

*The Table of Contents is a total listing of Parts A and B.
Part A consists of pages 020101(R)–022717, and Part B pages 023401–029907(E).*

PART A

RAPID COMMUNICATIONS

Fundamental concepts

- Efficient entanglement criteria for discrete, continuous, and hybrid variables (6 pages) 020101(R)
Manuel Gessner, Luca Pezzè, and Augusto Smerzi
- ☞ Bell inequalities for quantum optical fields (6 pages) 020102(R)
Marek Żukowski, Marcin Wieśniak, and Wiesław Laskowski
- Sufficient conditions for a memory-kernel master equation (6 pages) 020103(R)
Dariusz Chruściński and Andrzej Kossakowski
- From many-particle interference to correlation spectroscopy (6 pages) 020104(R)
Mattia Walschaers, Jack Kuipers, and Andreas Buchleitner
- Quantum-polarization state tomography (5 pages) 020105(R)
Ömer Bayraktar, Marcin Swillo, Carlota Canalias, and Gunnar Björk

Quantum information

- ☞ Experimental quantum data locking (5 pages) 020301(R)
Yang Liu, Zhu Cao, Cheng Wu, Daiji Fukuda, Lixing You, Jiaqiang Zhong, Takayuki Numata, Sijing Chen, Weijun Zhang, Sheng-Cai Shi, Chao-Yang Lu, Zhen Wang, Xiongfeng Ma, Jingyun Fan, Qiang Zhang, and Jian-Wei Pan
- Quantitative bound entanglement in two-qutrit states (5 pages) 020302(R)
Gael Sentís, Christopher Eltschka, and Jens Siewert

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

- Diamond-nitrogen-vacancy electronic and nuclear spin-state anticrossings under weak transverse magnetic fields (6 pages) 021401(R)
Hannah Clevenson, Edward H. Chen, Florian Dolde, Carson Teale, Dirk Englund, and Danielle Braje



Copyright 2016 by American Physical Society

(Continued)



2469-9926(201608)94:2:A;1-I

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

☞ 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).

CONTENTS - *Continued*

PHYSICAL REVIEW A

THIRD SERIES, VOLUME 94, NUMBER 2

AUGUST 2016

Matter waves and collective properties of cold atoms and molecules

- Disappearance of quasiparticles in a Bose lattice gas (*5 pages*) 021601(R)
David Chen, Carolyn Meldgin, Philip Russ, Brian DeMarco, and Erich Mueller

- Self-bound dipolar droplet: A localized matter wave in free space (*5 pages*) 021602(R)
D. Baillie, R. M. Wilson, R. N. Bisset, and P. B. Blakie

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

- Instability of bosonic topological edge states in the presence of interactions (*6 pages*) 021801(R)
Yaakov Lumer, Mikael C. Rechtsman, Yonatan Plotnik, and Mordechai Segev

- Near-resonant four-wave mixing of attosecond extreme-ultraviolet pulses with near-infrared pulses in neon:
Detection of electronic coherences (*5 pages*) 021802(R)
Wei Cao, Erika R. Warrick, Ashley Fidler, Stephen R. Leone, and Daniel M. Neumark

- Tighter spots of light with superposed orbital-angular-momentum beams (*5 pages*) 021803(R)
Paweł Woźniak, Peter Banzer, Frédéric Bouchard, Ebrahim Karimi, Gerd Leuchs, and Robert W. Boyd

- Hanbury Brown and Twiss anticorrelation in disordered photonic lattices (*4 pages*) 021804(R)
H. Esat Kondakci, Lane Martin, Robert Keil, Armando Perez-Leija, Alexander Szameit, Ayman F. Abouraddy, Demetrios N. Christodoulides, and Bahaa E. A. Saleh

ARTICLES

Fundamental concepts

- Approximations for the free evolution of self-gravitating quantum particles (*6 pages*) 022101
André Großardt

- Tight-binding lattices with an oscillating imaginary gauge field (*9 pages*) 022102
Stefano Longhi

- Time evolution of initial states that extend beyond the potential interaction region in quantum
decay (*10 pages*) 022103
Gastón García-Calderón, Jorge Villavicencio, Alberto Hernández-Maldonado, and Roberto Romo

- Virtual-detector approach to tunnel ionization and tunneling times (*10 pages*) 022104
Nicolas Teeny, Christoph H. Keitel, and Heiko Bauke

- Higher-order time-symmetry-breaking phase transition due to meeting of an exceptional point
and a Fano resonance (*11 pages*) 022105
Satoshi Tanaka, Savannah Garmon, Kazuki Kanki, and Tomio Petrosky

- Simple state preparation for contextuality tests with few observables (*4 pages*) 022106
S. Camalet

- Violation of Bell inequality based on S_4 symmetry (*9 pages*) 022107
Katarzyna Bolonek-Lasoń

- Exactly solvable time-dependent models of two interacting two-level systems (*13 pages*) 022108
R. Grimaudo, A. Messina, and H. Nakazato

(Continued)

CONTENTS - Continued

PHYSICAL REVIEW A

THIRD SERIES, VOLUME 94, NUMBER 2

AUGUST 2016

Adaptive strategy for joint measurements (9 pages)	022109
Roope Uola, Kimmo Luoma, Tobias Moroder, and Teiko Heinosaari	
Hierarchy of multipartite nonlocality in the nonsignaling scenario (5 pages)	022110
Xiaoxu Wang, Chengjie Zhang, Qing Chen, Sixia Yu, Haidong Yuan, and C. H. Oh	
Improved limits on interactions of low-mass spin-0 dark matter from atomic clock spectroscopy (5 pages)	022111
Y. V. Stadnik and V. V. Flambaum	
Coherence susceptibility as a probe of quantum phase transitions (7 pages)	022112
Jin-Jun Chen, Jian Cui, Yu-Ran Zhang, and Heng Fan	
Fast universal performance certification of measurement schemes for quantum tomography (8 pages)	022113
Dominik Koutný, Yong Siah Teo, Zdeněk Hradil, and Jaroslav Řeháček	
Semiclassical spectral function and density of states in speckle potentials (16 pages)	022114
Tony Prat, Nicolas Cherroret, and Dominique Delande	
Quantum statistical effects in multichannel wave-packet scattering of noninteracting identical particles (9 pages)	022115
D. Sokolovski and L. M. Baskin	
Nonlocal games and optimal steering at the boundary of the quantum set (8 pages)	022116
Yi-Zheng Zhen, Koon Tong Goh, Yu-Lin Zheng, Wen-Fei Cao, Xingyao Wu, Kai Chen, and Valerio Scarani	
Nonresonant two-photon transitions in length and velocity gauges (7 pages)	022117
U. D. Jentschura	
Generalized Pauli channels and a class of non-Markovian quantum evolution (6 pages)	022118
Dariusz Chruściński and Katarzyna Siudzińska	
Non-Hermitian Kitaev chain with complex on-site potentials (7 pages)	022119
Qi-Bo Zeng, Baogang Zhu, Shu Chen, L. You, and Rong Lü	
Aspects of the decoherence in high-spin environments: Breakdown of the mean-field approximation (13 pages)	022120
Yamen Hamdouni	
Repeatability of measurements: Non-Hermitian observables and quantum Coriolis force (5 pages)	022121
Bartłomiej Gardas, Sebastian Deffner, and Avadh Saxena	
Spin dynamics in Kapitza-Dirac scattering of electrons from bichromatic laser fields (10 pages)	022122
Matthias M. Dellweg, Hani M. Awwad, and Carsten Müller	
Berry phase and quantum entanglement in Majorana's stellar representation (13 pages)	022123
H. D. Liu and L. B. Fu	
Quantum information	
Perfect state transfer by means of discrete-time quantum walk search algorithms on highly symmetric graphs (8 pages)	022301
M. Štefaňák and S. Skoupý	

(Continued)

CONTENTS - *Continued*

PHYSICAL REVIEW A

THIRD SERIES, VOLUME 94, NUMBER 2

AUGUST 2016

Realizing a topological transition in a non-Hermitian quantum walk with circuit QED (9 pages)	022302
Yizhou Huang, Zhang-qi Yin, and W. L. Yang	
High-fidelity two-qubit gates via dynamical decoupling of local $1/f$ noise at the optimal point (11 pages)	022303
A. D'Arrigo, G. Falci, and E. Paladino	
Engineering the success of quantum walk search using weighted graphs (10 pages)	022304
Thomas G. Wong and Pascal Philipp	
Completely device-independent quantum key distribution (9 pages)	022305
Edgar A. Aguilar, Ravishankar Ramanathan, Johannes Kofler, and Marcin Pawłowski	
Thermal stability of the two-dimensional topological color code (11 pages)	022306
Razieh Mohseninia	
Entangling and assisted entangling power of bipartite unitary operations (18 pages)	022307
Lin Chen and Li Yu	
Estimation of effective temperatures in quantum annealers for sampling applications: A case study with possible applications in deep learning (13 pages)	022308
Marcello Benedetti, John Realpe-Gómez, Rupak Biswas, and Alejandro Perdomo-Ortiz	
Training a quantum optimizer (11 pages)	022309
Dave Wecker, Matthew B. Hastings, and Matthias Troyer	
Operational meaning of quantum measures of recovery (8 pages)	022310
Tom Cooney, Christoph Hirche, Ciara Morgan, Jonathan P. Olson, Kaushik P. Seshadreesan, John Watrous, and Mark M. Wilde	
Entanglement as a resource for local state discrimination in multipartite systems (7 pages)	022311
Somshubhro Bandyopadhyay, Saronath Halder, and Michael Nathanson	
Origins and optimization of entanglement in plasmonically coupled quantum dots (15 pages)	022312
Matthew Otten, Jeffrey Larson, Misun Min, Stefan M. Wild, Matthew Pelton, and Stephen K. Gray	
 Measurement of a microwave field amplitude beyond the standard quantum limit (6 pages)	022313
M. Penasa, S. Gerlich, T. Rybarczyk, V. Métillon, M. Brune, J. M. Raimond, S. Haroche, L. Davidovich, and I. Dotsenko	
Duality in entanglement of macroscopic states of light (5 pages)	022314
Su-Yong Lee, Chang-Woo Lee, Paweł Kurzyński, Dagomir Kaszlikowski, and Jaewan Kim	
 Quantum enigma machine: Experimentally demonstrating quantum data locking (10 pages)	022315
Daniel J. Lum, John C. Howell, M. S. Allman, Thomas Gerrits, Varun B. Verma, Sae Woo Nam, Cosmo Lupo, and Seth Lloyd	
Generation of concurrence between two qubits locally coupled to a one-dimensional spin chain (12 pages)	022316
Tanay Nag and Amit Dutta	
Digital quantum simulation of many-body non-Markovian dynamics (12 pages)	022317
R. Sweke, M. Sanz, I. Sinayskiy, F. Petruccione, and E. Solano	
Popescu-Rohrlich correlations imply efficient instantaneous nonlocal quantum computation (4 pages)	022318
Anne Broadbent	

(Continued)

CONTENTS - *Continued*

PHYSICAL REVIEW A

THIRD SERIES, VOLUME 94, NUMBER 2

AUGUST 2016

Quantum simulation with a boson sampling circuit (8 pages)	022319
Diego González Olivares, Borja Peropadre, Alán Aspuru-Guzik, and Juan José García-Ripoll	
Implementation of bipartite or remote unitary gates with repeater nodes (22 pages)	022320
Li Yu and Kae Nemoto	
Certified randomness from a two-level system in a relativistic quantum field (12 pages)	022321
Le Phuc Thinh, Jean-Daniel Bancal, and Eduardo Martín-Martínez	
Optimal measurements for nonlocal correlations (13 pages)	022322
Sacha Schwarz, André Stefanov, Stefan Wolf, and Alberto Montina	
Entanglement-fluctuation relation for bipartite pure states (6 pages)	022323
Aura Mae B. Villaruel and Francis N. C. Paraan	
Geometric approach to entanglement quantification with polynomial measures (12 pages)	022324
Bartosz Regula and Gerardo Adesso	
Quantum information processing in phase space: A modular variables approach (14 pages)	022325
A. Ketterer, A. Keller, S. P. Walborn, T. Coudreau, and P. Milman	
Effect of component variations on the gate fidelity in linear optical networks (6 pages)	022326
Jonathan Crickmore, Jonathan Frazer, Scott Shaw, and Pieter Kok	
Simulated-quantum-annealing comparison between all-to-all connectivity schemes (18 pages)	022327
Tameem Albash, Walter Vinci, and Daniel A. Lidar	
Measurement-device-independent quantum digital signatures (11 pages)	022328
Ittoop Verghese Puthoor, Ryan Amiri, Petros Wallden, Marcos Curty, and Erika Andersson	
Unified view of quantum correlations and quantum coherence (8 pages)	022329
Kok Chuan Tan, Hyukjoon Kwon, Chae-Yeun Park, and Hyunseok Jeong	
Force sensors with precision beyond the standard quantum limit (7 pages)	022330
Peter A. Ivanov	
Nonadiabatic holonomic quantum computation with all-resonant control (8 pages)	022331
Zheng-Yuan Xue, Jian Zhou, Yao-Ming Chu, and Yong Hu	
Security of the differential-quadrature-phase-shift quantum key distribution (12 pages)	022332
Shun Kawakami, Toshihiko Sasaki, and Masato Koashi	
Self-tallying quantum anonymous voting (11 pages)	022333
Qingle Wang, Chaohua Yu, Fei Gao, Haoyu Qi, and Qiaoyan Wen	
Optimizing qubit phase estimation (14 pages)	022334
François Chapeau-Blondeau	
Communication capacity of mixed quantum t -designs (8 pages)	022335
Sarah Brandsen, Michele Dall'Arno, and Anna Szymusiak	
Generalized geometric measure of entanglement for multiparty mixed states (8 pages)	022336
Tamoghna Das, Sudipto Singha Roy, Shrobona Bagchi, Avijit Misra, Aditi Sen(De), and Ujjwal Sen	

(Continued)

Strengths and weaknesses of weak-strong cluster problems: A detailed overview of state-of-the-art classical heuristics versus quantum approaches (<i>13 pages</i>)	022337
Salvatore Mandrà, Zheng Zhu, Wenlong Wang, Alejandro Perdomo-Ortiz, and Helmut G. Katzgraber	
Tight bound on the classical value of generalized Clauser-Horne-Shimony-Holt games (<i>5 pages</i>)	022338
Matej Pivoluska, Marcin Pawłowski, and Martin Plesch	
Entanglement swapping between dissipative systems (<i>9 pages</i>)	022339
A. Nourmandipour and M. K. Tavassoly	
Quantum conditional operations (<i>7 pages</i>)	022340
Alessandro Bisio, Michele Dall'Arno, and Paolo Perinotti	
Minimum output entropy of a non-Gaussian quantum channel (<i>6 pages</i>)	022341
Laleh Memarzadeh and Stefano Mancini	
Prediction by linear regression on a quantum computer (<i>5 pages</i>)	022342
Maria Schuld, Ilya Sinayskiy, and Francesco Petruccione	
Hyperparallel optical quantum computation assisted by atomic ensembles embedded in double-sided optical cavities (<i>10 pages</i>)	022343
Tao Li (李涛) and Gui-Lu Long (龙桂鲁)	
Simple permutation-based measure of quantum correlations and maximally-3-tangled states (<i>14 pages</i>)	022344
Udaysinh T. Bhosale and Arul Lakshminarayan	
Atomic and molecular structure and dynamics	
Effect of higher-order multipole moments on the Stark line shape (<i>6 pages</i>)	022501
T. A. Gomez, T. Nagayama, D. P. Kilcrease, M. H. Montgomery, and D. E. Winget	
Weighted difference of g factors of light Li-like and H-like ions for an improved determination of the fine-structure constant (<i>10 pages</i>)	022502
V. A. Yerokhin, E. Berseneva, Z. Harman, I. I. Tupitsyn, and C. H. Keitel	
Observation of hyperfine interaction in photoassociation spectra of ultracold RbYb (<i>6 pages</i>)	022503
C. Bruni and A. Görlitz	
Analytic calculation of the edge components of the angular Fock coefficients (<i>13 pages</i>)	022504
Evgeny Z. Liverts	
Microwave spectroscopy of the cold rubidium $(n + 1)d_{5/2} \rightarrow ng$ and nh transitions (<i>8 pages</i>)	022505
Jeonghun Lee, J. Nunkaew, and T. F. Gallagher	
Two-particle atomic coalescences: Boundary conditions for the Fock coefficient components (<i>13 pages</i>)	022506
Evgeny Z. Liverts	
Measurement of the binding energy of ultracold $^{87}\text{Rb}^{133}\text{Cs}$ molecules using an offset-free optical frequency comb (<i>8 pages</i>)	022507
Peter K. Molony, Avinash Kumar, Philip D. Gregory, Russell Kliese, Thomas Puppe, C. Ruth Le Sueur, Jesus Aldegunde, Jeremy M. Hutson, and Simon L. Cornish	
Benchmarking a modified version of the CIV3 nonrelativistic atomic-structure code within Na-like-tungsten R -matrix calculations (<i>9 pages</i>)	022508
M. D. Turkington, C. P. Ballance, A. Hibbert, and C. A. Ramsbottom	

(Continued)

CONTENTS - *Continued*

PHYSICAL REVIEW A

THIRD SERIES, VOLUME 94, NUMBER 2

AUGUST 2016

Spectroscopic probe of the van der Waals interaction between polar molecules and a curved surface (<i>8 pages</i>) . . .	022509
Giuseppe Bimonte, Thorsten Emig, R. L. Jaffe, and Mehran Kardar	
Theory of noncontact friction for atom-surface interactions (<i>9 pages</i>)	022510
U. D. Jentschura, M. Janke, and M. DeKieviet	
Light trapping in an ensemble of pointlike impurity centers in a Fabry-Perot cavity (<i>10 pages</i>)	022511
A. S. Kuraptsev and I. M. Sokolov	
Inner-shell magnetic dipole transition in Tm atoms: A candidate for optical lattice clocks (<i>12 pages</i>)	022512
D. Sukachev, S. Fedorov, I. Tolstikhina, D. Tregubov, E. Kalganova, G. Vishnyakova, A. Golovizin, N. Kolachevsky, K. Khabarova, and V. Sorokin	
Momentum distribution of positronium and its interactions with oxygen molecules studied by coincidence Doppler broadening spectroscopy (<i>6 pages</i>)	022513
Yawei Zhou, Jingjing Li, Chongshan Yin, Wenfeng Mao, Juncheng Wang, and Chunqing He	
Mean-square radii of two-component three-body systems in two spatial dimensions (<i>10 pages</i>)	022514
J. H. Sandoval, F. F. Bellotti, A. S. Jensen, and M. T. Yamashita	
Measurement of the scalar polarizability of the indium $6p_{1/2}$ state using two-step atomic-beam spectroscopy (<i>8 pages</i>)	022515
Benjamin L. Augenbraun, Allison Carter, P. M. Rupasinghe, and P. K. Majumder	
Rydberg and continuum states of the HeH^+ molecular ion: Variational R -matrix and multichannel quantum defect theory calculations (<i>9 pages</i>)	022516
I. Bouhali, S. Bezzaouia, M. Telmini, and Ch. Jungen	
Atomic and molecular collisions and interactions	
Electron-beam transmission through a micrometer-sized tapered-glass capillary: Dependence on incident energy and angular tilt angle (<i>10 pages</i>)	022701
S. J. Wickramarachchi, T. Ikeda, B. S. Dassanayake, D. Keerthisinghe, and J. A. Tanis	
Dissociative recombination of N_2H^+ (<i>10 pages</i>)	022702
S. Fonseca dos Santos, V. Ngassam, A. E. Orel, and Å. Larson	
Wave-packet continuum-discretization approach to ion-atom collisions: Nonrearrangement scattering (<i>13 pages</i>)	022703
I. B. Abdurakhmanov, A. S. Kadyrov, and I. Bray	
Confinement-induced resonances in ultracold atom-ion systems (<i>8 pages</i>)	022704
V. S. Melezhik and A. Negretti	
Calculations of long-range three-body interactions for $\text{Li}(2^2S)\text{-Li}(2^2S)\text{-Li}(2^2P)$ (<i>21 pages</i>)	022705
Pei-Gen Yan, Li-Yan Tang, Zong-Chao Yan, and James F. Babb	
Scattering framework for two particles with isotropic spin-orbit coupling applicable to all energies (<i>15 pages</i>) . . .	022706
Q. Guan and D. Blume	
Thermodynamic model for electron emission and negative- and positive-ion formation in keV molecular collisions (<i>19 pages</i>)	022707
Z. Juhász	

(Continued)

CONTENTS - *Continued*

PHYSICAL REVIEW A

THIRD SERIES, VOLUME 94, NUMBER 2

AUGUST 2016

Higher-order corrections to electron-nucleus bremsstrahlung cross sections above a few MeV (<i>12 pages</i>)	022708
A. Mangiarotti and M. N. Martins	
Theoretical study of mutual neutralization in $\text{He}^+ + \text{H}^-$ collisions (<i>9 pages</i>)	022709
Åsa Larson, Sifiso M. Nkambule, and Ann E. Orel	
Switching classical trajectory Monte Carlo method to describe two-active-electron collisions (<i>6 pages</i>)	022710
A. Jorge, Clara Illescas, L. Méndez, and B. Pons	
van der Waals effects on grazing-incidence fast-atom diffraction for H on LiF(001) (<i>11 pages</i>)	022711
G. A. Bocan, J. D. Fuhr, and M. S. Gravielle	
Water fragmentation by bare and dressed light ions with MeV energies: Fragment-ion-energy and time-of-flight distributions (<i>11 pages</i>)	022712
W. Wolff, H. Luna, R. Schuch, N. D. Cariatore, S. Otranto, F. Turco, D. Fregenal, G. Bernardi, and S. Suárez	
Theory of inelastic confinement-induced resonances due to the coupling of center-of-mass and relative motion (<i>13 pages</i>)	022713
Simon Sala and Alejandro Saenz	
Cross section for Rydberg antihydrogen production via charge exchange between Rydberg positroniums and antiprotons in a magnetic field (<i>14 pages</i>)	022714
D. Krasnický, R. Caravita, C. Canali, and G. Testera	
Comparison of experimental and theoretical fully differential cross sections for single ionization of the $2s$ and $2p$ states of Li by O^{8+} ions (<i>9 pages</i>)	022715
Ebrahim Ghanbari-Adivi, Daniel Fischer, Natalia Ferreira, Johannes Goullon, Renate Hubele, Aaron LaForge, Michael Schulz, and Don Madison	
Spatial confinement of muonium atoms (<i>5 pages</i>)	022716
K. S. Khaw, A. Antognini, T. Prokscha, K. Kirch, L. Liskay, Z. Salman, and P. Crivelli	
Evolution of the energy-loss-spectrum profile with the projectile mass in impulsive ion-molecule collisions (<i>7 pages</i>)	022717
Masato Nakamura and Atsushi Ichimura	

PART B

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

Motional-mode analysis of trapped ions (<i>6 pages</i>)	023401
Henning Kalis, Frederick Hakelberg, Matthias Wittemer, Manuel Mielenz, Ulrich Warring, and Tobias Schaetz	
Low-energy photodetachment of Ga^- and elastic electron scattering from neutral Ga (<i>8 pages</i>)	023402
Kedong Wang, Oleg Zatsarinny, and Klaus Bartschat	
Reconstruction of an excited-state molecular wave packet with attosecond transient absorption spectroscopy (<i>10 pages</i>)	023403
Yan Cheng, Michael Chini, Xiaowei Wang, Alberto González-Castrillo, Alicia Palacios, Luca Argenti, Fernando Martín, and Zenghu Chang	
Stimulated Raman adiabatic passage for improved performance of a cold-atom electron and ion source (<i>8 pages</i>)	023404
B. M. Sparkes, D. Murphy, R. J. Taylor, R. W. Speirs, A. J. McCulloch, and R. E. Scholten	

(Continued)

CONTENTS - Continued

PHYSICAL REVIEW A

THIRD SERIES, VOLUME 94, NUMBER 2

AUGUST 2016

Time-dependent complete-active-space self-consistent-field method for atoms: Application to high-order harmonic generation (14 pages)	023405
Takeshi Sato, Kenichi L. Ishikawa, Iva Březinová, Fabian Lackner, Stefan Nagele, and Joachim Burgdörfer	
Shifting nodal-plane suppressions in high-order-harmonic spectra from diatomic molecules in orthogonally polarized driving fields (10 pages)	023406
T. Das and C. Figueira de Morisson Faria	
One- and two-photon detachment of O^- (11 pages)	023407
Matthieu Génévriez, Xavier Urbain, Arnaud Dochain, Alain Cyr, Kevin M. Dunseath, and Mariko Terao-Dunseath	
Large energy superpositions via Rydberg dressing (9 pages)	023408
Mohammadsadegh Khazali, Hon Wai Lau, Adam Humeniuk, and Christoph Simon	
Azimuthal dependence of the Garton-Tomkins orbit in crossed magnetic and electric fields (25 pages)	023409
C. Bleasdale, R. A. Lewis, and A. Bruno-Alfonso	
Deconvoluting nonaxial recoil in Coulomb explosion measurements of molecular axis alignment (10 pages)	023410
Lauge Christensen, Lars Christiansen, Benjamin Shepperson, and Henrik Stapelfeldt	
Steering continuum electron dynamics by low-energy attosecond streaking (5 pages)	023411
Ji-Wei Geng, Wei-Hao Xiong, Xiang-Ru Xiao, Qihuang Gong, and Liang-You Peng	
Selective excitation in a three-state system using a hybrid adiabatic-nonadiabatic interaction (7 pages)	023412
Yunheung Song, Han-gyeol Lee, Hanlae Jo, and Jaewook Ahn	
Photoassociative cooling and trapping of a pair of interacting atoms (11 pages)	023413
Subrata Saha, Somnath Naskar, and Bimalendu Deb	
Alignment dependence of photoelectron momentum distributions of atomic and molecular targets probed by few-cycle circularly polarized laser pulses (8 pages)	023414
M. Abu-samha and Lars Bojer Madsen	
Preparation of circular Rydberg states in helium using the crossed-fields method (9 pages)	023415
V. Zhelyazkova and S. D. Hogan	
Ramsey interferometry for resonant Auger decay through core-excited states (7 pages)	023417
Souvik Chatterjee and Takashi Nakajima	
Determination of magic wavelengths for the $7s\ ^2S_{1/2} - 7p\ ^2P_{3/2,1/2}$ transitions in Fr (10 pages)	023418
Sukhjit Singh, B. K. Sahoo, and Bindiya Arora	
Enhanced high-order harmonic generation from periodic potentials in inhomogeneous laser fields (5 pages)	023419
Tao-Yuan Du, Zhong Guan, Xiao-Xin Zhou, and Xue-Bin Bian	
Maximizing hole coherence in ultrafast photoionization of argon with an optimization by sequential parametrization update (12 pages)	023420
R. Esteban Goetz, Maximilian Merkel, Antonia Karamatskou, Robin Santra, and Christiane P. Koch	
Inversion of strong-field photoelectron spectra for molecular orbital imaging (12 pages)	023421
R. Puthumpally-Joseph, J. Viau-Trudel, M. Peters, T. T. Nguyen-Dang, O. Atabek, and E. Charron	

(Continued)

X-ray multiphoton ionization dynamics of a water molecule irradiated by an x-ray free-electron laser pulse (8 pages)	023422
Ludger Inhester, Kota Hanasaki, Yajiang Hao (郝亚江), Sang-Kil Son (손상길), and Robin Santra	
Influence of the initial angular distribution on strong-field molecular dissociation (6 pages)	023423
Youliang Yu, Shuo Zeng, J. V. Hernández, Yujun Wang, and B. D. Esry	
Matter waves and collective properties of cold atoms and molecules	
Effects of long-range hopping and interactions on quantum walks in ordered and disordered lattices (9 pages)	023601
T. Chattaraj and R. V. Krems	
Theory of the vortex-clustering transition in a confined two-dimensional quantum fluid (11 pages)	023602
Xiaoquan Yu, Thomas P. Billam, Jun Nian, Matthew T. Reeves, and Ashton S. Bradley	
Effect of anisotropic exchange interactions and short-range phenomena on superfluidity in a homogeneous dipolar Fermi gas (9 pages)	023603
I. Corro and A. M. Martin	
Ballistic quench-induced correlation waves in ultracold gases (10 pages)	023604
John P. Corson and John L. Bohn	
Quantum rotor theory of systems of spin-2 bosons (12 pages)	023605
Matjaž Payrits and Ryan Barnett	
Momentum distributions and numerical methods for strongly interacting one-dimensional spinor gases (15 pages)	023606
F. Deuretzbacher, D. Becker, and L. Santos	
Sudden-quench dynamics of Bardeen-Cooper-Schrieffer states in deep optical lattices (12 pages)	023607
Marlon Nuske, L. Mathey, and Eite Tiesinga	
Coarsening and thermalization properties of a quenched ferromagnetic spin-1 condensate (13 pages)	023608
Lewis A. Williamson and P. B. Blakie	
Cotraping different species in ion traps using multiple radio frequencies (9 pages)	023609
Dimitris Trypogeorgos and Christopher J. Foot	
String order via Floquet interactions in atomic systems (7 pages)	023610
Tony E. Lee, Yogesh N. Joglekar, and Philip Richerme	
Superfluid transition in the attractive Hofstadter-Hubbard model (8 pages)	023611
R. O. Umucalılar and M. Iskin	
☞ Light scattering from dense cold atomic media (13 pages)	023612
Bihui Zhu, John Cooper, Jun Ye, and Ana Maria Rey	
Phase diagram of dipolar hard-core bosons on a honeycomb lattice (10 pages)	023613
Takashi Nakafuji, Takeshi Ito, Yuya Nagamori, and Ikuo Ichinose	
Generalized gradient expansion for inhomogeneous dynamical mean-field theory: Application to ultracold atoms in a harmonic trap (14 pages)	023614
J. K. Freericks, Shuyang Han, Karlis Mielsons, and H. R. Krishnamurthy	

(Continued)

CONTENTS - *Continued*

PHYSICAL REVIEW A

THIRD SERIES, VOLUME 94, NUMBER 2

AUGUST 2016

Engineering interactions and anyon statistics by multicolor lattice-depth modulations (9 pages)	023615
Lorenzo Cardarelli, Sebastian Greschner, and Luis Santos	
Rabi-coupled two-component Bose-Einstein condensates: Classification of the ground states, defects, and energy estimates (12 pages)	023616
Amandine Aftalion and Peter Mason	
Skyrmionic vortex lattices in coherently coupled three-component Bose-Einstein condensates (12 pages)	023617
Natalia V. Orlova, Pekko Kuopanportti, and Milorad V. Milošević	
Asymmetric sequential Landau-Zener dynamics of Bose-condensed atoms in a cavity (13 pages)	023618
Jiahao Huang (黄嘉豪), Pu Gong (龚璞), Xizhou Qin (秦锡洲), Honghua Zhong (钟宏华), and Chaohong Lee (李朝红)	
Creating Feshbach resonances for ultracold molecule formation with radio-frequency fields (5 pages)	023619
Daniel J. Owens, Ting Xie, and Jeremy M. Hutson	
Finite-temperature vortices in a rotating Fermi gas (13 pages)	023620
S. N. Klimin, J. Tempere, N. Verhelst, and M. V. Milošević	
Impact of Casimir-Polder interaction on Poisson-spot diffraction at a dielectric sphere (11 pages)	023621
Joshua L. Hemmerich, Robert Bennett, Thomas Reisinger, Stefan Nimmrichter, Johannes Fiedler, Horst Hahn, Herbert Gleiter, and Stefan Yoshi Buhmann	
Quantized conductance through the quantum evaporation of bosonic atoms (6 pages)	023622
D. J. Papoular, L. P. Pitaevskii, and S. Stringari	
Single-shot simulations of dynamics of quantum dark solitons (11 pages)	023623
Andrzej Syrwid, Mirosław Brewczyk, Mariusz Gajda, and Krzysztof Sacha	
Time-optimal quantum control of nonlinear two-level systems (7 pages)	023624
Xi Chen, Yue Ban, and Gerhard C. Hegerfeldt	
Optical pumping effect in absorption imaging of $F = 1$ atomic gases (6 pages)	023625
Sooshin Kim, Sang Won Seo, Heung-Ryoul Noh, and Y. Shin	
Superfluid transport dynamics in a capacitive atomtronic circuit (12 pages)	023626
Aijun Li, Stephen Eckel, Benjamin Eller, Kayla E. Warren, Charles W. Clark, and Mark Edwards	
Transition from vortices to solitonic vortices in trapped atomic Bose-Einstein condensates (7 pages)	023627
M. C. Tsatsos, M. J. Edmonds, and N. G. Parker	
Creation and counting of defects in a temperature-quenched Bose-Einstein condensate (8 pages)	023628
S. Donadello, S. Serafini, T. Bienaimé, F. Dalfovo, G. Lamporesi, and G. Ferrari	
Large-coordination-number expansion of a lattice Bose gas at finite temperature (6 pages)	023629
Patrick Navez, Friedemann Queisser, and Ralf Schützhold	
Synthetic dimensions in the strong-coupling limit: Supersolids and pair superfluids (9 pages)	023630
Thomas Bilitewski and Nigel R. Cooper	
Topological bound states of a quantum walk with cold atoms (16 pages)	023631
Samuel Mugel, Alessio Celi, Pietro Massignan, János K. Asbóth, Maciej Lewenstein, and Carlos Lobo	

(Continued)

Phase transitions in a Bose-Hubbard model with cavity-mediated global-range interactions (<i>7 pages</i>)	023632
N. Dogra, F. Brennecke, S. D. Huber, and T. Donner	
Anderson localization in the time domain (<i>6 pages</i>)	023633
Krzysztof Sacha and Dominique Delande	
Cluster mean-field signature of entanglement entropy in bosonic superfluid-insulator transitions (<i>7 pages</i>)	023634
Li Zhang (张莉), Xizhou Qin (秦锡洲), Yongguan Ke (柯勇贯), and Chaohong Lee (李朝红)	
Spectral weight suppression in response functions of ultracold fermion-boson mixtures (<i>13 pages</i>)	023635
Kai Ji and Andreas Komnik	
Quantum optics, physics of lasers, nonlinear optics, classical optics	
Superposition of nonparaxial vectorial complex-source spherically focused beams: Axial Poynting singularity and reverse propagation (<i>10 pages</i>)	023801
F. G. Mitri	
General theorem on the divergence of vortex beams (<i>8 pages</i>)	023802
Giuseppe Vallone, Giuseppe Parisi, Fabio Spinello, Elettra Mari, Fabrizio Tamburini, and Paolo Villoresi	
Floquet approach to bichromatically driven cavity-optomechanical systems (<i>15 pages</i>)	023803
Daniel Malz and Andreas Nunnenkamp	
Quantum interference of high-order harmonics from mixed gases (<i>8 pages</i>)	023804
A. González-Fernández and P. Velarde	
 Synthetic magnetism for photon fluids (<i>8 pages</i>)	023805
N. Westerberg, C. Maitland, D. Faccio, K. Wilson, P. Öhberg, and E. M. Wright	
Time-delayed quantum coherent Pyragas feedback control of photon squeezing in a degenerate parametric oscillator (<i>11 pages</i>)	023806
Manuel Kraft, Sven M. Hein, Judith Lehnert, Eckehard Schöll, Stephen Hughes, and Andreas Knorr	
Mean-field theory of atomic self-organization in optical cavities (<i>14 pages</i>)	023807
Simon B. Jäger, Stefan Schütz, and Giovanna Morigi	
Feedback-induced bistability of an optically levitated nanoparticle: A Fokker-Planck treatment (<i>10 pages</i>)	023808
Wenchao Ge, Brandon Rodenburg, and M. Bhattacharya	
 Enhanced optical squeezing from a degenerate parametric amplifier via time-delayed coherent feedback (<i>12 pages</i>)	023809
Nikolett Német and Scott Parkins	
Quantum frequency conversion and strong coupling of photonic modes using four-wave mixing in integrated microresonators (<i>12 pages</i>)	023810
Z. Vernon, M. Liscidini, and J. E. Sipe	
Fractal frequency spectrum in laser resonators and three-dimensional geometric topology of optical coherent waves (<i>6 pages</i>)	023811
J. C. Tung, P. H. Tuan, H. C. Liang, K. F. Huang, and Y. F. Chen	

(Continued)

CONTENTS - Continued

PHYSICAL REVIEW A

THIRD SERIES, VOLUME 94, NUMBER 2

AUGUST 2016

Strong quantum squeezing near the pull-in instability of a nonlinear beam (11 pages)	023812
Ali Passian and George Siopsis	
Surface-enhanced Raman scattering as a higher-order Raman process (13 pages)	023813
Niclas S. Mueller, Sebastian Heeg, and Stephanie Reich	
Modeling of the carrier dynamics in nonlinear semiconductor nanoscale resonators (12 pages)	023814
Gregory Moille, Sylvain Combrié, and Alfredo De Rossi	
☞ Photon pair generation in multimode optical fibers via intermodal phase matching (10 pages)	023815
Hamed Pourbeyram and Arash Mafi	
Two-photon vibrational excitation of air by long-wave infrared laser pulses (7 pages)	023816
J. P. Palastro, J. Peñano, L. A. Johnson, B. Hafizi, J. K. Wahlstrand, and H. M. Milchberg	
Interplay of phase-sensitive amplification and cascaded four-wave mixing in dispersion-controlled waveguides (9 pages)	023817
Aude Martin, Sylvain Combrié, Amnon Willinger, Gadi Eisenstein, and Alfredo de Rossi	
Mode-selective quantization and multimodal effective models for spherically layered systems (15 pages)	023818
D. Dzsojtan, B. Rousseaux, H. R. Jauslin, G. Colas des Francs, C. Couteau, and S. Guérin	
Elucidating Dicke superradiance by quantum uncertainty (5 pages)	023819
Eduardo M. dos Santos and Eduardo I. Duzzioni	
Controlling electromagnetic fields at boundaries of arbitrary geometries (14 pages)	023820
Jonathon Yi Han Teo, Liang Jie Wong, Carlo Molardi, and Patrice Genevet	
Formation of ultrashort pulses from quasimonochromatic XUV radiation via infrared-field-controlled forward scattering (8 pages)	023821
T. R. Akhmedzhanov, V. A. Antonov, and Olga Kocharovskaya	
Lorentz-covariant quantum 4-potential and orbital angular momentum for the transverse confinement of matter waves (10 pages)	023822
R. Ducharme and I. G. da Paz	
Ground-state cooling of a dispersively coupled optomechanical system in the unresolved sideband regime via a dissipatively coupled oscillator (11 pages)	023823
Yu-Xiang Zhang, Shengjun Wu, Zeng-Bing Chen, and Yutaka Shikano	
Pulse self-compression to single-cycle pulse widths a few decades above the self-focusing threshold (6 pages)	023824
A. A. Voronin and A. M. Zheltikov	
In situ attosecond pulse characterization techniques to measure the electromagnetic phase (7 pages)	023825
M. Spanner, J. B. Bertrand, and D. M. Villeneuve	
Generation of an optical Schrödinger-cat-like state in a nonideal cavity by injecting opposite-phase atomic dipoles (9 pages)	023826
Daeho Yang, Junki Kim, Moonjoo Lee, Young-Tak Chough, and Kyungwon An	
High-order correlation of chaotic bosons and fermions (7 pages)	023827
Hong-Chao Liu	

(Continued)

CONTENTS - *Continued*

PHYSICAL REVIEW A

THIRD SERIES, VOLUME 94, NUMBER 2

AUGUST 2016

Quantum-noise-limited sensitivity enhancement of a passive optical cavity by a fast-light medium (<i>13 pages</i>)	023828
David D. Smith, H. A. Luckay, Hongrok Chang, and Krishna Myneni	
Systems that become $\mathcal{PT}$ symmetric through interaction (<i>13 pages</i>)	023829
S. Karthiga, V. K. Chandrasekar, M. Senthilvelan, and M. Lakshmanan	
Parity oscillations and photon correlation functions in the Z_2 -U(1) Dicke model at a finite number of atoms or qubits (<i>9 pages</i>)	023830
Yu Yi-Xiang, Jinwu Ye, and CunLin Zhang	
Atom-assisted quadrature squeezing of a mechanical oscillator inside a dispersive cavity (<i>7 pages</i>)	023831
Anil Kumar Chauhan and Asoka Biswas	
Spectroscopy of cesium Rydberg atoms in strong radio-frequency fields (<i>7 pages</i>)	023832
Yuechun Jiao, Xiaoxuan Han, Zhiwei Yang, Jingkui Li, Georg Raithel, Jianming Zhao, and Suotang Jia	
Two photons co- and counterpropagating through N cross-Kerr sites (<i>21 pages</i>)	023833
Daniel J. Brod, Joshua Combes, and Julio Gea-Banacloche	
Quantum optical metrology in the lossy SU(2) and SU(1,1) interferometers (<i>6 pages</i>)	023834
Yang Gao	
Excited-state quantum phase transition in the Rabi model (<i>9 pages</i>)	023835
Ricardo Puebla, Myung-Joong Hwang, and Martin B. Plenio	
Transverse-electric Brewster effect enabled by nonmagnetic two-dimensional materials (<i>8 pages</i>)	023836
Xiao Lin, Yichen Shen, Ido Kaminer, Hongsheng Chen, and Marin Soljačić	
Phase-dependent multiple optomechanically induced absorption in multimode optomechanical systems with mechanical driving (<i>7 pages</i>)	023837
Cheng Jiang, Yuanshun Cui, Xintian Bian, Fen Zuo, Hualing Yu, and Guibin Chen	
Spiral phase plate contrast in optical and electron microscopy (<i>7 pages</i>)	023838
Roeland Juchtmans, Laura Clark, Axel Lubk, and Jo Verbeeck	
Optical nonlinearity of Rydberg electromagnetically induced transparency in thermal vapor using the optical-heterodyne-detection technique (<i>7 pages</i>)	023839
Arup Bhowmick, Sushree S. Sahoo, and Ashok K. Mohapatra	
Quantum-enhanced metrology with the single-mode coherent states of an optical cavity inside a quantum feedback loop (<i>12 pages</i>)	023840
Lewis A. Clark, Adam Stokes, and Almut Beige	
Near-field levitated quantum optomechanics with nanodiamonds (<i>9 pages</i>)	023841
M. L. Juan, G. Molina-Terriza, T. Volz, and O. Romero-Isart	
Collective resonance fluorescence in small and dense atom clouds: Comparison between theory and experiment (<i>13 pages</i>)	023842
S. D. Jenkins, J. Ruostekoski, J. Javanainen, S. Jennewein, R. Bourgain, J. Pellegrino, Y. R. P. Sortais, and A. Browaeys	

(Continued)

CONTENTS - *Continued*

PHYSICAL REVIEW A

THIRD SERIES, VOLUME 94, NUMBER 2

AUGUST 2016

Raman scattering with strongly coupled vibron-polaritons (<i>10 pages</i>)	023843
Artem Strashko and Jonathan Keeling	
 Optomechanical many-body cooling to the ground state using frustration (<i>12 pages</i>)	023844
Thomás Fogarty, Haggai Landa, Cecilia Cormick, and Giovanna Morigi	
Comprehensive analysis of the optical Kerr coefficient of graphene (<i>11 pages</i>)	023845
Daniel B. S. Soh, Ryan Hamerly, and Hideo Mabuchi	
Equivalence classes of Fibonacci lattices and their similarity properties (<i>9 pages</i>)	023846
N. Lo Gullo, L. Vittadello, M. Bazzan, and L. Dell’Anna	
Ikeda-like chaos on a dynamically filtered supercontinuum light source (<i>5 pages</i>)	023847
Yanne K. Chembo, Maxime Jacquot, John M. Dudley, and Laurent Larger	
Delay times in a terahertz chiral metamaterial slab (<i>7 pages</i>)	023848
Danka B. Stojanović, Jelena Radovanović, and Vitomir Milanović	
Controllable hybrid shape of correlation and squeezing (<i>11 pages</i>)	023849
Garuma Abdisa, Irfan Ahmed, Xiuxiu Wang, Zongchen Liu, Hongxing Wang, and Yanpeng Zhang	
Nonlinear optical response of noble gases via the metastable electronic state approach (<i>10 pages</i>)	023850
A. Bahl, E. M. Wright, and M. Kolesik	
Optical switching and bistability in four-level atomic systems (<i>8 pages</i>)	023851
Pardeep Kumar and Shubhrangshu Dasgupta	

COMMENTS

Comment on “Linear-depth quantum circuits for n -qubit Toffoli gates with no ancilla” (<i>2 pages</i>)	026301
Ming-Xing Luo and Hui-Ran Li	

ERRATA

Erratum: Reformulation of the strong-field approximation for light-matter interactions [Phys. Rev. A 93 , 023422 (2016)] (<i>1 page</i>)	029901(E)
A. Galstyan, O. Chuluunbaatar, A. Hamido, Yu. V. Popov, F. Mota-Furtado, P. F. O’Mahony, N. Janssens, F. Catoire, and B. Piraux	
Publisher’s Note: Control of the electromagnetic environment of a quantum emitter by shaping the vacuum field in a coupled-cavity system [Phys. Rev. A 91 , 063807 (2015)] (<i>1 page</i>)	029902(E)
Robert Johnne, Ron Schutjens, Sartoon Fattah poor, Chao-Yuan Jin, and Andrea Fiore	
Erratum: Electron-ion collision spectroscopy: Lithium-like xenon ions [Phys. Rev. A 91 , 012710 (2015)] (<i>1 page</i>)	029903(E)
D. Bernhardt, C. Brandau, Z. Harman, C. Kozhuharov, S. Böhm, F. Bosch, S. Fritzsche, J. Jacobi, S. Kieslich, H. Knopp, F. Nolden, W. Shi, Z. Stachura, M. Steck, Th. Stöhlker, S. Schippers, and A. Müller	
Erratum: Calculated electron dynamics in an electric field [Phys. Rev. A 56 , 278 (1997)] (<i>1 page</i>)	029904(E)
F. Robicheaux and J. Shaw	

(Continued)

CONTENTS - *Continued*

PHYSICAL REVIEW A

THIRD SERIES, VOLUME 94, NUMBER 2

AUGUST 2016

Erratum: Polarization measurement of dielectronic recombination transitions in highly charged krypton ions [Phys. Rev. A 92 , 042702 (2015)] (<i>1 page</i>)	029905(E)
Chintan Shah, Holger Jörg, Sven Bernitt, Stepan Dobrodey, René Steinbrügge, Christian Beilmann, Pedro Amaro, Zhimin Hu, Sebastian Weber, Stephan Fritzsche, Andrey Surzhykov, José R. Crespo López-Urrutia, and Stanislav Tashenov	
Publisher's Note: Optomechanics for absolute rotation detection [Phys. Rev. A 94 , 013808 (2016)] (<i>1 page</i>)	029906(E)
Sankar Davuluri	
Publisher's Note: Erratum: Electron rescattering in strong-field photodetachment of F^- [Phys. Rev. A 91 , 031404(R) (2015)] [Phys. Rev. A 93 , 069901 (2016)] (<i>2 pages</i>)	029907(E)
O. Hassouneh, S. M. K. Law, S. F. C. Shearer, A. C. Brown, and H. W. van der Hart	