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 5
PARTS A AND B

CONTENTS

NOVEMBER 2010

The Table of Contents is a total listing of Parts A and B.
Part A consists of pages 050101(R)-052904, and Part B pages 053401-059904(E).

RAPID COMMUNICATIONS

Fundamental concepts

Quantum metrology to probe atomic parity nonconservation *(4 pages)* . . . . . 050101(R)
P. Mandal and M. Mukherjee

Quantum information

Tensor network decompositions in the presence of a global symmetry *(4 pages)* . . . . . 050301(R)
Sukhwinder Singh, Robert N. C. Pfeifer, and Guifré Vidal

Atomic and molecular structure and dynamics

Quantum interference due to energy shifts and its effect on spontaneous emission *(4 pages)* . . . . . 050501(R)
Zheng-Hong Li, Da-Wei Wang, Hang Zheng, Shi-Yao Zhu, and M. Suhail Zubairy

Clusters (including fullerenes)

Strong $3p$-T_{1u} hybridization in Ar@C_{60} *(4 pages)* . . . . . 051201(R)
M. Morscher, A. P. Seitsonen, S. Ito, H. Takagi, N. Dragoe, and T. Greber

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

Doppler effect in fragment autoionization following core-to-valence excitation in O_2 *(4 pages)* . . . . . 051401(R)
Renaud Guillemin, Marc Simon, and Eiji Shigemasa

Light-induced torque for the generation of persistent current flow in atomic gas Bose-Einstein condensates *(4 pages)* . . . . . 051402(R)
V. E. Lembessis and M. Babiker

Matter waves and collective properties of cold atoms and molecules

Phase estimation with interfering Bose-Einstein-condensed atomic clouds *(4 pages)* . . . . . 051601(R)
Jan Chwedeńczuk, Francesco Piazza, and Augusto Smerzi

Copyright 2010 by The American Physical Society

(Continued)

1050-2947(201011)82:5:A;1-2

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 82, NUMBER 5** **NOVEMBER 2010**

Mott transitions of three-component fermionic atoms with repulsive interaction in optical lattices *(4 pages)* . . . . . 051602(R)
Kensuke Inaba, Shin-ya Miyatake, and Sei-ichiro Suga

Thermometry and refrigeration in a two-component Mott insulator of ultracold atoms *(4 pages)* . . . . . 051603(R)
David M. Weld, Hirokazu Miyake, Patrick Medley, David E. Pritchard, and Wolfgang Ketterle

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

Self-similarity and optical kinks in resonant nonlinear media *(4 pages)* . . . . . 051801(R)
Sergey A. Ponomarenko and Soodeh Haghgoo

ARTICLES

Fundamental concepts

Entanglement criteria for microscopic-macroscopic systems *(10 pages)* 052101
Nicolò Spagnolo, Chiara Vitelli, Fabio Sciarrino, and Francesco De Martini

Multipartite nonlocality distillation *(5 pages)* 052102
Li-Yi Hsu and Keng-Shuo Wu

Information conservation and entropy change in quantum measurements *(5 pages)* 052103
Shunlong Luo

Collisional decoherence of a tracer particle moving in one dimension *(9 pages)* 052104
Ingo Kamleitner

Evaluation of partial widths and branching ratios from resonance wave functions *(10 pages)* 052105
Tamar Goldzak, Ido Gilary, and Nimrod Moiseyev

Time-averaged quantum dynamics and the validity of the effective Hamiltonian model *(7 pages)* 052106
Omar Gamel and Daniel F. V. James

Hidden parameters in open-system evolution unveiled by geometric phase *(5 pages)* 052107
Patrik Pawlus and Erik Sjöqvist

Zeno subspace in quantum-walk dynamics *(5 pages)* 052108
C. M. Chandrashekar

Coherent excitation-energy transfer and quantum entanglement in a dimer *(12 pages)* 052109
Jie-Qiao Liao (廖洁桥), Jin-Feng Huang (黄金凤), Le-Man Kuang (匡乐满), and C. P. Sun (孙昌璞)

Relativistic electron confined by isotropic parabolic potential *(9 pages)* 052110
A. Poszwa

Information flow, non-Markovianity, and geometric phases *(8 pages)* 052111
S. L. Wu (武松林), X. L. Huang (黄晓理), L. C. Wang (王林成), and X. X. Yi (衣学喜)

Enhancement and suppression of tunneling by controlling symmetries of a potential barrier *(9 pages)* 052112
Denys I. Bondar, Wing-Ki Liu, and Misha Yu. Ivanov

Gegenbauer-solvable quantum chain model *(10 pages)* 052113
Miloslav Znojil

(Continued)

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 82, NUMBER 5** **NOVEMBER 2010**

Long-time coherence in echo spectroscopy with $\pi/2$-π-$\pi/2$ pulse sequence *(5 pages)* 052114
Arseni Goussev and Philippe Jacquod

Space-time evolution of Dirac wave packets *(10 pages)* 052115
V. Ya. Demikhovskii, G. M. Maksimova, A. A. Perov, and E. V. Frolova

Time dilation in relativistic two-particle interactions *(6 pages)* 052116
B. T. Shields, M. C. Morris, M. R. Ware, Q. Su, E. V. Stefanovich, and R. Grobe

Generalized crossing states in the interacting case: The uniform gravitational field *(7 pages)* 052117
Anthony D. Villanueva and Eric A. Galapon

Quantum Zeno and anti-Zeno effects on quantum and classical correlations *(9 pages)* 052118
F. Francica, F. Plastina, and S. Maniscalco

Nonlinear thermodynamic quantum master equation: Properties and examples *(11 pages)* 052119
Hans Christian Öttinger

Entanglement-based signature of nonlocal dispersion cancellation *(5 pages)* 052120
Tomasz Wasak, Piotr Szańkowski, Wojciech Wasilewski, and Konrad Banaszek

Tilted phase-space measurements in the eight-port homodyne detection scheme *(4 pages)* 052121
Pekka Lahti and Jussi Schultz

Decorrelating capabilities of operations with application to decoherence *(12 pages)* 052122
Shunlong Luo, Shuangshuang Fu, and Nan Li

Quantum information

When different entanglement witnesses detect the same entangled states *(7 pages)* 052301
Jinchuan Hou and Yu Guo

Initialization of NMR quantum registers using long-lived singlet states *(6 pages)* 052302
Soumya Singha Roy and T. S. Mahesh

Invariance of the bit error rate in the ancilla-assisted homodyne detection *(4 pages)* 052303
Yuhsuke Yoshida, Masahiro Takeoka, and Masahide Sasaki

Ground-state geometric quantum computing in superconducting systems *(8 pages)* 052304
P. Solinas, J.-M. Pirkkalainen, and M. Möttönen

Accuracy versus run time in an adiabatic quantum search *(19 pages)* 052305
A. T. Rezakhani, A. K. Pimachev, and D. A. Lidar

Entanglement dynamics of two independent Jaynes-Cummings atoms without the rotating-wave approximation *(7 pages)* 052306
Qing-Hu Chen, Yuan Yang, Tao Liu, and Ke-Lin Wang

Family of loss-tolerant quantum coin-flipping protocols *(7 pages)* 052307
N. Aharon, S. Massar, and J. Silman

Robustness of entanglement as a resource *(10 pages)* 052308
Rafael Chaves and Luiz Davidovich

(Continued)

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 82, NUMBER 5** **NOVEMBER 2010**

Universal quantum computer from a quantum magnet *(5 pages)* 052309
Jianming Cai, Akimasa Miyake, Wolfgang Dür, and Hans J. Briegel

Constructing optimal entanglement witnesses. II. Witnessing entanglement in $4N \times 4N$ systems *(5 pages)* 052310
Dariusz Chruściński and Justyna Pytel

Using superconducting qubit circuits to engineer exotic lattice systems *(6 pages)* 052311
Dimitris I. Tsomokos, Sahel Ashhab, and Franco Nori

Statistical properties of random matrix product states *(11 pages)* 052312
Silvano Garnerone, Thiago R. de Oliveira, Stephan Haas, and Paolo Zanardi

Implementing quantum gates through scattering between a static and a flying qubit *(7 pages)* 052313
G. Cordourier-Maruri, F. Ciccarello, Y. Omar, M. Zarcone, R. de Coss, and S. Bose

Entanglement-fidelity relations for inaccurate ancilla-driven quantum computation *(7 pages)* 052314
Tomoyuki Morimae and Jonas Kahn

Quantum entanglement distribution with hybrid parity gate *(8 pages)* 052315
Feng Mei, Ya-Fei Yu, Xun-Li Feng, Zhi-Ming Zhang, and C. H. Oh

Construction of $[\![n,n-4,3]\!]_q$ quantum codes for odd prime power q *(4 pages)* 052316
Ruihu Li and Zongben Xu

Low-energy-state dynamics of entanglement for spin systems *(4 pages)* 052317
R. Jafari

Counterfactual quantum key distribution with high efficiency *(5 pages)* 052318
Ying Sun and Qiao-Yan Wen

Gaussian approximation and single-spin measurement in magnetic resonance force microscopy with spin noise *(11 pages)* 052319
Shesha Raghunathan, Todd A. Brun, and Hsi-Sheng Goan

Quantum correlations in a clusterlike system *(7 pages)* 052320
Yi-Xin Chen, Sheng-Wen Li, and Zhi Yin

Optimal dynamics for quantum-state and entanglement transfer through homogeneous quantum systems *(5 pages)* 052321
L. Banchi, T. J. G. Apollaro, A. Cuccoli, R. Vaia, and P. Verrucchi

Universal quantum computation in a semiconductor quantum wire network *(6 pages)* 052322
Jay D. Sau, Sumanta Tewari, and S. Das Sarma

Reversing entanglement change by a weak measurement *(5 pages)* 052323
Qingqing Sun, M. Al-Amri, Luiz Davidovich, and M. Suhail Zubairy

Dynamical decoupling for a qubit in telegraphlike noises *(4 pages)* 052324
Ke Chen and Ren-Bao Liu

Passive sources for the Bennett-Brassard 1984 quantum-key-distribution protocol with practical signals *(13 pages)* 052325
Marcos Curty, Xiongfeng Ma, Hoi-Kwong Lo, and Norbert Lütkenhaus

(Continued)

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 82, NUMBER 5** **NOVEMBER 2010**

Topological matter with collective encoding and Rydberg blockade *(8 pages)* 052326
Anne E. B. Nielsen and Klaus Mølmer

Average entanglement for Markovian quantum trajectories *(7 pages)* 052327
S. Vogelsberger and D. Spehner

Noise-enhanced performance of adiabatic quantum computing by lifting degeneracies *(5 pages)* 052328
R. D. Wilson, A. M. Zagoskin, and S. Savel'ev

Quantum-information processing in decoherence-free subspace with low-Q cavities *(6 pages)* 052329
Qiong Chen and Mang Feng

Periodic revival of entanglement of two strongly driven qubits in a dissipative cavity *(8 pages)* 052330
Marcin Dukalski and Ya. M. Blanter

Quantum throughput: Quantifying quantum-communication devices with homodyne measurements *(8 pages)* 052331
N. Killoran, H. Häseler, and N. Lütkenhaus

Evaluation of ground-state entanglement in spin systems with the random phase approximation *(11 pages)* 052332
J. M. Matera, R. Rossignoli, and N. Canosa

Local quantum control of Heisenberg spin chains *(8 pages)* 052333
Rahel Heule, C. Bruder, Daniel Burgarth, and Vladimir M. Stojanović

Quantum correlation between the selection of the problem and that of the solution sheds light on the mechanism of the quantum speed-up *(8 pages)* 052334
Giuseppe Castagnoli

Entanglement dynamics via coherent-state propagators *(9 pages)* 052335
A. D. Ribeiro and R. M. Angelo

Numerical estimation of the relative entropy of entanglement *(7 pages)* 052336
Yuriy Zinchenko, Shmuel Friedland, and Gilad Gour

Entanglement in a time-dependent coupled XY spin chain in an external magnetic field *(18 pages)* 052337
Gehad Sadiek, Bedoor Alkurtass, and Omar Aldossary

Protecting unknown two-qubit entangled states by nesting Uhrig's dynamical decoupling sequences *(10 pages)* 052338
Musawwadah Mukhtar, Wee Tee Soh, Thuan Beng Saw, and Jiangbin Gong

Perfect function transfer in two and three dimensions without initialization *(5 pages)* 052339
Lian-Ao Wu, Mark Byrd, Z. D. Wang, and Bin Shao

Local unitary invariants for N-qubit pure states *(5 pages)* 052340
S. Shelly Sharma and N. K. Sharma

Quantifying non-Gaussianity for quantum information *(19 pages)* 052341
Marco G. Genoni and Matteo G. A. Paris

Generalized entropic measures of quantum correlations *(9 pages)* 052342
R. Rossignoli, N. Canosa, and L. Ciliberti

(Continued)

PHYSICAL REVIEW A THIRD SERIES, VOLUME 82, NUMBER 5 NOVEMBER 2010

Atomic and molecular structure and dynamics

Direct evidence of three-body interactions in a cold ^{85}Rb Rydberg gas *(8 pages)* 052501
Jianing Han

Combining density-functional theory and density-matrix-functional theory *(4 pages)* 052502
Daniel R. Rohr, Julien Toulouse, and Katarzyna Pernal

Two-dimensional Fourier-transform spectroscopy of potassium vapor *(6 pages)* 052503
X. Dai, A. D. Bristow, D. Karaiskaj, and S. T. Cundiff

Casimir force between integrable and chaotic pistons *(10 pages)* 052504
Ezequiel Álvarez, Francisco D. Mazzitelli, Alejandro G. Monastra, and Diego A. Wisniacki

Multiconfiguration Dirac-Fock calculations in open-shell atoms: Convergence methods and satellite spectra of the copper $K\alpha$ photoemission spectrum *(4 pages)* 052505
C. T. Chantler, J. A. Lowe, and I. P. Grant

Rotational Doppler effect in x-ray photoionization *(7 pages)* 052506
Yu-Ping Sun, Chuan-Kui Wang, and Faris Gel'mukhanov

Casimir potential of a compact object enclosed by a spherical cavity *(10 pages)* 052507
Saad Zaheer, Sahand Jamal Rahi, Thorsten Emig, and Robert L. Jaffe

Physical restrictions on the Casimir interaction of metal-dielectric metamaterials: An effective-medium approach *(5 pages)* 052508
Mário G. Silveirinha and Stanislav I. Maslovski

Dynamical Casimir effect in superconducting microwave circuits *(17 pages)* 052509
J. R. Johansson, G. Johansson, C. M. Wilson, and Franco Nori

Modifying the variational principle in the action-integral-functional derivation of time-dependent density-functional theory *(5 pages)* 052510
J. Schirmer

Delayed emission of cold positronium from mesoporous materials *(9 pages)* 052511
D. B. Cassidy, T. H. Hisakado, V. E. Meligne, H. W. K. Tom, and A. P. Mills Jr.

Experimental and theoretical lifetimes and transition probabilities in Sb I *(8 pages)* 052512
Henrik Hartman, Hampus Nilsson, Lars Engström, Hans Lundberg, Patrick Palmeri, Pascal Quinet, and Émile Biémont

Optimizing the resolution of the alternating-gradient m/μ selector *(11 pages)* 052513
Frank Filsinger, Stephan Putzke, Henrik Haak, Gerard Meijer, and Jochen Küpper

Hyperfine, rotational, and vibrational structure of the $a^3\Sigma_u^+$ state of $^{87}Rb_2$ *(12 pages)* 052514
C. Strauss, T. Takekoshi, F. Lang, K. Winkler, R. Grimm, J. Hecker Denschlag, and E. Tiemann

Possibility of measuring the thermal Casimir interaction between a plate and a cylinder attached to a micromachined oscillator *(12 pages)* 052515
R. S. Decca, E. Fischbach, G. L. Klimchitskaya, D. E. Krause, D. López, and V. M. Mostepanenko

Polarizabilities of the beryllium clock transition *(5 pages)* 052516
J. Mitroy

(Continued)

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 82, NUMBER 5** **NOVEMBER 2010**

Casimir-Polder interaction between an atom and a dielectric grating *(6 pages)* 052517
Ana M. Contreras-Reyes, Romain Guérout, Paulo A. Maia Neto, Diego A. R. Dalvit, Astrid Lambrecht, and Serge Reynaud

Numerical solution of the Hartree-Fock equation in molecular geometries *(8 pages)* 052518
James D. Talman

Shifts from a distant neighboring resonance *(6 pages)* 052519
M. Horbatsch and E. A. Hessels

Electrodynamics of finite-size particles with arbitrary spin *(6 pages)* 052520
Jacek Zatorski and Krzysztof Pachucki

Laser-cooled RaF as a promising candidate to measure molecular parity violation *(5 pages)* 052521
T. A. Isaev, S. Hoekstra, and R. Berger

Photoelectron angular distributions from polarized Ne* atoms near threshold *(11 pages)* 052522
P. O'Keeffe, P. Bolognesi, A. Mihelič, A. Moise, R. Richter, G. Cautero, L. Stebel, R. Sergo, L. Pravica, E. Ovcharenko, P. Decleva, and L. Avaldi

Momentum vector correlation maps for three-particle fragmentation of neutral triatomic hydrogen near its ionization threshold *(7 pages)* 052523
Peer Fechner and Hanspeter Helm

Atomic and molecular collisions and interactions

Double vibrational collision-induced Raman scattering by SF_6–N_2: Beyond the point-polarizable molecule model *(10 pages)* 052701
I. A. Verzhbitskiy, M. Chrysos, and A. P. Kouzov

Evidence of strong projectile–target-core interaction in single ionization of neon by electron impact *(4 pages)* . . . 052702
S. Yan, X. Ma, P. Zhang, S. Xu, S. F. Zhang, X. L. Zhu, W. T. Feng, and H. P. Liu

Nonasymptotic analysis of relativistic electron scattering in the Coulomb field *(11 pages)* 052703
I. D. Feranchuk and O. D. Skoromnik

Trapped scattering with three incident channels and the evaluation of the three-body forces *(7 pages)* 052704
C. G. Bao

Convergent-close-coupling calculations for excitation and ionization processes of electron-hydrogen collisions in Debye plasmas *(7 pages)* 052705
Mark C. Zammit, Dmitry V. Fursa, and Igor Bray

Low-energy charge transfer in collisions of He^{2+} with H in a Debye plasma *(9 pages)* 052706
Y. Zhang, C. H. Liu, Y. Wu, J. G. Wang, Y. Z. Qu, and J. Yan

Interatomic Coulombic electron capture *(14 pages)* 052707
K. Gokhberg and L. S. Cederbaum

Two-center dielectronic recombination and resonant photoionization *(9 pages)* 052708
A. B. Voitkiv and B. Najjari

(Continued)

PHYSICAL REVIEW A THIRD SERIES, VOLUME 82, NUMBER 5 NOVEMBER 2010

Bethe binary-encounter peaks in the double-differential cross sections for high-energy electron-impact ionization of H_2 and He *(6 pages)* 052709
S. Chatterjee, A. N. Agnihotri, C. R. Stia, O. A. Fojón, R. D. Rivarola, and L. C. Tribedi

Classical trajectory Monte Carlo model calculations for ionization of atomic hydrogen by 75-keV proton impact *(11 pages)* 052710
L. Sarkadi

Complex scattering lengths for ultracold He collisions with rotationally excited linear and nonlinear molecules *(7 pages)* 052711
Benhui Yang, R. C. Forrey, P. C. Stancil, and N. Balakrishnan

Shell- and subshell-resolved projectile excitation of hydrogenlike Au^{78+} ions in relativistic ion-atom collisions *(7 pages)* 052712
A. Gumberidze, S. Fritzsche, F. Bosch, D. C. Ionescu, A. Krämer, C. Kozhuharov, Z. Stachura, A. Surzhykov, A. Warczak, and Th. Stöhlker

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

Dynamics of guiding highly charged ions through SiO_2 nanocapillaries *(9 pages)* 052901
H.-Q. Zhang, P. Skog, and R. Schuch

Guided transmission of 3-keV Ne^{7+} ions through nanocapillaries in insulating polymers: Dependence on the capillary diameter *(8 pages)* 052902
N. Stolterfoht, R. Hellhammer, Z. Juhász, B. Sulik, E. Bodewits, H. M. Dang, and R. Hoekstra

van der Waals interaction of an atom with the internal surface of a hollow submicrometer-size cylinder *(7 pages)* 052903
Anton Afanasiev and Vladimir Minogin

Diffraction of swift atoms after grazing scattering from metal surfaces: N/Ag(111) system *(6 pages)* 052904
M. S. Gravielle, G. A. Bocan, and R. Díez Muiño

PART B

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

Impact of nuclear dynamics on interatomic Coulombic decay in a He dimer *(8 pages)* 053401
Nicolas Sisourat, Nikolai V. Kryzhevoi, Přemysl Kolorenč, Simona Scheit, and Lorenz S. Cederbaum

Asymmetric electron energy sharing in strong-field double ionization of helium *(5 pages)* 053402
Yueming Zhou, Qing Liao, and Peixiang Lu

Transient energy excitation in shortcuts to adiabaticity for the time-dependent harmonic oscillator *(7 pages)* 053403
Xi Chen and J. G. Muga

Strong-field ionization of polar molecules: Stark-shift-corrected strong-field approximation *(9 pages)* 053404
D. Dimitrovski, C. P. J. Martiny, and L. B. Madsen

Density of states in an optical speckle potential *(10 pages)* 053405
G. M. Falco, A. A. Fedorenko, J. Giacomelli, and M. Modugno

(Continued)

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 82, NUMBER 5** **NOVEMBER 2010**

Rydberg-electron decoherence in experimentally obtained recurrence spectra *(9 pages)* 053406
M. L. Keeler, W. Setzer, and W. W. Martin

Sensitive frequency dependence of the carrier-envelope phase effect on bound-bound transitions: An interference perspective *(6 pages)* 053407
Dian Peng (彭典), Biao Wu (吴飙), Panming Fu (傅盘铭), Bingbing Wang (王兵兵), Jiangbin Gong (龚江滨), and Zong-Chao Yan (严宗朝)

Laser cooling of molecules by zero-velocity selection and single spontaneous emission *(9 pages)* 053408
C. H. Raymond Ooi

Stark-tuned Förster resonance and dipole blockade for two to five cold Rydberg atoms: Monte Carlo simulations for various spatial configurations *(10 pages)* 053409
I. I. Ryabtsev, D. B. Tretyakov, I. I. Beterov, V. M. Entin, and E. A. Yakshina

Enhancements of rescattered electron yields in above-threshold ionization of molecules *(4 pages)* 053410
C. Cornaggia

Robust generation of isolated attosecond pulse against the variation of carrier envelope phase of driving laser pulses *(5 pages)* 053411
Pu Zou, Zhinan Zeng, Yinghui Zheng, Yingying Lu, Peng Liu, Ruxin Li, and Zhizhan Xu

Controlling transport and entanglement of two particles in a bipartite lattice *(8 pages)* 053412
Kuo Hai, Wenhua Hai, and Qiong Chen

Optimization of infrared two-color multicycle field synthesis for intense-isolated-attosecond-pulse generation *(14 pages)* 053413
Pengfei Lan, Eiji J. Takahashi, and Katsumi Midorikawa

Potential barrier effects in two-photon ionization processes *(4 pages)* 053414
Liang-Wen Pi and Anthony F. Starace

Theory of ultrafast autoionization dynamics of Fano resonances *(9 pages)* 053415
W.-C. Chu and C. D. Lin

THz generation by a two-color pulse in prealigned molecules *(5 pages)* 053416
Jian Wu, Yuqi Tong, Min Li, Haifeng Pan, and Heping Zeng

Combined quantum-state preparation and laser cooling of a continuous beam of cold atoms *(9 pages)* 053417
Gianni Di Domenico, Laurent Devenoges, Claire Dumas, and Pierre Thomann

Numerical investigation of strong-field photoionization rates *(9 pages)* 053418
Jarosław H. Bauer and Jacek Matulewski

Atomic ionization by intense laser pulses of short duration: Photoelectron energy and angular distributions *(9 pages)* 053419
M. Dondera

Slowing atoms using optical cavities pumped by phase-modulated light *(7 pages)* 053420
M. Hemmerling and G. R. M. Robb

(Continued)

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 82, NUMBER 5** **NOVEMBER 2010**

Matter waves and collective properties of cold atoms and molecules

Dimensional reduction of a binary Bose-Einstein condensate in mixed dimensions *(9 pages)* 053601
Luis E. Young-S., L. Salasnich, and S. K. Adhikari

Particle creation in Bose-Einstein condensates: Theoretical formulation based on conserving gapless mean-field theory *(8 pages)* 053602
Yasunari Kurita, Michikazu Kobayashi, Hideki Ishihara, and Makoto Tsubota

Atomic population distribution in the output ports of cold-atom interferometers with optical splitting and recombination *(10 pages)* 053603
Ebubechukwu O. Ilo-Okeke and Alex A. Zozulya

Transfer of Bose-Einstein condensates through discrete breathers in an optical lattice *(9 pages)* 053604
H. Hennig, J. Dorignac, and D. K. Campbell

Simulating and detecting the quantum spin Hall effect in the kagome optical lattice *(8 pages)* 053605
Guocai Liu, Shi-Liang Zhu, Shaojian Jiang, Fadi Sun, and W. M. Liu

Three-dimensional gap solitons in Bose-Einstein condensates supported by one-dimensional optical lattices *(5 pages)* 053606
A. Muñoz Mateo, V. Delgado, and Boris A. Malomed

Supersolid and charge-density-wave states from anisotropic interaction in an optical lattice *(5 pages)* 053607
Y.-H. Chan, Y.-J. Han, and L.-M. Duan

Parametric amplification of matter waves in dipolar spinor Bose-Einstein condensates *(7 pages)* 053608
F. Deuretzbacher, G. Gebreyesus, O. Topic, M. Scherer, B. Lücke, W. Ertmer, J. Arlt, C. Klempt, and L. Santos

Extracting the Mott gap from energy measurements in trapped atomic gases *(5 pages)* 053609
Juan Carrasquilla and Federico Becca

Hidden vorticity in binary Bose-Einstein condensates *(10 pages)* 053610
Marijana Brtka, Arnaldo Gammal, and Boris A. Malomed

F-wave pairing of cold atoms in optical lattices *(8 pages)* 053611
Wei-Cheng Lee, Congjun Wu, and S. Das Sarma

Center motions of nonoverlapping condensates coupled by long-range dipolar interaction in bilayer and multilayer stacks *(6 pages)* 053612
Chao-Chun Huang and Wen-Chin Wu

Collective atomic recoil motion in short-pulse matter-wave superradiance *(4 pages)* 053613
L. Deng and E. W. Hagley

Hydrodynamic equation of a spinor dipolar Bose-Einstein condensate *(9 pages)* 053614
Kazue Kudo and Yuki Kawaguchi

Quantum coherence for Bose-Einstein condensates induced by an imaginary potential *(8 pages)* 053615
Hongwei Xiong

(Continued)

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 82, NUMBER 5** **NOVEMBER 2010**

Helical spin textures in dipolar Bose-Einstein condensates *(7 pages)* 053616
J. A. M. Huhtamäki and P. Kuopanportti

Quantum dynamics in the bosonic Josephson junction *(14 pages)* 053617
Maya Chuchem, Katrina Smith-Mannschott, Moritz Hiller, Tsampikos Kottos, Amichay Vardi, and Doron Cohen

Proposed realization of itinerant ferromagnetism in optical lattices *(5 pages)* 053618
Shizhong Zhang, Hsiang-hsuan Hung, and Congjun Wu

Pattern formations in miscellaneous mixtures of Bose-Einstein condensates and the higher-dimensional time-gated Manakov system *(22 pages)* 053619
Victor K. Kuetche, Thomas B. Bouetou, Timoleon C. Kofane, Alain B. Moubissi, and K. Porsezian

Ground-state and collective modes of a spin-polarized dipolar Bose-Einstein condensate in a harmonic trap *(25 pages)* 053620
I. Sapina, T. Dahm, and N. Schopohl

Thermodynamics of balanced and slightly spin-imbalanced Fermi gases at unitarity *(11 pages)* 053621
Olga Goulko and Matthew Wingate

Full counting statistics of the interference contrast from independent Bose-Einstein condensates *(14 pages)* 053622
Steffen Patrick Rath and Wilhelm Zwerger

Tunneling dynamics of superfluid Fermi gases in an accelerating optical lattice *(8 pages)* 053623
Lu Tie and Ju-Kui Xue

Heavy fermions in an optical lattice *(11 pages)* 053624
Michael Foss-Feig, Michael Hermele, Victor Gurarie, and Ana Maria Rey

Mixture of Tonks-Girardeau gas and Fermi gas in one-dimensional optical lattices *(5 pages)* 053625
Shu Chen, Junpeng Cao, and Shi-Jian Gu

Spontaneously axisymmetry-breaking phase in a binary mixture of spinor Bose-Einstein condensates *(9 pages)* 053626
Z. F. Xu, J. W. Mei, R. Lü, and L. You

Hidden vortices in a Bose-Einstein condensate in a rotating double-well potential *(6 pages)* 053627
Linghua Wen (文灵华), Hongwei Xiong (熊宏伟), and Biao Wu (吴飙)

Excitations in disordered bosonic optical lattices *(7 pages)* 053628
Michael Knap, Enrico Arrigoni, and Wolfgang von der Linden

Phase transition to Bose-Einstein condensation for a bosonic gas confined in a combined trap *(9 pages)* 053629
Baolong Lü, Xinzhou Tan, Bing Wang, Lijuan Cao, and Hongwei Xiong

Ground states of trapped spin-1 condensates in magnetic field *(8 pages)* 053630
Michał Matuszewski

Dynamics and decoherence of two cold bosons in a one-dimensional harmonic trap *(7 pages)* 053631
Tomasz Sowiński, Mirosław Brewczyk, Mariusz Gajda, and Kazimierz Rzążewski

Dissipative transport of trapped Bose-Einstein condensates through disorder *(7 pages)* 053632
S. G. Bhongale, Paata Kakashvili, C. J. Bolech, and H. Pu

(Continued)

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 82, NUMBER 5** **NOVEMBER 2010**

Analytical thermodynamics of a strongly attractive three-component Fermi gas in one dimension *(15 pages)* 053633
Peng He, Xiangguo Yin, Xiwen Guan, Murray T. Batchelor, and Yupeng Wang

Atomic quantum corrals for Bose-Einstein condensates *(7 pages)* 053634
Hongwei Xiong (熊宏伟) and Biao Wu (吴飙)

Integro-differential equation for Bose-Einstein condensates *(7 pages)* 053635
R. M. Adam and S. A. Sofianos

Nonlinear interferometry with Bose-Einstein condensates *(9 pages)* 053636
Alexandre B. Tacla, Sergio Boixo, Animesh Datta, Anil Shaji, and Carlton M. Caves

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

Transformation optics in nonvacuum initial dielectric media *(5 pages)* 053801
Robert T. Thompson

Single-qubit lasing in the strong-coupling regime *(9 pages)* 053802
Stephan André, Pei-Qing Jin, Valentina Brosco, Jared H. Cole, Alessandro Romito, Alexander Shnirman, and Gerd Schön

Comparison of the signal-to-noise characteristics of quantum versus thermal ghost imaging *(7 pages)* 053803
Malcolm N. O'Sullivan, Kam Wai Clifford Chan, and Robert W. Boyd

Phase estimation without *a priori* phase knowledge in the presence of loss *(6 pages)* 053804
Jan Kołodyński and Rafał Demkowicz-Dobrzański

Anderson localization with second quantized fields in a coupled array of waveguides *(6 pages)* 053805
Clinton Thompson, Gautam Vemuri, and G. S. Agarwal

Optical wavelength conversion of quantum states with optomechanics *(5 pages)* 053806
L. Tian and Hailin Wang

Rapidly reconfigurable slow-light system based on off-resonant Raman absorption *(5 pages)* 053807
Praveen K. Vudyasetu, Ryan M. Camacho, and John C. Howell

Mechanism of high-energy pulse generation without wave breaking in mode-locked fiber lasers *(5 pages)* 053808
Xueming Liu

Effective temporal resolution in pump-probe spectroscopy with strongly chirped pulses *(8 pages)* 053809
D. Polli, D. Brida, S. Mukamel, G. Lanzani, and G. Cerullo

Ultrasensitive detection of mode splitting in active optical microcavities *(4 pages)* 053810
Lina He, Şahin Kaya Özdemir, Jiangang Zhu, and Lan Yang

Advanced Jones calculus for the classification of periodic metamaterials *(9 pages)* 053811
Christoph Menzel, Carsten Rockstuhl, and Falk Lederer

Quantum state engineering by a coherent superposition of photon subtraction and addition *(7 pages)* 053812
Su-Yong Lee and Hyunchul Nha

(Continued)

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 82, NUMBER 5** **NOVEMBER 2010**

Quasienergy band engineering and broadband dynamic localization in photonic lattices with long-range interaction *(5 pages)* 053813
Stefano Longhi, Felix Dreisow, Matthias Heinrich, Thomas Pertsch, Andreas Tünnermann, Stefan Nolte, and Alexander Szameit

Cloning entangled photons to scales one can see *(13 pages)* 053814
Pavel Sekatski, Bruno Sanguinetti, Enrico Pomarico, Nicolas Gisin, and Christoph Simon

Entanglement properties of an ultracold atom interacting with a cavity quantized electromagnetic field *(16 pages)* 053815
L. O. Castaños and R. Jáuregui

Superradiance from a cylindrically shaped cloud of N two-level atoms *(9 pages)* 053816
Jamal T. Manassah

Generation of coherent waves by frequency up-conversion and down-conversion of incoherent light *(7 pages)* 053817
A. Piskarskas, V. Pyragaite, and A. Stabinis

Highly entangled photons and rapidly responding polarization qubit phase gates in a room-temperature active Raman gain medium *(7 pages)* 053818
Chao Hang and Guoxiang Huang

Optical trapping of dielectric nanoparticles in resonant cavities *(8 pages)* 053819
Juejun Hu, Shiyun Lin, Lionel C. Kimerling, and Kenneth Crozier

Strong asymmetry for surface modes in nonlinear lattices with long-range coupling *(4 pages)* 053820
Alejandro J. Martínez, Rodrigo A. Vicencio, and Mario I. Molina

Unipolar half-cycle pulse generation in asymmetrical media with a periodic subwavelength structure *(5 pages)* . . . 053821
Xiaohong Song, Weifeng Yang, Zhinan Zeng, Ruxin Li, and Zhizhan Xu

Extension of harmonic cutoff in a multicycle chirped pulse combined with a chirp-free pulse *(5 pages)* 053822
Junjie Xu, Bin Zeng, and Yongli Yu

Slow-light propagation using mode locking of spin precession in quantum dots *(5 pages)* 053823
A. Shabaev, Z. Dutton, T. A. Kennedy, and Al. L. Efros

Generating single-mode behavior in fiber-coupled optical cavities *(12 pages)* 053824
Jonathan Busch and Almut Beige

Group velocity in lossy periodic structured media *(11 pages)* 053825
P. Y. Chen, R. C. McPhedran, C. M. de Sterke, C. G. Poulton, A. A. Asatryan, L. C. Botten, and M. J. Steel

Analysis of a continuous-variable quadripartite cluster state from a single optical parametric oscillator *(10 pages)* 053826
S. L. W. Midgley, M. K. Olsen, A. S. Bradley, and O. Pfister

Parametrically polarization-shaped pulses via a hollow-core photonic crystal fiber *(6 pages)* 053827
Fabian Weise, Georg Achazi, and Albrecht Lindinger

Fully localized two-dimensional embedded solitons *(5 pages)* 053828
Jianke Yang

Shaping solitons by lattice defects *(8 pages)* 053829
Liangwei Dong and Fangwei Ye

(Continued)

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 82, NUMBER 5** **NOVEMBER 2010**

Cross-talk dynamics of optical solitons in a broadband Kerr nonlinear system with weak cubic loss *(10 pages)* . . . 053830
Avner Peleg, Quan M. Nguyen, and Yeojin Chung

Systematic studies of two-color pump-induced high-order harmonic generation in plasma plumes *(7 pages)* 053831
R. A. Ganeev, H. Singhal, P. A. Naik, J. A. Chakera, H. S. Vora, R. A. Khan, and P. D. Gupta

Cavity quantum electrodynamics with a Rydberg-blocked atomic ensemble *(8 pages)* 053832
Christine Guerlin, Etienne Brion, Tilman Esslinger, and Klaus Mølmer

Self-similar interaction of slowly oscillating dispersion-managed solitons *(8 pages)* 053833
A. Hause, H. Hartwig, and F. Mitschke

Quantum theory of phase correlations in optical frequency combs generated by stimulated Raman scattering *(9 pages)* 053834
Chunbai Wu, M. G. Raymer, Y. Y. Wang, and F. Benabid

Changes in the statistical and quantum features of the cavity radiation of a two-photon coherent beat laser due to phase fluctuation *(8 pages)* 053835
Sintayehu Tesfa

Correlated two-photon transport in a one-dimensional waveguide side-coupled to a nonlinear cavity *(8 pages)* . . . 053836
Jie-Qiao Liao (廖洁桥) and C. K. Law

Four-wave-mixing gap solitons *(6 pages)* 053837
Yanpeng Zhang, Zhiguo Wang, Huaibin Zheng, Chenzhi Yuan, Changbiao Li, Keqing Lu, and Min Xiao

Photonic-band-gap effects in two-dimensional polycrystalline and amorphous structures *(8 pages)* 053838
Jin-Kyu Yang, Carl Schreck, Heeso Noh, Seng-Fatt Liew, Mikhael I. Guy, Corey S. O'Hern, and Hui Cao

Storage by trapping and spatial staggering of multiple interacting solitons in Λ-type media *(6 pages)* 053839
Willem P. Beeker, Chris J. Lee, Edip Can, and Klaus J. Boller

Photonic-crystal surface modes found from impedances *(8 pages)* 053840
Felix J. Lawrence, Lindsay C. Botten, Kokou B. Dossou, R. C. McPhedran, and C. Martijn de Sterke

Quantum phase transitions in coupled two-level atoms in a single-mode cavity *(6 pages)* 053841
Qing-Hu Chen, Tao Liu, Yu-Yu Zhang, and Ke-Lin Wang

Correlated photon pairs generated from a warm atomic ensemble *(7 pages)* 053842
R. T. Willis, F. E. Becerra, L. A. Orozco, and S. L. Rolston

Refraction of nonlinear beams by localized refractive index changes in nematic liquid crystals *(8 pages)* 053843
Gaetano Assanto, Antonmaria A. Minzoni, Noel F. Smyth, and Annette L. Worthy

BRIEF REPORTS

Fundamental concepts

Extended Fizeau experiment and the ether *(4 pages)* 054101
Iver Brevik

Local and nonlocal contents in N-qubit generalized Greenberger-Horne-Zeilinger states *(4 pages)* 054102
Chang-Liang Ren and Mahn-Soo Choi

(Continued)

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 82, NUMBER 5** **NOVEMBER 2010**

Deterministic creation of stationary entangled states by dissipation *(4 pages)* 054103
A. F. Alharbi and Z. Ficek

Asymptotic relation between Bell-inequality violations and entanglement distillability *(4 pages)* 054104
Younghun Kwon

Quantum information

Generation of hyperentangled states between remote noninteracting atomic ions *(4 pages)* 054301
Bao-Lin Hu and You-Bang Zhan

Qubit initialization and readout with finite coherent amplitudes in cavity QED *(4 pages)* 054302
Ricardo Kennedy, Leonhard Horstmeyer, Andrzej Dragan, and Terry Rudolph

Quantum information transfer with superconducting flux qubits coupled to a resonator *(4 pages)* 054303
Chui-Ping Yang

Atomic and molecular structure and dynamics

Measurement of the $(3s3p)^1P$–$(3s3d)^1D$ isotope shift in Mg I *(3 pages)* 054501
M. P. Steenstrup, A. Brusch, B. B. Jensen, J. Hald, and J. W. Thomsen

Atomic and molecular collisions and interactions

Highly excited Rydberg electron as a spectator to an ion-molecule reaction *(3 pages)* 054701
Michio Matsuzawa

Kinetic-energy release in N_2 fragmentation by charge-changing collisions of 2-MeV C^+ ions *(3 pages)* 054702
T. Mizuno, T. Yamada, H. Tsuchida, Y. Nakai, and A. Itoh

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

Precision spectroscopy of the molecular ion HD^+: Control of Zeeman shifts *(4 pages)* 055401
Dimitar Bakalov, Vladimir Korobov, and Stephan Schiller

Coherent population trapping in ^{87}Rb atoms induced by the optical frequency comb excitation *(4 pages)* 055402
D. Aumiler

Numerical simulation of strong-field electron spectra of Xe in the rescattering region *(4 pages)* 055403
Yaqiu Liang

Matter waves and collective properties of cold atoms and molecules

Mean-field theory for the Mott-insulator–paired-superfluid phase transition in the two-species Bose-Hubbard model *(3 pages)* 055601
M. Iskin

Vortex lattices generated by the Kelvin-Helmholtz instability in the Gross-Pitaevskii equation *(4 pages)* 055602
A. Ohta, R. Kashiwa, and H. Sakaguchi

(Continued)

PHYSICAL REVIEW A THIRD SERIES, VOLUME 82, NUMBER 5 NOVEMBER 2010

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

Measurement strategy for spatially encoded photonic qubits *(4 pages)* 055801
M. A. Solís-Prosser and L. Neves

Relationship between the Kramers-Kronig relations and negative index of refraction *(4 pages)* 055802
Alkim Akyurtlu and Adil-Gerai Kussow

Interpreting quantum states of electromagnetic field in time-dependent linear media *(4 pages)* 055803
Jeong Ryeol Choi

Active drains and causality *(3 pages)* 055804
Paul Kinsler

Addendum to "Behavior of a bipartite system in a cavity" *(3 pages)* 055805
C. A. Linhares, A. P. C. Malbouisson, and J. M. C. Malbouisson

Random quasi-phase-matched conversion of broadband radiation in a nonlinear photonic crystal *(4 pages)* 055806
A. S. Aleksandrovsky, A. M. Vyunishev, A. I. Zaitsev, and V. V. Slabko

COMMENTS

Quantum information

Comment on "Connection between entanglement and the speed of quantum evolution" and on "Entanglement and the lower bounds on the speed of quantum evolution" *(2 pages)* 056301
H. F. Chau

Reply to "Comment on 'Connection between entanglement and the speed of quantum evolution' and on 'Entanglement and the lower bounds on the speed of quantum evolution' " *(2 pages)* 056302
J. Batle, A. Borras, M. Casas, A. R. Plastino, and A. Plastino

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

Comment on "Light-induced atomic desorption and diffusion of Rb from porous alumina" *(3 pages)* 056901
Krzysztof Ręb ilas

Reply to Comment on Light-induced atomic desorption and diffusion of Rb from porous alumina *(2 pages)* 056902
S. Villalba, H. Failache, and A. Lezama

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

Comment on "Perfect imaging with positive refraction in three dimensions" *(2 pages)* 057801
R. Merlin

Reply to "Comment on 'Perfect imaging with positive refraction in three dimensions' " *(2 pages)* 057802
Ulf Leonhardt and Thomas G. Philbin

ERRATA

Erratum: Limitations on the principle of stationary phase when it is applied to tunneling analysis [Phys. Rev. A **74**, 062111 (2006)] *(1 page)* . . . . . 059901(E)
A. E. Bernardini

(Continued)

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 82, NUMBER 5** **NOVEMBER 2010**

Erratum: Extended Thomas-Fermi density functional for the unitary Fermi gas
[Phys. Rev. A **78**, 053626 (2008)] *(1 page)* . . . . . 059902(E)
Luca Salasnich and Flavio Toigo

Erratum: Stabilization of ultracold molecules using optimal control theory
[Phys. Rev. A **70**, 013402 (2004)] *(1 page)* . . . . . 059903(E)
Christiane P. Koch, José P. Palao, Ronnie Kosloff, and Françoise Masnou-Seeuws

Publisher's Note: Trapped scattering with three incident channels and the evaluation of the
three-body forces [Phys. Rev. A **82**, 052704 (2010)] *(1 page)* . . . . . 059904(E)
C. G. Bao