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
P.O. Box 41
Annapolis Junction, MD 20701

THIRD SERIES, VOLUME 92, NUMBER 5 **PARTS A AND B**

CONTENTS

NOVEMBER 2015

The Table of Contents is a total listing of Parts A and B.
Part A consists of pages 050101(R)–053426, and Part B pages 053601–059904(E).

PART A

RAPID COMMUNICATIONS

Fundamental concepts

Structure of eigenstates and quench dynamics at an excited-state quantum phase transition *(5 pages)* . . . . . 050101(R)
Lea F. Santos and Francisco Pérez-Bernal

Quantum information

Quantum entanglement from random measurements *(7 pages)* . . . . . 050301(R)
Minh Cong Tran, Borivoje Dakić, François Arnault, Wiesław Laskowski, and Tomasz Paterek

Atomic and molecular collisions and interactions

Electron emission and recoil effects following the beta decay of ^{6}He *(5 pages)* . . . . . 050701(R)
Eva E. Schulhoff and G. W. F. Drake

Failure of hydrogenation in protecting polycyclic aromatic hydrocarbons from fragmentation *(5 pages)* . . . . . 050702(R)
M. Gatchell, M. H. Stockett, N. de Ruette, T. Chen, L. Giacomozzi, R. F. Nascimento, M. Wolf, E. K. Anderson, R. Delaunay, V. Vizcaino, P. Rousseau, L. Adoui, B. A. Huber, H. T. Schmidt, H. Zettergren, and H. Cederquist

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

Photon-momentum transfer in multiphoton ionization and in time-resolved holography with photoelectrons *(5 pages)* . . . . . 051401(R)
Szczepan Chelkowski, André D. Bandrauk, and Paul B. Corkum

Rydberg blockade effects at $n \sim 300$ in strontium *(5 pages)* . . . . . 051402(R)
X. Zhang, F. B. Dunning, S. Yoshida, and J. Burgdörfer

Creation and survival of autoionizing states in strong laser fields *(4 pages)* . . . . . 051403(R)
Lutz Fechner, Nicolas Camus, Andreas Krupp, Joachim Ullrich, Thomas Pfeifer, and Robert Moshammer

Matter waves and collective properties of cold atoms and molecules

Thermal friction on quantum vortices in a Bose-Einstein condensate *(5 pages)* . . . . . 051601(R)
Geol Moon, Woo Jin Kwon, Hyunjik Lee, and Yong-il Shin

Copyright 2015 by American Physical Society

(Continued)

1050-2947(201511)92:5:B;1-K

The editors and referees of PRA find these papers to be of particular interest, importance, or clarity. Please see our Announcement Phys. Rev. A 88, 020001 (2013).

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 92, NUMBER 5** **NOVEMBER 2015**

Baryon squishing in synthetic dimensions by effective SU(M) gauge fields *(5 pages)* . . . . . 051602(R)
Sudeep Kumar Ghosh, Umesh K. Yadav, and Vijay B. Shenoy

ARTICLES

Fundamental concepts

Symmetries of general non-Markovian Gaussian diffusive unravelings *(10 pages)* 052101
Adrián A. Budini

Nonlocality without counterfactual reasoning *(5 pages)* 052102
Stefan Wolf

Parity-time symmetry in a flat-band system *(8 pages)* 052103
Li Ge

Bell inequalities violated using detectors of low efficiency *(10 pages)* 052104
Károly F. Pál and Tamás Vértesi

Sequential nonideal measurements of quantum oscillators: Statistical characterization with and without environmental coupling *(16 pages)* 052105
Vincenzo Matta and Vincenzo Pierro

Bayesian recursive data-pattern tomography *(10 pages)* 052106
Alexander Mikhalychev, Dmitri Mogilevtsev, Yong Siah Teo, Jaroslav Řeháček, and Zdeněk Hradil

Hidden momentum in a hydrogen atom and the Lorentz-force law *(5 pages)* 052107
J. S. Oliveira Filho and Pablo L. Saldanha

Realization of adiabatic Aharonov-Bohm scattering with neutrons *(5 pages)* 052108
Erik Sjöqvist, Martin Almquist, Ken Mattsson, Zeynep Nilhan Gürkan, and Björn Hessmo

Role of control constraints in quantum optimal control *(14 pages)* 052109
Dmitry V. Zhdanov and Tamar Seideman

Restrictions on initial system-environment correlations based on the dynamics of an open quantum system *(8 pages)* 052110
Eric Chitambar, Ali Abu-Nada, Russell Ceballos, and Mark Byrd

Spikes in quantum trajectories *(7 pages)* 052111
Antoine Tilloy, Michel Bauer, and Denis Bernard

Improved thermometry of low-temperature quantum systems by a ring-structure probe *(11 pages)* 052112
Li-Sha Guo, Bao-Ming Xu, Jian Zou, and Bin Shao

Protocol for detection of nonsecular conversion through coherent nanooptical spectroscopy *(14 pages)* 052113
Markus Krecik, Sven M. Hein, Mario Schoth, and Marten Richter

Contrast in multipath interference and quantum coherence *(9 pages)* 052114
Kai von Prillwitz, Łukasz Rudnicki, and Florian Mintert

Validity of one-dimensional QED for a system with spatial symmetry *(14 pages)* 052115
Q. Z. Lv, N. D. Christensen, Q. Su, and R. Grobe

(Continued)

The editors and referees of PRA find these papers to be of particular interest, importance, or clarity. Please see our Announcement Phys. Rev. A 88, 020001 (2013).

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 92, NUMBER 5** **NOVEMBER 2015**

Thermofield-based chain-mapping approach for open quantum systems *(7 pages)* 052116
Inés de Vega and Mari-Carmen Bañuls

Geometric characterization of true quantum decoherence *(5 pages)* 052117
Julius Kayser, Kimmo Luoma, and Walter T. Strunz

Tunneling time in attosecond experiments and the time-energy uncertainty relation *(10 pages)* 052118
Ossama Kullie

Investigation of quantum-entanglement simulation in random-variable theories augmented by either classical communication or nonlocal effects *(8 pages)* 052119
Akbar Fahmi

Measuring non-Hermitian operators via weak values *(8 pages)* 052120
Arun Kumar Pati, Uttam Singh, and Urbasi Sinha

Evolutional entanglement production *(8 pages)* 052121
V. I. Yukalov and E. P. Yukalova

Gaussian interferometric power as a measure of continuous-variable non-Markovianity *(12 pages)* 052122
Leonardo A. M. Souza, Himadri Shekhar Dhar, Manabendra Nath Bera, Pietro Liuzzo-Scorpo, and Gerardo Adesso

Excited-to-excited-state scattering using weak measurements *(5 pages)* 052123
Satya Sainadh U and Andal Narayanan

General description of quasiadiabatic dynamical phenomena near exceptional points *(12 pages)* 052124
Thomas J. Milburn, Jörg Doppler, Catherine A. Holmes, Stefano Portolan, Stefan Rotter, and Peter Rabl

Quantum information

Quantum-optical channels that output only classical states *(7 pages)* 052301
Krishna Kumar Sabapathy

Nonadiabatic holonomic gates realized by a single-shot implementation *(5 pages)* 052302
G. F. Xu, C. L. Liu, P. Z. Zhao, and D. M. Tong

Least-bias state estimation with incomplete unbiased measurements *(13 pages)* 052303
Jaroslav Řeháček, Zdeněk Hradil, Yong Siah Teo, Luis L. Sánchez-Soto, Hui Khoon Ng, Jing Hao Chai, and Berthold-Georg Englert

Practical position-based quantum cryptography *(10 pages)* 052304
Kaushik Chakraborty and Anthony Leverrier

Localization in quantum walks on a honeycomb network *(10 pages)* 052305
Changyuan Lyu, Luyan Yu, and Shengjun Wu

Qubit measurement error from coupling with a detuned neighbor in circuit QED *(19 pages)* 052306
Mostafa Khezri, Justin Dressel, and Alexander N. Korotkov

Asymptotic compatibility between local-operations-and-classical-communication conversion and recovery *(14 pages)* 052308
Kosuke Ito, Wataru Kumagai, and Masahito Hayashi

(Continued)

The editors and referees of PRA find these papers to be of particular interest, importance, or clarity. Please see our Announcement Phys. Rev. A 88, 020001 (2013).

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 92, NUMBER 5** **NOVEMBER 2015**

Symmetry-protected topologically ordered states for universal quantum computation *(17 pages)* 052309
Hendrik Poulsen Nautrup and Tzu-Chieh Wei

Entropy bounds for quantum processes with initial correlations *(5 pages)* 052310
Sai Vinjanampathy and Kavan Modi

Localization, delocalization, and topological phase transitions in the one-dimensional split-step quantum walk *(13 pages)* 052311
Tibor Rakovszky and Janos K. Asboth

Nonsignaling quantum random access-code boxes *(5 pages)* 052312
Andrzej Grudka, Michał Horodecki, Ryszard Horodecki, and Antoni Wójcik

Large bipartite Bell violations with dichotomic measurements *(7 pages)* 052313
C. Palazuelos and Z. Yin

Minimum time generation of SU(2) transformations with asymmetric bounds on the controls *(5 pages)* 052314
Raffaele Romano

Direct counterfactual transmission of a quantum state *(9 pages)* 052315
Zheng-Hong Li, M. Al-Amri, and M. Suhail Zubairy

Systematic construction of genuine-multipartite-entanglement criteria in continuous-variable systems using uncertainty relations *(13 pages)* 052316
F. Toscano, A. Saboia, A. T. Avelar, and S. P. Walborn

Practical security analysis of two-way quantum-key-distribution protocols based on nonorthogonal states *(9 pages)* 052317
C. Ivan Henao and Roberto M. Serra

Device-independent quantum key distribution with generalized two-mode Schrödinger cat states *(5 pages)* 052318
Curtis J. Broadbent, Kevin Marshall, Christian Weedbrook, and John C. Howell

Implementing BosonSampling with time-bin encoding: Analysis of loss, mode mismatch, and time jitter *(10 pages)* 052319
Keith R. Motes, Jonathan P. Dowling, Alexei Gilchrist, and Peter P. Rohde

Generality of the concatenated five-qubit code *(8 pages)* 052320
Long Huang, Bo You, Xiaohua Wu, and Tao Zhou

Reduced gap between observed and certified randomness for semi-device-independent protocols *(7 pages)* 052321
Yu-Kun Wang, Su-Juan Qin, Xia Wu, Fei Gao, and Qiao-Yan Wen

Compressed sensing for Hamiltonian reconstruction *(6 pages)* 052322
Kenneth Rudinger and Robert Joynt

Searching for quantum speedup in quasistatic quantum annealers *(5 pages)* 052323
Mohammad H. Amin

Nearly deterministic Bell measurement with multiphoton entanglement for efficient quantum-information processing *(9 pages)* 052324
Seung-Woo Lee, Kimin Park, Timothy C. Ralph, and Hyunseok Jeong

Quantum superposition of the order of parties as a communication resource *(5 pages)* 052326
Adrien Feix, Mateus Araújo, and Časlav Brukner

(Continued)

The editors and referees of PRA find these papers to be of particular interest, importance, or clarity. Please see our Announcement Phys. Rev. A 88, 020001 (2013).

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 92, NUMBER 5** **NOVEMBER 2015**

Steady-state entanglement enhanced by a dissipative ancilla *(7 pages)* 052327
Joachim Fischbach and Matthias Freyberger

Conservation relation of nonclassicality and entanglement for Gaussian states in a beam splitter *(9 pages)* 052328
Wenchao Ge, Mehmet Emre Tasgin, and M. Suhail Zubairy

Direct characterization of quantum dynamics with noisy ancilla *(7 pages)* 052329
Eugene Dumitrescu and Travis S. Humble

Distributed quantum dense coding with two receivers in noisy environments *(11 pages)* 052330
Tamoghna Das, R. Prabhu, Aditi Sen(De), and Ujjwal Sen

Quantum union bounds for sequential projective measurements *(6 pages)* 052331
Jingliang Gao

Magnetic alteration of entanglement in two-electron quantum dots *(19 pages)* 052332
N. S. Simonović and R. G. Nazmitdinov

Anticoherence of spin states with point-group symmetries *(13 pages)* 052333
D. Baguette, F. Damanet, O. Giraud, and J. Martin

General dichotomization procedure to provide qudit entanglement criteria *(7 pages)* 052334
Ibrahim Saideh, A. D. Ribeiro, Giulia Ferrini, Thomas Coudreau, Pérola Milman, and Arne Keller

Coupling a single nitrogen-vacancy center to a superconducting flux qubit in the far-off-resonance regime *(8 pages)* 052335
Tom Douce, Michael Stern, Nicim Zagury, Patrice Bertet, and Pérola Milman

Quantum walk as a simulator of nonlinear dynamics: Nonlinear Dirac equation and solitons *(8 pages)* 052336
Chang-Woo Lee, Paweł Kurzyński, and Hyunchul Nha

Optimal amount of entanglement to distinguish quantum states instantaneously *(9 pages)* 052337
Berry Groisman and Sergii Strelchuk

Determination of Dicke states equivalent under stochastic local operations and classical communication *(9 pages)* 052338
Xia Wu, Ying-hui Yang, Qiao-yan Wen, Su-juan Qin, and Fei Gao

Experimental quantum key distribution with simulated ground-to-satellite photon losses and processing limitations *(12 pages)* 052339
Jean-Philippe Bourgoin, Nikolay Gigov, Brendon L. Higgins, Zhizhong Yan, Evan Meyer-Scott, Amir K. Khandani, Norbert Lütkenhaus, and Thomas Jennewein

Atomic and molecular structure and dynamics

High-precision measurements of the ^{87}Rb D-line tune-out wavelength *(7 pages)* 052501
R. H. Leonard, A. J. Fallon, C. A. Sackett, and M. S. Safronova

Large eigenvalue of the cumulant part of the two-electron reduced density matrix as a measure of off-diagonal long-range order *(6 pages)* 052502
Alexandra Raeber and David A. Mazziotti

Electron detachment and fragmentation of laser-excited rotationally hot Al_4^- *(11 pages)* 052503
B. Kafle, O. Aviv, V. Chandrasekaran, O. Heber, M. L. Rappaport, H. Rubinstein, D. Schwalm, D. Strasser, and D. Zajfman

(Continued)

The editors and referees of PRA find these papers to be of particular interest, importance, or clarity. Please see our Announcement Phys. Rev. A 88, 020001 (2013).

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 92, NUMBER 5** **NOVEMBER 2015**

Frequency-offset separated oscillatory fields *(5 pages)* 052504
A. C. Vutha and E. A. Hessels

Multiconfiguration Dirac-Hartree-Fock calculations of excitation energies, oscillator strengths, and hyperfine structure constants for low-lying levels of Sm I *(9 pages)* 052505
Fuyang Zhou, Yizhi Qu, Jiguang Li, and Jianguo Wang

Appraising nuclear-octupole-moment contributions to the hyperfine structures in ^{211}Fr *(10 pages)* 052506
B. K. Sahoo

Isotope shifts and hyperfine structure of the laser-cooling Fe I 358-nm line *(5 pages)* 052507
N. Huet, M. Pettens, and T. Bastin

Influence of ion movement in a particle trap on the bound electron g factor *(4 pages)* 052509
Niklas Michel, Jacek Zatorski, and Christoph H. Keitel

Dynamic polarizabilities and hyperfine-structure constants for Sc^{2+} *(8 pages)* 052510
Narendra Nath Dutta, Sourav Roy, and P. C. Deshmukh

Theoretical studies of the long lifetimes of the $6d\,^2D_{3/2,5/2}$ states in Fr: Implications for parity-nonconservation measurements *(5 pages)* 052511
B. K. Sahoo and B. P. Das

Hyperfine structure of P states in muonic deuterium *(13 pages)* 052512
R. N. Faustov, A. P. Martynenko, G. A. Martynenko, and V. V. Sorokin

Measurements of the ground-state polarizabilities of Cs, Rb, and K using atom interferometry *(14 pages)* 052513
Maxwell D. Gregoire, Ivan Hromada, William F. Holmgren, Raisa Trubko, and Alexander D. Cronin

Reduced-density-matrix-functional theory at finite temperature: Theoretical foundations *(10 pages)* 052514
Tim Baldsiefen, Attila Cangi, and E. K. U. Gross

Finite-field calculation of static polarizabilities and hyperpolarizabilities of In^+ and Sr *(11 pages)* 052515
Yan-mei Yu, Bing-bing Suo, Hui-hui Feng, Heng Fan, and Wu-Ming Liu

Relativistic configuration interaction plus linearized-coupled-cluster calculations of U^{2+} energies, g factors, transition rates, and lifetimes *(10 pages)* 052516
I. Savukov, U. I. Safronova, and M. S. Safronova

Leading term of the He-$\bar{p}$He$^+$ long-range interaction *(7 pages)* 052517
Vladimir I. Korobov, Zhen-Xiang Zhong, and Quan-Long Tian

Convergent close coupling versus the generalized Sturmian function approach: Wave-function analysis *(8 pages)* 052518
M. Ambrosio, D. M. Mitnik, G. Gasaneo, J. M. Randazzo, A. S. Kadyrov, D. V. Fursa, and I. Bray

Structural information about the Ar_6 cluster from the frozen-Gaussian imaginary-time propagator *(10 pages)* 052519
Holger Cartarius

Atomic and molecular collisions and interactions

B-spline R-matrix-with-pseudostates calculations for electron collisions with aluminum *(7 pages)* 052701
Viktor Gedeon, Sergej Gedeon, Vladimir Lazur, Elizabeth Nagy, Oleg Zatsarinny, and Klaus Bartschat

(Continued)

The editors and referees of PRA find these papers to be of particular interest, importance, or clarity. Please see our Announcement Phys. Rev. A 88, 020001 (2013).

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 92, NUMBER 5** **NOVEMBER 2015**

Electron-scattering studies of carbonyl fluoride *(8 pages)* 052702
Jaspreet Kaur, Nigel Mason, and Bobby Antony

Scattering of wave packets on atoms in the Born approximation *(8 pages)* 052703
D. V. Karlovets, G. L. Kotkin, and V. G. Serbo

Anisotropic contribution to the van der Waals and the Casimir-Polder energies for CO_2 and CH_4 molecules near surfaces and thin films *(7 pages)* 052704
Priyadarshini Thiyam, Prachi Parashar, K. V. Shajesh, Clas Persson, Martin Schaden, Iver Brevik, Drew F. Parsons, Kimball A. Milton, Oleksandr I. Malyi, and Mathias Boström

Strong sensitivity of x-ray emission lines following charge exchange between highly charged ions and H(1s) in weakly screened media *(7 pages)* 052705
N. D. Cariatore and S. Otranto

Spectroscopic detection of atom-surface interactions in an atomic-vapor layer with nanoscale thickness *(11 pages)* 052706
K. A. Whittaker, J. Keaveney, I. G. Hughes, A. Sargsyan, D. Sarkisyan, and C. S. Adams

Propensity for distinguishing two free electrons with equal energies in electron-impact ionization of helium *(5 pages)* 052707
Xueguang Ren, Arne Senftleben, Thomas Pflüger, Klaus Bartschat, Oleg Zatsarinny, Jamal Berakdar, James Colgan, Michael S. Pindzola, Igor Bray, Dmitry V. Fursa, and Alexander Dorn

Angle-differential observation of plasmon electrons in the double-differential cross-section spectra of fast-ion-induced electron ejection from C_{60} *(7 pages)* 052708
A. H. Kelkar, L. Gulyás, and Lokesh C. Tribedi

Compton scattering of two x-ray photons by an atom *(6 pages)* 052709
Alexey N. Hopersky, Alexey M. Nadolinsky, and Sergey A. Novikov

Kinetic-energy transfer in highly-charged-ion collisions with carbon *(5 pages)* 052710
R. E. Lake and N. R. Arista

Antiproton stopping in H_2 and H_2O *(7 pages)* 052711
J. J. Bailey, A. S. Kadyrov, I. B. Abdurakhmanov, D. V. Fursa, and I. Bray

Unified calculation of generalized oscillator strength of argon ranging from bound to continuum states *(7 pages)* 052712
Xiang Gao, Rui Jin, De-Ling Zeng, Xiao-Ying Han, Jun Yan, and Jia-Ming Li

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

Modeling magneto-optical trapping of CaF molecules *(7 pages)* 053401
M. R. Tarbutt and T. C. Steimle

Vibrational-coherence measurement of nonequilibrium quantum systems by four-wave mixing *(8 pages)* 053402
Alexander Schubert, Cyril Falvo, and Christoph Meier

Initial electronic coherence in molecular dissociation induced by an attosecond pulse *(10 pages)* 053403
Lukas Medišauskas, Serguei Patchkovskii, Alex Harvey, Danilo S. Brambila, Christian Neidel, Jesse Klei, Arnaud Rouzée, Marc J. J. Vrakking, and Misha Yu. Ivanov

Two-photon double ionization of atomic beryllium with ultrashort laser pulses *(11 pages)* 053404
F. L. Yip, A. Palacios, F. Martín, T. N. Rescigno, and C. W. McCurdy

(Continued)

The editors and referees of PRA find these papers to be of particular interest, importance, or clarity. Please see our Announcement Phys. Rev. A 88, 020001 (2013).

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 92, NUMBER 5** **NOVEMBER 2015**

Influence of wavelength on nonadiabatic effects in circularly polarized strong-field ionization *(6 pages)* 053405
MingHu Yuan, GuangJiu Zhao, and HongPing Liu

Fast bias inversion of a double well without residual particle excitation *(7 pages)* 053406
S. Martínez-Garaot, M. Palmero, D. Guéry-Odelin, and J. G. Muga

Frequency shifts and relaxation rates for spin-1/2 particles moving in electromagnetic fields *(8 pages)* 053407
G. Pignol, M. Guigue, A. Petukhov, and R. Golub

Quantum control of a molecular ionization process by using Fourier-synthesized laser fields *(6 pages)* 053408
Hideki Ohmura and Naoaki Saito

Ionization dynamics of C_2H_2 in intense laser fields: Time-dependent Hartree-Fock approach *(7 pages)* 053409
Shi-Lin Hu, Zeng-Xiu Zhao, Jing Chen, and Ting-Yun Shi

Nonlinear magneto-optical rotation in rubidium vapor excited with blue light *(9 pages)* 053410
S. Pustelny, L. Busaite, M. Auzinsh, A. Akulshin, N. Leefer, and D. Budker

Time-optimal control fields for quantum systems with multiple avoided crossings *(10 pages)* 053411
P. M. Poggi, F. C. Lombardo, and D. A. Wisniacki

Efficient isolation of multiphoton processes and detection of collective resonances in dilute samples *(6 pages)* . . . 053412
Lukas Bruder, Marcel Binz, and Frank Stienkemeier

Time-dependent density-functional study of the ionization and fragmentation of C_2H_2 and H_2 by strong circularly polarized laser pulses *(11 pages)* 053413
Arthur Russakoff and Kálmán Varga

Time-optimal polarization transfer from an electron spin to a nuclear spin *(12 pages)* 053414
Haidong Yuan, Robert Zeier, Nikolas Pomplun, Steffen J. Glaser, and Navin Khaneja

Alignment enhancement of molecules embedded in helium nanodroplets by multiple laser pulses *(6 pages)* 053415
Lars Christiansen, Jens H. Nielsen, Dominik Pentlehner, Jonathan G. Underwood, and Henrik Stapelfeldt

Bicircular-laser-field-assisted electron-ion radiative recombination *(10 pages)* 053416
S. Odžak and D. B. Milošević

Subcycle engineering of laser filamentation in gas by harmonic seeding *(7 pages)* 053417
P. Béjot, G. Karras, F. Billard, J. Doussot, E. Hertz, B. Lavorel, and O. Faucher

Relativistic approach to the tunneling-time problem *(6 pages)* 053418
I. A. Ivanov and Kyung Taec Kim

Modeling sympathetic cooling of molecules by ultracold atoms *(15 pages)* 053419
Jongseok Lim, Matthew D. Frye, Jeremy M. Hutson, and M. R. Tarbutt

Superstatistical velocity distributions of cold trapped ions in molecular-dynamics simulations *(12 pages)* 053420
I. Rouse and S. Willitsch

Multielectron dynamics in the tunneling ionization of correlated quantum systems *(8 pages)* 053421
Maximilian Hollstein and Daniela Pfannkuche

Control of photoelectron interference in asymmetric momentum distributions using two-color laser fields *(6 pages)* 053422
Xu Zheng, Ming-Ming Liu, Hui Xie, Peipei Ge, Min Li, and Yunquan Liu

(Continued)

The editors and referees of PRA find these papers to be of particular interest, importance, or clarity. Please see our Announcement Phys. Rev. A 88, 020001 (2013).

PHYSICAL REVIEW A THIRD SERIES, VOLUME 92, NUMBER 5 NOVEMBER 2015

Phonon-to-spin mapping in a system of a trapped ion via optimal control *(9 pages)* 053423
Matthias M. Müller, Ulrich G. Poschinger, Tommaso Calarco, Simone Montangero, and Ferdinand Schmidt-Kaler

Driving Rabi oscillations at the giant dipole resonance in xenon *(6 pages)* 053424
Stefan Pabst, Daochen Wang, and Robin Santra

Fast radiative cooling of anthracene: Dependence on internal energy *(13 pages)* 053425
S. Martin, M. Ji, J. Bernard, R. Brédy, B. Concina, A. R. Allouche, C. Joblin, C. Ortega, G. Montagne, A. Cassimi, Y. Ngono-Ravache, and L. Chen

Effect of bound-state dressing in laser-assisted radiative recombination *(8 pages)* 053426
Robert A. Müller, Daniel Seipt, Stephan Fritzsche, and Andrey Surzhykov

PART B

Matter waves and collective properties of cold atoms and molecules

Stable multiple vortices in collisionally inhomogeneous attractive Bose-Einstein condensates *(6 pages)* 053601
J. B. Sudharsan, R. Radha, H. Fabrelli, A. Gammal, and Boris A. Malomed

Tunable dual-species Bose-Einstein condensates of ^{39}K and ^{87}Rb *(9 pages)* 053602
L. Wacker, N. B. Jørgensen, D. Birkmose, R. Horchani, W. Ertmer, C. Klempt, N. Winter, J. Sherson, and J. J. Arlt

Stable Hopf solitons in rotating Bose-Einstein condensates *(5 pages)* 053603
Y. M. Bidasyuk, A. V. Chumachenko, O. O. Prikhodko, S. I. Vilchinskii, M. Weyrauch, and A. I. Yakimenko

Magnetic tensor gradiometry using Ramsey interferometry of spinor condensates *(6 pages)* 053604
A. A. Wood, L. M. Bennie, A. Duong, M. Jasperse, L. D. Turner, and R. P. Anderson

Excitonic states of an impurity in a Fermi gas *(6 pages)* 053605
Zhihao Lan and Carlos Lobo

Quantum walks accompanied by spin flipping in one-dimensional optical lattices *(8 pages)* 053606
Li Wang, Na Liu, Shu Chen, and Yunbo Zhang

Multifrequency perturbations in matter-wave interferometry *(7 pages)* 053607
A. Günther, A. Rembold, G. Schütz, and A. Stibor

Measure synchronization in a spin-orbit-coupled bosonic Josephson junction *(6 pages)* 053608
Wen-Yuan Wang, Jie Liu, and Li-Bin Fu

Mean-field predictions for a dipolar Bose-Einstein condensate with ^{164}Dy *(5 pages)* 053609
Damir Zajec and Günter Wunner

Demixing effects in mixtures of two bosonic species *(6 pages)* 053610
F. Lingua, M. Guglielmino, V. Penna, and B. Capogrosso Sansone

High-temperature expansion for interacting fermions *(15 pages)* 053611
Mingyuan Sun and Xavier Leyronas

Feshbach modulation spectroscopy of the Fermi-Hubbard model *(5 pages)* 053612
Andreas Dirks, Karlis Mikelsons, H. R. Krishnamurthy, and J. K. Freericks

(Continued)

The editors and referees of PRA find these papers to be of particular interest, importance, or clarity. Please see our Announcement Phys. Rev. A 88, 020001 (2013).

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 92, NUMBER 5** **NOVEMBER 2015**

Raman-pulse-duration effect in gravity gradiometers composed of two atom interferometers *(4 pages)* 053613
Cheng-Gang Shao, De-Kai Mao, Min-Kang Zhou, Yu-Jie Tan, Le-Le Chen, Jun Luo, and Zhong-Kun Hu

Nonlinear dressed states at the miscibility-immiscibility threshold *(6 pages)* 053614
E. Nicklas, W. Muessel, H. Strobel, P. G. Kevrekidis, and M. K. Oberthaler

Effects of gapless bosonic fluctuations on Majorana fermions in an atomic wire coupled to a molecular reservoir *(24 pages)* 053615
Ying Hu and Mikhail A. Baranov

Superfluid phases of fermions with hybridized *s* and *p* orbitals *(12 pages)* 053616
Shaoyu Yin, J. E. Baarsma, M. O. J. Heikkinen, J.-P. Martikainen, and P. Törmä

Collective oscillations of a trapped quantum gas in low dimensions *(10 pages)* 053617
Giulia De Rosi and Sandro Stringari

℘ Phase diagram of the three-dimensional Anderson model for short-range speckle potentials *(8 pages)* 053618
M. Pasek, Z. Zhao, D. Delande, and G. Orso

Large-momentum-transfer Bragg interferometer with strontium atoms *(6 pages)* 053619
T. Mazzoni, X. Zhang, R. Del Aguila, L. Salvi, N. Poli, and G. M. Tino

Spectroscopic probes of isolated nonequilibrium quantum matter: Quantum quenches, Floquet states, and distribution functions *(19 pages)* 053620
Yunxiang Liao and Matthew S. Foster

Multidimensional discrete compactons in nonlinear Schrödinger lattices with strong nonlinearity management *(9 pages)* 053621
J. D'Ambroise, M. Salerno, P. G. Kevrekidis, and F. Kh. Abdullaev

Enhancing quantum coherence with short-range correlated disorder *(8 pages)* 053622
P. Capuzzi, M. Gattobigio, and P. Vignolo

Bosons with long-range interactions on two-leg ladders in artificial magnetic fields *(11 pages)* 053623
Stefan S. Natu

Absence of a four-body Efimov effect in the $2 + 2$ fermionic problem *(27 pages)* 053624
Shimpei Endo and Yvan Castin

Tunable defect interactions and supersolidity in dipolar quantum gases on a lattice potential *(9 pages)* 053625
Wolfgang Lechner, Fabio Cinti, and Guido Pupillo

Nonadiabatic dynamics of superfluid spin-orbit-coupled degenerate Fermi gas *(14 pages)* 053626
Maxim Dzero, Ammar A. Kirmani, and Emil A. Yuzbashyan

℘ $\mathcal{PT}$-symmetric currents of a Bose-Einstein condensate in a triple well *(6 pages)* 053627
Daniel Haag, Dennis Dast, Holger Cartarius, and Günter Wunner

Dynamics of Hubbard-band quasiparticles in disordered optical lattices *(14 pages)* 053628
V. W. Scarola and B. DeMarco

Sudden expansion and domain-wall melting of strongly interacting bosons in two-dimensional optical lattices and on multileg ladders *(15 pages)* 053629
Johannes Hauschild, Frank Pollmann, and Fabian Heidrich-Meisner

(Continued)

℘ The editors and referees of PRA find these papers to be of particular interest, importance, or clarity. Please see our Announcement Phys. Rev. A 88, 020001 (2013).

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 92, NUMBER 5** **NOVEMBER 2015**

Comparison between two models of absorption of matter waves by a thin time-dependent barrier *(14 pages)* 053630
Maximilien Barbier, Mathieu Beau, and Arseni Goussev

Fulde-Ferrell-Larkin-Ovchinnikov state of two-dimensional imbalanced Fermi gases *(15 pages)* 053631
Daniel E. Sheehy

Parametric-squeezing amplification of Bose-Einstein condensates *(8 pages)* 053632
Georg Jäger, Tarik Berrada, Jörg Schmiedmayer, Thorsten Schumm, and Ulrich Hohenester

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

Analytical study of quantum-feedback-enhanced Rabi oscillations *(6 pages)* 053801
Julia Kabuss, Dmitry O. Krimer, Stefan Rotter, Kai Stannigel, Andreas Knorr, and Alexander Carmele

Injection locking of a semiconductor double-quantum-dot micromaser *(7 pages)* 053802
Y.-Y. Liu, J. Stehlik, M. J. Gullans, J. M. Taylor, and J. R. Petta

Time-dependent phase shift of a retrieved pulse in off-resonant electromagnetically-induced-transparency–based light storage *(6 pages)* 053803
M.-A. Maynard, R. Bouchez, J. Lugani, F. Bretenaker, F. Goldfarb, and E. Brion

Transfer of non-Gaussian quantum states of mechanical oscillator to light *(9 pages)* 053804
Radim Filip and Andrey A. Rakhubovsky

Quantum interface to charged particles in a vacuum *(10 pages)* 053805
Hiroshi Okamoto

Intrinsic formation of electromagnetic divergence and rotation by parabolic focusing *(8 pages)* 053806
Kazunori Shibata, Mayuko Takai, Mitsuharu Uemoto, and Shinichi Watanabe

Timing jitter of passively-mode-locked semiconductor lasers subject to optical feedback: A semi-analytic approach *(11 pages)* 053807
Lina Jaurigue, Alexander Pimenov, Dmitrii Rachinskii, Eckehard Schöll, Kathy Lüdge, and Andrei G. Vladimirov

Low-power cross-phase modulation in a metastable xenon-filled cavity for quantum-information applications *(7 pages)* 053808
G. T. Hickman, T. B. Pittman, and J. D. Franson

Temporal coherence and correlation of counterpropagating twin photons *(13 pages)* 053809
A. Gatti, T. Corti, and E. Brambilla

Normalization of quasinormal modes in leaky optical cavities and plasmonic resonators *(9 pages)* 053810
Philip Trøst Kristensen, Rong-Chun Ge, and Stephen Hughes

Hybridization of plasmonic antenna and cavity modes: Extreme optics of nanoparticle-on-mirror nanogaps *(6 pages)* 053811
C. Tserkezis, R. Esteban, D. O. Sigle, J. Mertens, L. O. Herrmann, J. J. Baumberg, and J. Aizpurua

Quantum plasmonic sensing *(5 pages)* 053812
Wenjiang Fan, Benjamin J. Lawrie, and Raphael C. Pooser

Asymmetric transmission of surface plasmon polaritons on planar gratings *(9 pages)* 053813
V. Kuzmiak and A. A. Maradudin

(Continued)

The editors and referees of PRA find these papers to be of particular interest, importance, or clarity. Please see our Announcement Phys. Rev. A 88, 020001 (2013).

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 92, NUMBER 5** **NOVEMBER 2015**

Synchronization of qubit ensembles under optimized π-pulse driving *(6 pages)* 053814
Sergey V. Remizov, Dmitriy S. Shapiro, and Alexey N. Rubtsov

Passive $\mathcal{PT}$-symmetric couplers without complex optical potentials *(4 pages)* 053815
Yi-Chan Lee, Jibing Liu, You-Lin Chuang, Min-Hsiu Hsieh, and Ray-Kuang Lee

Features of the extreme events observed in an all-solid-state laser with a saturable absorber *(8 pages)* 053816
Carlos R. Bonazzola, Alejandro A. Hnilo, Marcelo G. Kovalsky, and Jorge R. Tredicce

Birefringence-induced frequency beating in high-finesse cavities by continuous-wave cavity ring-down spectroscopy *(14 pages)* 053817
Patrick Dupré

Strong squeezing in periodically modulated optical parametric oscillators *(9 pages)* 053818
Hayk H. Adamyan, János A. Bergou, Narine T. Gevorgyan, and Gagik Yu. Kryuchkyan

Mesoscopic quantum superposition of the generalized cat state: A diffraction limit *(6 pages)* 053819
Suranjana Ghosh, Raman Sharma, Utpal Roy, and Prasanta K. Panigrahi

Nonlinear spectroscopy of Sr atoms in an optical cavity for laser stabilization *(7 pages)* 053820
Bjarke T. R. Christensen, Martin R. Henriksen, Stefan A. Schäffer, Philip G. Westergaard, David Tieri, Jun Ye, Murray J. Holland, and Jan W. Thomsen

One- and two-mode squeezed light in correlated interferometry *(8 pages)* 053821
I. Ruo-Berchera, I. P. Degiovanni, S. Olivares, N. Samantaray, P. Traina, and M. Genovese

Topologically nontrivial Floquet band structure in a system undergoing photonic transitions in the ultrastrong-coupling regime *(6 pages)* 053822
Luqi Yuan and Shanhui Fan

Ground-state phase diagram of the quantum Rabi model *(13 pages)* 053823
Zu-Jian Ying, Maoxin Liu, Hong-Gang Luo, Hai-Qing Lin, and J. Q. You

Electromagnetically-induced-transparency–like phenomenon with resonant meta-atoms in a cavity *(8 pages)* 053824
Yueyun Hu, Wenxing Liu, Yong Sun, Xi Shi, Jun Jiang, Yaping Yang, Shiyao Zhu, Jörg Evers, and Hong Chen

Origin of quantum noise and decoherence in distributed amplifiers *(9 pages)* 053825
J. D. Franson and B. T. Kirby

Subwavelength transportation of light with atomic resonances *(6 pages)* 053826
Siu-Tat Chui, Shengwang Du, and Gyu-Boong Jo

Absolute optical instruments without spherical symmetry *(6 pages)* 053827
Tomáš Tyc, H. L. Dao, and Aaron J. Danner

Visualizing revivals and fractional revivals in a Kerr medium using an optical tomogram *(11 pages)* 053828
M. Rohith and C. Sudheesh

Multiplexed single-photon-state preparation using a fiber-loop architecture *(11 pages)* 053829
Peter P. Rohde, L. G. Helt, M. J. Steel, and Alexei Gilchrist

Frequency shift in three-photon resonant four-wave mixing by internal atom-field interaction *(6 pages)* 053830
Natalia R. de Melo and Sandra S. Vianna

(Continued)

The editors and referees of PRA find these papers to be of particular interest, importance, or clarity. Please see our Announcement Phys. Rev. A 88, 020001 (2013).

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 92, NUMBER 5** **NOVEMBER 2015**

Carrier-envelope phase dynamics of cavity solitons: Scaling law and soliton stability *(6 pages)* 053831
Chengying Bao and Changxi Yang

Molecular harmonic extension and enhancement from H_2^+ ions in the presence of spatially inhomogeneous fields *(10 pages)* 053832
Liqiang Feng

Time-resolved dynamics of odd and even harmonic emission from oriented asymmetric molecules *(8 pages)* 053833
Bing Zhang, Shujuan Yu, Yanjun Chen, Xiangqian Jiang, and Xiudong Sun

Multiphoton-scattering theory and generalized master equations *(20 pages)* 053834
Tao Shi, Darrick E. Chang, and J. Ignacio Cirac

Homodyne detection with on-off detector systems *(13 pages)* 053835
T. Lipfert, J. Sperling, and W. Vogel

Fields and propagation characteristics in vacuum of an ultrashort tightly focused radially polarized laser pulse *(7 pages)* 053836
Yousef I. Salamin

Proposal for enhanced photon blockade in parity-time-symmetric coupled microcavities *(8 pages)* 053837
Jiahua Li (李家华), Rong Yu (余荣), and Ying Wu (吴颖)

Localized plateau beam resulting from strong nonlocal coupling in a cavity filled by metamaterials and liquid-crystal cells *(7 pages)* 053838
M. Tlidi, C. Fernandez-Oto, M. G. Clerc, D. Escaff, and P. Kockaert

Impact of slow-light enhancement on optical propagation in active semiconductor photonic-crystal waveguides *(8 pages)* 053839
Yaohui Chen, Jakob Rosenkrantz de Lasson, Niels Gregersen, and Jesper Mørk

Narrow dip inside a natural linewidth absorption profile in a system of two atoms *(16 pages)* 053840
A. A. Makarov

Dual-path source engineering in integrated quantum optics *(6 pages)* 053841
Regina Kruse, Linda Sansoni, Sebastian Brauner, Raimund Ricken, Craig S. Hamilton, Igor Jex, and Christine Silberhorn

Breakdown of atomic hyperfine coupling in a deep optical-dipole trap *(7 pages)* 053842
Andreas Neuzner, Matthias Körber, Stephan Dürr, Gerhard Rempe, and Stephan Ritter

Polychromatic phase diagram for n-level atoms interacting with ℓ modes of an electromagnetic field *(15 pages)* 053843
S. Cordero, E. Nahmad-Achar, R. López-Peña, and O. Castaños

Classes of two-photon states defined by linear interactions and destructive two-photon quantum interference in a single mode *(6 pages)* 053844
A. P. Lund

Temperature sensitivity of the cavity scale factor enhancement for a Gaussian absorption resonance *(9 pages)* 053845
Krishna Myneni, David D. Smith, Hongrok Chang, and H. A. Luckay

Many-body physics of Rydberg dark-state polaritons in the strongly interacting regime *(11 pages)* 053846
Matthias Moos, Michael Höning, Razmik Unanyan, and Michael Fleischhauer

(Continued)

The editors and referees of PRA find these papers to be of particular interest, importance, or clarity. Please see our Announcement Phys. Rev. A 88, 020001 (2013).

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 92, NUMBER 5** **NOVEMBER 2015**

Dynamically controllable anisotropic metamaterials with simultaneous attenuation and amplification *(6 pages)* . . . 053847
Tom G. Mackay and Akhlesh Lakhtakia

Theory of Maxwell's fish eye with mutually interacting sources and drains *(8 pages)* 053848
Ulf Leonhardt and Sahar Sahebdivan

Effects of self- and cross-phase modulation on photon purity for four-wave-mixing photon pair sources *(10 pages)* 053849
Bryn Bell, Alex McMillan, Will McCutcheon, and John Rarity

Elliptic solitons in optical fiber media *(7 pages)* 053850
Défi Jr. Fandio Jubgang, Alain M. Dikandé, and A. Sunda-Meya

Soft-x-ray Cherenkov radiation generated by a charged particle moving near a finite-size screen *(14 pages)* 053851
M. Shevelev, A. Konkov, and A. Aryshev

Surface-plasmon-polariton–assisted dissipative backaction cooling and amplification *(7 pages)* 053852
Iman Hassani nia and Hooman Mohseni

Total transmission of inhomogeneous electromagnetic waves at planar interfaces *(6 pages)* 053853
Fabrizio Frezza and Nicola Tedeschi

Polarization modulation instability in a Manakov fiber system *(8 pages)* 053854
B. Frisquet, B. Kibler, J. Fatome, P. Morin, F. Baronio, M. Conforti, G. Millot, and S. Wabnitz

Excitable solitons in a semiconductor laser with a saturable absorber *(7 pages)* 053855
Margherita Turconi, Franco Prati, Stéphane Barland, and Giovanna Tissoni

Impedance matching of inverted conductors: Two-dimensional beam splitters with divergent gain *(5 pages)* 053856
Matthew Mecklenburg and B. C. Regan

Nonclassical light from an incoherently pumped quantum dot in a microcavity *(9 pages)* 053857
L. Teuber, P. Grünwald, and W. Vogel

Experimental demonstration of phase bistability in a broad-area optical oscillator with injected signal *(4 pages)* 053858
R. Martínez-Lorente, A. Esteban-Martín, E. Roldán, K. Staliunas, G. J. de Valcárcel, and F. Silva

Dynamically induced two-color nonreciprocity in a tripod system of a moving atomic lattice *(7 pages)* 053859
Liu Yang, Yan Zhang, Xiao-Bo Yan, Ying Sheng, Cui-Li Cui, and Jin-Hui Wu

Monomorphous decomposition method and its application for phase retrieval and phase-contrast tomography *(10 pages)* 053860
T. E. Gureyev, Ya. I. Nesterets, and D. M. Paganin

Projective filtering of the fundamental eigenmode from spatially multimode radiation *(9 pages)* 053861
A. M. Pérez, P. R. Sharapova, S. S. Straupe, F. M. Miatto, O. V. Tikhonova, G. Leuchs, and M. V. Chekhova

COMMENTS

Comment on "Nonlinear fluctuations and dissipation in matter revealed by quantum light" *(3 pages)* 057801
M. Kira, S. W. Koch, and S. T. Cundiff

Reply to "Comment on 'Nonlinear fluctuations and dissipation in matter revealed by quantum light' " *(3 pages)* . . 057802
Shaul Mukamel and Konstantin E. Dorfman

(Continued)

The editors and referees of PRA find these papers to be of particular interest, importance, or clarity. Please see our Announcement Phys. Rev. A 88, 020001 (2013).

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 92, NUMBER 5** **NOVEMBER 2015**

Comment on "Guided electromagnetic waves propagating in a plane dielectric waveguide with nonlinear permittivity" *(3 pages)* 057803
Hans Werner Schürmann and Valery Serov

Reply to "Comment on 'Guided electromagnetic waves propagating in a plane dielectric waveguide with nonlinear permittivity' " *(2 pages)* 057804
Yury G. Smirnov and Dmitry V. Valovik

ERRATA

Erratum: Generalized quantum state discrimination problems [Phys. Rev. A **91**, 052304 (2015)] *(1 page)* . . . . . 059901(E)
Kenji Nakahira, Kentaro Kato, and Tsuyoshi Sasaki Usuda

Erratum: Many-body localization and thermalization in disordered Hubbard chains [Phys. Rev. A **92**, 041601(R) (2015)] *(1 page)* . . . . . 059902(E)
Rubem Mondaini and Marcos Rigol

Publisher's Note: Relaxation dynamics of ultracold bosons in a double-well potential: Thermalization and prethermalization in a nearly integrable model [Phys. Rev. A **92**, 033607 (2015)] *(1 page)* . . . . . 059903(E)
Jayson G. Cosme and Oleksandr Fialko

Publisher's Note: Hilbert transform: Applications to atomic spectra [Phys. Rev. A **91**, 032513 (2015)] *(1 page)* . . . 059904(E)
Kate A. Whittaker, James Keaveney, Ifan G. Hughes, and Charles S. Adams