic trap *(4 pages)* 065603
Francis N. C. Paraan and Vladimir E. Korepin

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

Microscopic model for the higher-order nonlinearity in optical filaments *(4 pages)* 065801
A. Teleki, E. M. Wright, and M. Kolesik

Electromagnetically induced conical emission *(4 pages)* 065802
E. M. Becerra-Castro and Luís E. E. de Araujo

(Continued)

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

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 82, NUMBER 6** **DECEMBER 2010**

Breathing dynamics of an asymmetric Gaussian beam propagating in a saturable absorbing medium *(4 pages)* . . . 065803
D. Ianetz, Yu. Kaganovskii, A. D. Wilson-Gordon, and M. Rosenbluh

Asymmetric Fano resonance analysis in indirectly coupled microresonators *(4 pages)* 065804
Yun-Feng Xiao, Min Li, Yong-Chun Liu, Yan Li, Xiudong Sun, and Qihong Gong

ERRATA

Erratum: Theory of time-resolved inelastic x-ray diffraction [Phys. Rev. A **81**, 023422 (2010)] *(1 page)* . . . . . 069901(E)
Ulf Lorenz, Klaus B. Møller, and Niels E. Henriksen

Erratum: Quantum discord for two-qubit X states [Phys. Rev. A **81**, 042105 (2010)] *(1 page)* . . . . . 069902(E)
Mazhar Ali, A. R. P. Rau, and G. Alber

Erratum: Entanglement criteria via concave-function uncertainty relations [Phys. Rev. A **82**, 012335 (2010)] *(1 page)* . . . . . 069903(E)
Yichen Huang

Erratum: Time-resolved measurement of Landau-Zener tunneling in different bases [Phys. Rev. A **82**, 013633 (2010)] *(1 page)* . . . . . 069904(E)
G. Tayebirad, A. Zenesini, D. Ciampini, R. Mannella, O. Morsch, E. Arimondo, N. Lörch, and S. Wimberger

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