

*The Table of Contents is a total listing of Parts A and B.
Part A consists of pages 030301(R)–033417, and Part B pages 033601–039903(E).*

PART A

RAPID COMMUNICATIONS

Quantum information

- Photon-photon gate via the interaction between two collective Rydberg excitations (5 pages) 030301(R)
Mohammadsadeh Khazali, Khabat Heshami, and Christoph Simon

Atomic and molecular structure and dynamics

- Rigorous limits on the hadronic and semileptonic CP -violating coupling constants from the electric dipole moment of ^{199}Hg (5 pages) 030501(R)
Yashpal Singh and B. K. Sahoo

- Laser-spectroscopy measurement of the fine-structure splitting 2^3P_1 – 2^3P_2 of ^4He (5 pages) 030502(R)
G.-P. Feng, X. Zheng, Y. R. Sun, and S.-M. Hu

- Implementation of the Z -vector method in the relativistic-coupled-cluster framework to calculate first-order energy derivatives: Application to the SrF molecule (5 pages) 030503(R)
Sudip Sasmal, Himadri Pathak, Malaya K. Nayak, Nayana Vaval, and Sourav Pal

Atomic and molecular collisions and interactions

- Beyond universality: Parametrizing ultracold complex-mediated reactions using statistical assumptions (5 pages) 030701(R)
Manuel Lara, P. G. Jambrina, J.-M. Launay, and F. J. Aoiz

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

- ☞ Momentum-resolved study of the saturation intensity in multiple ionization (5 pages) 031401(R)
P. Wustelt, M. Möller, T. Rathje, A. M. Sayler, T. Stöhlker, and G. G. Paulus

- Strong-field ionization with two-color circularly polarized laser fields (7 pages) 031402(R)
Christopher A. Mancuso, Daniel D. Hickstein, Patrik Grychtol, Ronny Knut, Ofer Kfir, Xiao-Min Tong, Franklin Dollar, Dmitriy Zusin, Maithreyi Gopalakrishnan, Christian Gentry, Emrah Turgut, Jennifer L. Ellis, Ming-Chang Chen, Avner Fleischer, Oren Cohen, Henry C. Kapteyn, and Margaret M. Murnane



CONTENTS - *Continued*

PHYSICAL REVIEW A

THIRD SERIES, VOLUME 91, NUMBER 3

MARCH 2015

Understanding the modulation mechanism in resonance-enhanced multiphoton probing of molecular dynamics (5 pages) 031403(R)

Markus Koch, Thomas J. A. Wolf, and Markus Gühr

Electron rescattering in strong-field photodetachment of F^- (4 pages) 031404(R)

O. Hassouneh, S. Law, S. F. C. Shearer, A. C. Brown, and H. W. van der Hart

Matter waves and collective properties of cold atoms and molecules

☞ Interacting bosons in a disordered lattice: Dynamical characterization of the quantum phase diagram (5 pages) . . . 031601(R)

Pierfrancesco Buonsante, Luca Pezzè, and Augusto Smerzi

Life cycle of superfluid vortices and quantum turbulence in the unitary Fermi gas (5 pages) 031602(R)

Gabriel Wlazłowski, Aurel Bulgac, Michael McNeil Forbes, and Kenneth J. Roche

Goos-Hänchen shifts in spin-orbit-coupled cold atoms (5 pages) 031603(R)

Lu Zhou, Jie-Li Qin, Zhihao Lan, Guangjiong Dong, and Weiping Zhang

Equilibrium phases of two-dimensional bosons in quasiperiodic lattices (5 pages) 031604(R)

C. Zhang, A. Safavi-Naini, and B. Capogrosso-Sansone

Fate of a gray soliton in a quenched Bose-Einstein condensate (5 pages) 031605(R)

O. Gamayun, Yu. V. Bezvershenko, and V. Cheianov

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

Scheme for the detection of mixing processes in vacuum (5 pages) 031801(R)

François Fillion-Gourdeau, Catherine Lefebvre, and Steve MacLean

☞ Atomic quantum memory for multimode frequency combs (5 pages) 031802(R)

Zhan Zheng, Oxana Mishina, Nicolas Treps, and Claude Fabre

ARTICLES

Fundamental concepts

Asymmetric transmission through a flux-controlled non-Hermitian scattering center (6 pages) 032101

X. Q. Li, X. Z. Zhang, G. Zhang, and Z. Song

Practical implementation of mutually unbiased bases using quantum circuits (9 pages) 032102

U. Seyfarth, L. L. Sánchez-Soto, and G. Leuchs

Phase-sensitivity bounds for two-mode interferometers (15 pages) 032103

Luca Pezzè, Philipp Hyllus, and Augusto Smerzi

Engineering of a quantum state by time-dependent decoherence-free subspaces (7 pages) 032104

S. L. Wu (武松林)

Bell inequalities for continuously emitting sources (17 pages) 032105

Emanuel Knill, Scott Glancy, Sae Woo Nam, Kevin Coakley, and Yanbao Zhang

Charge asymmetry in the differential cross section of high-energy bremsstrahlung in the field of a heavy atom (11 pages) 032106

P. A. Krachkov and A. I. Milstein

(Continued)

CONTENTS - *Continued*

PHYSICAL REVIEW A

THIRD SERIES, VOLUME 91, NUMBER 3

MARCH 2015

Geometric Bell-like inequalities for steering (<i>5 pages</i>)	032107
Marek Żukowski, Arijit Dutta, and Zhi Yin	
Nonlocality of W and Dicke states subject to losses (<i>7 pages</i>)	032108
Tomer Jack Barnea, Gilles Pütz, Jonatan Bohr Brask, Nicolas Brunner, Nicolas Gisin, and Yeong-Cherng Liang	
Classicality condition on a system observable in a quantum measurement and a relative-entropy conservation law (<i>13 pages</i>)	032110
Yui Kuramochi and Masahito Ueda	
Randomness requirement on the Clauser-Horne-Shimony-Holt Bell test in the multiple-run scenario (<i>7 pages</i>) . . .	032111
Xiao Yuan, Zhu Cao, and Xiongfeng Ma	
Classical-driving-assisted quantum speed-up (<i>5 pages</i>)	032112
Ying-Jie Zhang, Wei Han, Yun-Jie Xia, Jun-Peng Cao, and Heng Fan	
Generic map from non-Lindblad to Lindblad master equations (<i>12 pages</i>)	032113
Michael R. Hush, Igor Lesanovsky, and Juan P. Garrahan	
Localization by dissipative disorder: Deterministic approach to position measurements (<i>5 pages</i>)	032114
Giovanni Barontini and Vera Guarrera	
Characterizing non-Markovianity via quantum interferometric power (<i>9 pages</i>)	032115
Himadri Shekhar Dhar, Manabendra Nath Bera, and Gerardo Adesso	
Weak values as interference phenomena (<i>14 pages</i>)	032116
Justin Dressel	
Wigner's form of the Leggett-Garg inequality, the no-signaling-in-time condition, and unsharp measurements (<i>7 pages</i>)	032117
Debashis Saha, Shiladitya Mal, Prasanta K. Panigrahi, and Dipankar Home	
Decoherence-enhanced quantum measurement of a quantum-dot spin qubit (<i>5 pages</i>)	032118
Katarzyna Roszak, Łukasz Marcinowski, and Paweł Machnikowski	
Analytic results for the Casimir free energy between ferromagnetic metals (<i>10 pages</i>)	032119
G. L. Klimchitskaya and C. C. Korikov	
Chirality quantum phase transition of a noncommutative planar Dirac oscillator (<i>9 pages</i>)	032120
Yu-Long Hou, Qing Wang, Zi-Gang Yuan, Zheng-Wen Long, and Jian Jing	
Steady-state one-way Einstein-Podolsky-Rosen steering in optomechanical interfaces (<i>8 pages</i>)	032121
Huatang Tan, Xincheng Zhang, and Gaoxiang Li	
Quantum origins of objectivity (<i>12 pages</i>)	032122
R. Horodecki, J. K. Korbicz, and P. Horodecki	
Majorization approach to entropic uncertainty relations for coarse-grained observables (<i>5 pages</i>)	032123
Łukasz Rudnicki	
Quantum information	
Robust state transfer with high fidelity in spin-1/2 chains by Lyapunov control (<i>8 pages</i>)	032301
Z. C. Shi, X. L. Zhao, and X. X. Yi	

(Continued)

CONTENTS - *Continued*

PHYSICAL REVIEW A

THIRD SERIES, VOLUME 91, NUMBER 3

MARCH 2015

Optimal simulation of Deutsch gates and the Fredkin gate (<i>7 pages</i>)	032302
Nengkun Yu and Mingsheng Ying	
☞ Perturbative instability of quantum memory based on effective long-range interactions (<i>12 pages</i>)	032303
Olivier Landon-Cardinal, Beni Yoshida, David Poulin, and John Preskill	
Shortcuts to adiabatic passage for multiqubit controlled-phase gate (<i>8 pages</i>)	032304
Yan Liang, Qi-Cheng Wu, Shi-Lei Su, Xin Ji, and Shou Zhang	
Detection efficiency and noise in a semi-device-independent randomness-extraction protocol (<i>6 pages</i>)	032305
Hong-Wei Li, Zhen-Qiang Yin, Marcin Pawłowski, Guang-Can Guo, and Zheng-Fu Han	
Connecting entanglement in time and space: Improving the folding algorithm (<i>11 pages</i>)	032306
M. B. Hastings and R. Mahajan	
Robust quantum state transfer between a Cooper-pair box and diamond nitrogen-vacancy centers (<i>6 pages</i>)	032307
Zhi-Bo Feng	
Decomposition of bipartite and multipartite unitary gates into the product of controlled unitary gates (<i>15 pages</i>)	032308
Lin Chen and Li Yu	
High-efficiency quantum state transfer and quantum memory using a mechanical oscillator (<i>7 pages</i>)	032309
Eyob A. Sete and H. Eleuch	
Efficient construction of three- and four-qubit quantum gates by global entangling gates (<i>8 pages</i>)	032311
Svetoslav S. Ivanov, Peter A. Ivanov, and Nikolay V. Vitanov	
Entanglement on macroscopic scales in a resonant-laser-field-excited atomic ensemble (<i>6 pages</i>)	032312
S. Camalet	
Dynamics of entanglement in systems of identical fermions undergoing decoherence (<i>9 pages</i>)	032313
A. Valdés-Hernández, A. P. Majtey, and A. R. Plastino	
Optimization of networks for measurement-based quantum computation (<i>7 pages</i>)	032314
G. Ferrini, J. Roslund, F. Arzani, Y. Cai, C. Fabre, and N. Treps	
Method for universal detection of two-photon polarization entanglement (<i>7 pages</i>)	032315
Karol Bartkiewicz, Paweł Horodecki, Karel Lemr, Adam Miranowicz, and Karol Życzkowski	
Quantum teleportation with identical particles (<i>19 pages</i>)	032316
Ugo Marzolino and Andreas Buchleitner	
Robust amplification of Santha-Vazirani sources with three devices (<i>8 pages</i>)	032317
Piotr Mironowicz, Rodrigo Gallego, and Marcin Pawłowski	
Statistical fluctuation analysis for measurement-device-independent quantum key distribution with three-intensity decoy-state method (<i>11 pages</i>)	032318
Zong-Wen Yu, Yi-Heng Zhou, and Xiang-Bin Wang	
Perfect quantum state transfer of hard-core bosons on weighted path graphs (<i>17 pages</i>)	032319
Steven J. Large, Michael S. Underwood, and David L. Feder	

(Continued)

CONTENTS - *Continued*

PHYSICAL REVIEW A

THIRD SERIES, VOLUME 91, NUMBER 3

MARCH 2015

Multimode quantum entropy power inequality (<i>6 pages</i>)	032320
G. De Palma, A. Mari, S. Lloyd, and V. Giovannetti	
Repeat-until-success cubic phase gate for universal continuous-variable quantum computation (<i>7 pages</i>)	032321
Kevin Marshall, Raphael Pooser, George Siopsis, and Christian Weedbrook	
Mediated semiquantum key distribution (<i>11 pages</i>)	032323
Walter O. Krawec	
Universal photonic quantum gates assisted by ancilla diamond nitrogen-vacancy centers coupled to resonators (<i>9 pages</i>)	032324
Hai-Rui Wei and Gui Lu Long	
Optimized pulse shapes for a resonator-induced PHASE gate (<i>12 pages</i>)	032325
Andrew W. Cross and Jay M. Gambetta	
Attacks exploiting deviation of mean photon number in quantum key distribution and coin tossing (<i>13 pages</i>)	032326
Shihan Sajeed, Igor Radchenko, Sarah Kaiser, Jean-Philippe Bourgoin, Anna Pappa, Laurent Monat, Matthieu Legré, and Vadim Makarov	
 Partial transposition as a direct link between concurrence and negativity (<i>9 pages</i>)	032327
Christopher Eltschka, Géza Tóth, and Jens Siewert	
Universal hyperparallel hybrid photonic quantum gates with dipole-induced transparency in the weak-coupling regime (<i>10 pages</i>)	032328
Bao-Cang Ren (任宝藏), Guan-Yu Wang (王冠玉), and Fu-Guo Deng (邓富国)	
Preserving photon qubits in an unknown quantum state with Knill dynamical decoupling: Towards an all optical quantum memory (<i>7 pages</i>)	032329
Manish K. Gupta, Erik J. Navarro, Todd A. Moulder, Jason D. Mueller, Ashkan Balouchi, Katherine L. Brown, Hwang Lee, and Jonathan P. Dowling	
Universal transversal gates with color codes: A simplified approach (<i>12 pages</i>)	032330
Aleksander Kubica and Michael E. Beverland	
Atomic and molecular structure and dynamics	
Quantum critical benchmark for electronic structure theory (<i>7 pages</i>)	032501
Paul E. Grabowski and Kieron Burke	
Absolute measurement of radiative and Auger rates of <i>K</i> -shell-vacancy states in highly charged Fe ions (<i>7 pages</i>)	032502
R. Steinbrügge, S. Bernitt, S. W. Epp, J. K. Rudolph, C. Beilmann, H. Bekker, S. Eberle, A. Müller, O. O. Versolato, H.-C. Wille, H. Yavaş, J. Ullrich, and J. R. Crespo López-Urrutia	
Theoretical characterization of the collective resonance states underlying the xenon giant dipole resonance (<i>11 pages</i>)	032503
Yi-Jen Chen (陳怡蓁), Stefan Pabst, Antonia Karamatskou, and Robin Santra	
Elimination of the asymptotic fractional dissociation problem in Kohn-Sham density-functional theory using the ensemble-generalization approach (<i>7 pages</i>)	032504
Eli Kraisler and Leeor Kronik	
Blackbody friction force on a relativistic small neutral particle (<i>6 pages</i>)	032505
A. I. Volokitin	

(Continued)

CONTENTS - *Continued*

PHYSICAL REVIEW A

THIRD SERIES, VOLUME 91, NUMBER 3

MARCH 2015

Investigating the static dipole polarizability of noble-gas atoms confined in impenetrable spheres and shells (6 pages)	032507
J. A. Ludlow and Teck-Ghee Lee	
Nonexistence of a Hohenberg-Kohn variational principle in total current-density-functional theory (4 pages)	032508
Andre Laestadius and Michael Benedicks	
Quasiclassical quantum defect theory and the spectrum of highly excited rubidium atoms (5 pages)	032509
Ali Sanayei, Nils Schopohl, Jens Grimm, Markus Mack, Florian Karlewski, and József Fortágh	
Lamb shift of electronic states in neutral muonic helium, an electron-muon-nucleus system (4 pages)	032510
Savely G. Karshenboim, Vladimir G. Ivanov, and Miron Amusia	
Theoretical isotope shifts in neutral barium (8 pages)	032511
C. Nazé, J. G. Li, and M. Godefroid	
Molecular beam study of the $a^3\Sigma^+$ state of NaK up to the dissociation limit (10 pages)	032512
I. Temelkov, H. Knöckel, A. Pashov, and E. Tiemann	
Hilbert transform: Applications to atomic spectra (5 pages)	032513
Kate A. Whittaker, James Keaveney, Ifan G. Hughes, and Charles S. Adams	
Experimental study of the x-ray transitions in the heliumlike isoelectronic sequence: Updated results (6 pages)	032514
Peter Beiersdorfer and Gregory V. Brown	
Hyperfine structure of the $(3s3d)^3D_J$ manifold of $^{25}\text{Mg I}$ (8 pages)	032515
N. K. Kjølner, S. G. Porsev, P. G. Westergaard, N. Andersen, and J. W. Thomsen	
Nuclear electric quadrupole moment of potassium from the molecular method (4 pages)	032516
Tiago Quevedo Teodoro, Roberto Luiz Andrade Haiduke, and Lucas Visscher	
Lifetime determination of the $5d^2\ ^3F_2$ state in barium using trapped atoms (4 pages)	032517
S. De, U. Dammalapati, and L. Willmann	
☞ Magic wavelengths for the $5s-18s$ transition in rubidium (6 pages)	032518
E. A. Goldschmidt, D. G. Norris, S. B. Koller, R. Wyllie, R. C. Brown, J. V. Porto, U. I. Safronova, and M. S. Safronova	
Calculating excitation energies by extrapolation along adiabatic connections (8 pages)	032519
Elisa Rebolini, Julien Toulouse, Andrew M. Teale, Trygve Helgaker, and Andreas Savin	
Rotation of a liquid crystal by the Casimir torque (5 pages)	032520
David A. T. Somers and Jeremy N. Munday	
Atomic and molecular collisions and interactions	
Electron-impact cross sections of SiH_2 using the R -matrix method at low energy (8 pages)	032701
Anand Bharadvaja, Savinder Kaur, and K. L. Baluja	
Proton-hydrogen collisions at low temperatures (10 pages)	032702
Ming Li and Bo Gao	
Inelastic electron-vortex-beam scattering (13 pages)	032703
Ruben Van Boxem, Bart Partoens, and Jo Verbeeck	

(Continued)

Confinement-induced interlayer molecules: A route to strong interatomic interactions (<i>12 pages</i>)	032704
M. Kanász-Nagy, E. A. Demler, and G. Zaránd	
Experiments and simulations of 4.5-keV Ar^{7+} -ion guiding through a conical glass macrocapillary (<i>8 pages</i>)	032705
Nikolaus Stolterfoht, Elisabeth Gruber, Peter Allinger, Stefan Wampl, Yuyu Wang, Marius J. Simon, and Friedrich Aumayr	
Non-sticking of helium buffer gas to hydrocarbons (<i>6 pages</i>)	032706
James F. E. Croft and John L. Bohn	
☞ Kinematically complete study of low-energy electron-impact ionization of neon: Internormalized cross sections in three-dimensional kinematics (<i>7 pages</i>)	032707
Xueguang Ren, Sadek Amami, Oleg Zatsarinny, Thomas Pflüger, Marvin Weyland, Woon Yong Baek, Hans Rabus, Klaus Bartschat, Don Madison, and Alexander Dorn	
Electron-positron pair creation in low-energy collisions of heavy bare nuclei (<i>7 pages</i>)	032708
I. A. Maltsev, V. M. Shabaev, I. I. Tupitsyn, A. I. Bondarev, Y. S. Kozhedub, G. Plunien, and Th. Stöhlker	
Charge-exchange collisions between ultracold fermionic lithium atoms and calcium ions (<i>5 pages</i>)	032709
Shinsuke Haze, Ryoichi Saito, Munekazu Fujinaga, and Takashi Mukaiyama	
Atomic and molecular processes in external fields, including interactions with strong fields and short pulses	
Maxwell-Schrödinger hybrid simulation for optically controlling quantum states: A scheme for designing control pulses (<i>13 pages</i>)	033401
Takashi Takeuchi, Shinichiro Ohnuki, and Tokuei Sako	
Narrowband inverse Compton scattering x-ray sources at high laser intensities (<i>12 pages</i>)	033402
D. Seipt, S. G. Rykovanov, A. Surzhykov, and S. Fritzsche	
Animated-beam measurement of the photodetachment cross section of H^- (<i>6 pages</i>)	033403
Matthieu Génévriez and Xavier Urbain	
Quantum phase transition of bosons in a shaken optical lattice (<i>10 pages</i>)	033404
Jiao Miao, Boyang Liu, and Wei Zheng	
Influence of excitation and deexcitation processes on the dynamics of laser-excited argon clusters (<i>15 pages</i>)	033405
M. Moll, M. Schlanges, Th. Bornath, and V. P. Krainov	
Fault-tolerant Hahn-Ramsey interferometry with pulse sequences of alternating detuning (<i>10 pages</i>)	033406
Nikolay V. Vitanov, Timm F. Gloger, Peter Kaufmann, Delia Kaufmann, Thomas Collath, M. Tanveer Baig, Michael Johanning, and Christof Wunderlich	
Minimizing nonadiabaticities in optical-lattice loading (<i>6 pages</i>)	033407
Michele Dolfi, Adrian Kantian, Bela Bauer, and Matthias Troyer	
Coulomb crystal mass spectrometry in a digital ion trap (<i>6 pages</i>)	033408
Nabanita Deb, Laura L. Pollum, Alexander D. Smith, Matthias Keller, Christopher J. Rennick, Brianna R. Heazlewood, and Timothy P. Softley	
Theory of low-energy photoelectrons in strong-field ionization by laser pulses with large ellipticity (<i>8 pages</i>)	033409
D. Dimitrovski and L. B. Madsen	

(Continued)

CONTENTS - *Continued*

PHYSICAL REVIEW A

THIRD SERIES, VOLUME 91, NUMBER 3

MARCH 2015

Quantum-ionic features in the absorption spectra of homonuclear diatomic molecules (<i>17 pages</i>)	033410
A. Crawford-Uranga, D. J. Mowbray, and D. M. Cardamone	
Enhanced harmonic generation in double-well potentials (<i>8 pages</i>)	033411
G. N. Gibson	
Photoelectron energy spectra from elastic rescattering in ultrastrong laser fields: A relativistic extension of the three-step model (<i>6 pages</i>)	033412
S. S. Luo, P. D. Grugan, and B. C. Walker	
Angular asymmetry and attosecond time delay from the giant plasmon resonance in C ₆₀ photoionization (<i>5 pages</i>)	033413
T. Barillot, C. Cauchy, P.-A. Hervieux, M. Gisselbrecht, S. E. Canton, P. Johnsson, J. Laksman, E. P. Mansson, J. M. Dahlström, M. Magrakvelidze, G. Dixit, M. E. Madjet, H. S. Chakraborty, E. Suraud, P. M. Dinh, P. Wopperer, K. Hansen, V. Lorient, C. Bordas, S. Sorensen, and F. Lépine	
Dramatic enhancement of high-order-harmonic generation via the quantum interference of dipole-transition paths (<i>8 pages</i>)	033414
Di Zhao, Chen-Wei Jiang, and Fu-li Li	
Double Compton scattering in a constant crossed field (<i>8 pages</i>)	033415
B. King	
Some exact properties of the nonequilibrium response function for transient photoabsorption (<i>16 pages</i>)	033416
E. Perfetto and G. Stefanucci	
Exclusion principle for photons: Spin-statistic selection rules for multiphoton transitions in atomic systems (<i>12 pages</i>)	033417
T. Zaliutdinov, D. Solov'yev, L. Labzowsky, and G. Plunien	

PART B

Matter waves and collective properties of cold atoms and molecules

Scattering theory for Floquet-Bloch states (<i>20 pages</i>)	033601
Thomas Bilitewski and Nigel R. Cooper	
High-temperature supersolid of ⁴ He in a one-dimensional periodic potential (<i>12 pages</i>)	033602
Raina J. Olsen	
In-plane gradient-magnetic-field-induced vortex lattices in spin-orbit-coupled Bose-Einstein condensations (<i>8 pages</i>)	033603
Xiang-Fa Zhou, Zheng-Wei Zhou, Congjun Wu, and Guang-Can Guo	
Topological flat bands in optical checkerboardlike lattices (<i>11 pages</i>)	033604
Tomi Paananen and Thomas Dahm	
Spinor Bose gas in an elongated trap (<i>6 pages</i>)	033605
Shun Uchino	
Artificial magnetic fields in momentum space in spin-orbit-coupled systems (<i>18 pages</i>)	033606
Hannah M. Price, Tomoki Ozawa, Nigel R. Cooper, and Iacopo Carusotto	
Vortices in a toroidal Bose-Einstein condensate with a rotating weak link (<i>8 pages</i>)	033607
A. I. Yakimenko, Y. M. Bidasyuk, M. Weyrauch, Y. I. Kuriatnikov, and S. I. Vilchinskii	

(Continued)

CONTENTS - *Continued*

PHYSICAL REVIEW A

THIRD SERIES, VOLUME 91, NUMBER 3

MARCH 2015

Ground states of spin-1 bosons in asymmetric double wells (7 pages)	033608
D. W. S. Carvalho, A. Foerster, and M. A. Gusmão	
Effects of dissipation on the superfluid–Mott-insulator transition of photons (12 pages)	033609
A.-W. de Leeuw, O. Onishchenko, R. A. Duine, and H. T. C. Stoof	
Scattering length of composite bosons in the three-dimensional BCS-BEC crossover (5 pages)	033610
L. Salasnich and G. Bighin	
Negative-quench-induced excitation dynamics for ultracold bosons in one-dimensional lattices (14 pages)	033611
S. I. Mistakidis, L. Cao, and P. Schmelcher	
Temporal and spatiotemporal correlation functions for trapped Bose gases (9 pages)	033612
M. Kohnen and R. A. Nyman	
Trimer superfluid and supersolid on two-dimensional optical lattices (8 pages)	033613
Wanzhou Zhang, Yuan Yang, Lijuan Guo, Chengxiang Ding, and Tony C. Scott	
Elastic and inelastic transmission in guided atom lasers: A truncated Wigner approach (10 pages)	033614
Julien Dujardin, Arturo Argüelles, and Peter Schlagheck	
Static interfacial properties of Bose-Einstein-condensate mixtures (10 pages)	033615
Joseph O. Indekeu, Chang-You Lin, Nguyen Van Thu, Bert Van Schaeybroeck, and Tran Huu Phat	
Heisenberg-limited metrology with a squeezed vacuum state, three-mode mixing, and information recycling (9 pages)	033616
Behnam Tonekaboni, Simon A. Haine, and Stuart S. Szigeti	
Modeling spontaneous breaking of time-translation symmetry (5 pages)	033617
Krzysztof Sacha	
Universality in one-dimensional fermions at finite temperature: Density, pressure, compressibility, and contact (6 pages)	033618
M. D. Hoffman, P. D. Javernick, A. C. Loheac, W. J. Porter, E. R. Anderson, and J. E. Drut	
Tunneling-assisted spin-orbit coupling in bilayer Bose-Einstein condensates (11 pages)	033619
Qing Sun, Lin Wen, W.-M. Liu, G. Juzeliūnas, and An-Chun Ji	
Generalized Gross-Pitaevskii equation adapted to the $U(5) \supset SO(5) \supset SO(3)$ symmetry for spin-2 condensates (6 pages)	033620
Y. Z. He, Y. M. Liu, and C. G. Bao	
Generic equilibration dynamics of planar defects in trapped atomic superfluids (11 pages)	033621
Peter Scherpelz, Karmela Padavić, Andy Murray, Andreas Glatz, Igor S. Aranson, and K. Levin	
Chaotic resonances of a Bose-Einstein condensate in a cavity pumped by a modulated optical field (8 pages)	033622
M. Diver, G. R. M. Robb, and G.-L. Oppo	
Rotating Bose-Einstein condensates: Closing the gap between exact and mean-field solutions (8 pages)	033623
J. C. Cremon, A. D. Jackson, E. Ö. Karabulut, G. M. Kavoulakis, B. R. Mottelson, and S. M. Reimann	
Frequency shifts in NIST Cs primary frequency standards due to transverse rf field gradients (13 pages)	033624
Neil Ashby, Stephan Barlow, Thomas Heavner, and Steven Jefferts	

(Continued)

CONTENTS - *Continued*

PHYSICAL REVIEW A

THIRD SERIES, VOLUME 91, NUMBER 3

MARCH 2015

Detuning-enhanced cavity spin squeezing (<i>8 pages</i>)	033625
Yan-Lei Zhang, Chang-Ling Zou, Xu-Bo Zou, Liang Jiang, and Guang-Can Guo	
Vortex macroscopic superpositions in ultracold bosons in a double-well potential (<i>9 pages</i>)	033626
M. A. Garcia-March and Lincoln D. Carr	
Quantum Brownian motion with inhomogeneous damping and diffusion (<i>20 pages</i>)	033627
Pietro Massignan, Aniello Lampo, Jan Wehr, and Maciej Lewenstein	
Quantum quench phase diagrams of an <i>s</i> -wave BCS-BEC condensate (<i>43 pages</i>)	033628
E. A. Yuzbashyan, M. Dzero, V. Gurarie, and M. S. Foster	
Testing gravity with cold-atom interferometers (<i>10 pages</i>)	033629
G. W. Biedermann, X. Wu, L. Deslauriers, S. Roy, C. Mahadeswaraswamy, and M. A. Kasevich	
Angular spin-orbit coupling in cold atoms (<i>6 pages</i>)	033630
Michael DeMarco and Han Pu	
Cavity-aided quantum parameter estimation in a bosonic double-well Josephson junction (<i>9 pages</i>)	033631
M. Zuppardo, J. P. Santos, G. De Chiara, M. Paternostro, F. L. Semião, and G. M. Palma	
Periodically driven quantum matter: The case of resonant modulations (<i>16 pages</i>)	033632
N. Goldman, J. Dalibard, M. Aidelsburger, and N. R. Cooper	
Scattering of matter waves in spatially inhomogeneous environments (<i>8 pages</i>)	033633
F. Tsitoura, P. Krüger, P. G. Kevrekidis, and D. J. Frantzeskakis	
Negative refraction for incoherent atomic matter waves (<i>11 pages</i>)	033634
Thibault Vogt and Wenhui Li	
Coherent spin-mixing dynamics in thermal ⁸⁷ Rb spin-1 and spin-2 gases (<i>6 pages</i>)	033635
Xiaodong He, Bing Zhu, Xiaoke Li, Fudong Wang, Zhi-Fang Xu, and Dajun Wang	
Cusp bifurcation in the eigenvalue spectrum of <i>PT</i> -symmetric Bose-Einstein condensates (<i>6 pages</i>)	033636
Daniel Dizdarevic, Dennis Dast, Daniel Haag, Jörg Main, Holger Cartarius, and Günter Wunner	
Typical observables in a two-mode Bose system (<i>7 pages</i>)	033637
Paolo Facchi, Saverio Pascazio, Francesco V. Pepe, and Golam Ali Sekh	
Quantum optics, physics of lasers, nonlinear optics, classical optics	
Stable quadratic solitons consisting of fundamental waves and oscillatory second harmonics subject to boundary confinement (<i>6 pages</i>)	033801
Jing Wang, Zhenlei Ma, Yiheng Li, Daquan Lu, Qi Guo, and Wei Hu	
Negative refraction and photonic-crystal optics in a cold gas (<i>7 pages</i>)	033802
Marina Litinskaya and Evgeny A. Shapiro	
X-ray-refractive-index measurements at photon energies above 100 keV with a grating interferometer (<i>5 pages</i>)	033803
M. Ruiz-Yaniz, I. Zanette, A. Rack, T. Weitkamp, P. Meyer, J. Mohr, and F. Pfeiffer	
Baseband modulation instability as the origin of rogue waves (<i>9 pages</i>)	033804
Fabio Baronio, Shihua Chen, Philippe Grelu, Stefan Wabnitz, and Matteo Conforti	

(Continued)

CONTENTS - *Continued*

PHYSICAL REVIEW A	THIRD SERIES, VOLUME 91, NUMBER 3	MARCH 2015
Enhancing parameter precision of optimal quantum estimation by direct quantum feedback (6 pages)		033805
Qiang Zheng, Li Ge, Yao Yao, and Qi-jun Zhi		
Discrete gap solitons in nonlinear binary plasmonic waveguide arrays (5 pages)		033806
Jie-Yun Yan		
Light propagation in periodically modulated complex waveguides (6 pages)		033807
Sean Nixon and Jianke Yang		
Formulation of the twisted-light–matter interaction at the phase singularity: The twisted-light gauge (11 pages)		033808
G. F. Quinteiro, D. E. Reiter, and T. Kuhn		
Theory of high-efficiency sum-frequency generation for single-photon waveform conversion (11 pages)		033809
John M. Donohue, Michael D. Mazurek, and Kevin J. Resch		
Spatiotemporal optical bullets in two-dimensional fiber arrays and their stability (6 pages)		033810
Alejandro B. Aceves, Olga V. Shtyrina, Alexander M. Rubenchik, Mikhail P. Fedoruk, and Sergei K. Turitsyn		
Parity-time-antisymmetric atomic lattices without gain (10 pages)		033811
Jin-Hui Wu, M. Artoni, and G. C. La Rocca		
Electron vortex beams in a magnetic field and spin filter (6 pages)		033812
Debashree Chowdhury, Banasri Basu, and Pratul Bandyopadhyay		
Experimental evidence for inhomogeneous pumping and energy-dependent effects in photon Bose-Einstein condensation (5 pages)		033813
J. Marelic and R. A. Nyman		
Conditional superpositions of Gaussian operations on different modes of light (9 pages)		033814
Kimin Park, Petr Marek, and Radim Filip		
Interplay of disorder and $\mathcal{PT}$ symmetry in one-dimensional optical lattices (8 pages)		033815
Cristian Mejía-Cortés and Mario I. Molina		
Tunable, nonlinear Hong-Ou-Mandel interferometer (10 pages)		033816
D. Oehri, M. Pletyukhov, V. Gritsev, G. Blatter, and S. Schmidt		
Nonparaxial aberrations in the optical Talbot effect probed by quantum-dot fluorescence tomography (5 pages)		033817
Hyosub Kim, Woojun Lee, Hangeol Lee, and Jaewook Ahn		
Coupled cavities for motional ground-state cooling and strong optomechanical coupling (10 pages)		033818
Yong-Chun Liu, Yun-Feng Xiao, Xingsheng Luan, Qihuang Gong, and Chee Wei Wong		
Ground state in the finite Dicke model for interacting qubits (7 pages)		033819
R. A. Robles Robles, S. A. Chilingaryan, B. M. Rodríguez-Lara, and Ray-Kuang Lee		
Controlling directionality and the statistical regime of the random laser emission (7 pages)		033820
Federico Tommasi, Emilio Ignesti, Lorenzo Fini, and Stefano Cavalieri		
Continuous-wave lasing between Landau levels in graphene (8 pages)		033821
Yongrui Wang, Mikhail Tokman, and Alexey Belyanin		

(Continued)

CONTENTS - *Continued*

PHYSICAL REVIEW A

THIRD SERIES, VOLUME 91, NUMBER 3

MARCH 2015

☞ Entanglement-enhanced time-continuous quantum control in optomechanics (<i>19 pages</i>)	033822
Sebastian G. Hofer and Klemens Hammerer	
Stationary discrete solitons in a driven dissipative Bose-Hubbard chain (<i>10 pages</i>)	033823
Uta Naether, Fernando Quijandría, Juan José García-Ripoll, and David Zueco	
Generation of higher-dimensional modal entanglement using a three-waveguide directional coupler (<i>9 pages</i>)	033824
Divya Bharadwaj, K. Thyagarajan, Michal Karpinski, and Konrad Banaszek	
Parity-time symmetry from stacking purely dielectric and magnetic slabs (<i>6 pages</i>)	033825
James Gear, Fu Liu, S. T. Chu, Stefan Rotter, and Jensen Li	
Thermalization and breakdown of thermalization in photon condensates (<i>15 pages</i>)	033826
Peter Kirton and Jonathan Keeling	
Flat and self-trapping photonic bands through coupling of two unidirectional edge modes (<i>5 pages</i>)	033827
Yun-tuan Fang, Han-Qing He, Jian-xia Hu, Lin-kun Chen, and Zhang Wen	
Effect of laser phase noise on the fidelity of optomechanical quantum memory (<i>10 pages</i>)	033828
F. Farman and A. R. Bahrampour	
Computable negativity in two-mode squeezing subject to dissipation (<i>11 pages</i>)	033829
Marcin Dukalski and Yaroslav M. Blanter	
Cyclic permutation-time symmetric structure with coupled gain-loss microcavities (<i>7 pages</i>)	033830
Bing He, Liu Yang, Zhaoyang Zhang, and Min Xiao	
Goos-Hänchen shift in a standing-wave-coupled electromagnetically-induced-transparency medium (<i>9 pages</i>)	033831
Xiao-Jun Zhang, Hai-Hua Wang, Zhi-Peng Liang, Yan Xu, Cun-Bo Fan, Cheng-Zhi Liu, and Jin-Yue Gao	
Observation of three-mode parametric instability (<i>9 pages</i>)	033832
X. Chen, C. Zhao, S. Danilishin, L. Ju, D. Blair, H. Wang, S. P. Vyatchanin, C. Molinelli, A. Kuhn, S. Gras, T. Briant, P.-F. Cohadon, A. Heidmann, I. Roch-Jeune, R. Flaminio, C. Michel, and L. Pinard	
Twisted anisotropic fibers for robust orbital-angular-momentum-based information transmission (<i>10 pages</i>)	033833
E. V. Barshak, C. N. Alexeyev, B. P. Lapin, and M. A. Yavorsky	
Interfacing microwave qubits and optical photons via spin ensembles (<i>14 pages</i>)	033834
Susanne Blum, Christopher O'Brien, Nikolai Lauk, Pavel Bushev, Michael Fleischhauer, and Giovanna Morigi	
Circuit analog of quadratic optomechanics (<i>16 pages</i>)	033835
Eun-jong Kim, J. R. Johansson, and Franco Nori	
☞ Real photons from vacuum fluctuations in optomechanics: The role of polariton interactions (<i>19 pages</i>)	033836
Marc-Antoine Lemonde and Aashish A. Clerk	
Comparative study of nonclassicality, entanglement, and dimensionality of multimode noisy twin beams (<i>11 pages</i>)	033837
Ievgen I. Arkhipov, Jan Peřina, Jr., Jan Peřina, and Adam Miranowicz	
Fractional quantum Hall states of Rydberg polaritons (<i>8 pages</i>)	033838
Mohammad F. Maghrebi, Norman Y. Yao, Mohammad Hafezi, Thomas Pohl, Ofer Firstenberg, and Alexey V. Gorshkov	

(Continued)

CONTENTS - *Continued*

PHYSICAL REVIEW A

THIRD SERIES, VOLUME 91, NUMBER 3

MARCH 2015

Extended laser filamentation in air generated by femtosecond annular Gaussian beams (7 pages)	033839
Z. F. Feng, W. Li, C. X. Yu, X. Liu, J. Liu, and L. B. Fu	

COMMENTS

Comment on “Solvability of the two-photon Rabi Hamiltonian” (2 pages)	037801
Andrzej J. Maciejewski, Maria Przybylska, and Tomasz Stachowiak	
Reply to “Comment on ‘Solvability of the two-photon Rabi Hamiltonian’ ” (1 page)	037802
I. Travěnek	

ERRATA

Erratum: Anisotropy enhancement of the Casimir-Polder force between a nanoparticle and graphene [Phys. Rev. A 90 , 042510 (2014)] (2 pages)	039901(E)
S.-A. Biehs and G. S. Agarwal	
Erratum: Precision measurements of temperature and chemical potential of quantum gases [Phys. Rev. A 88 , 063609 (2013)] (1 page)	039902(E)
Ugo Marzolino and Daniel Braun	
Publisher’s Note: High-efficiency quantum state transfer and quantum memory using a mechanical oscillator [Phys. Rev. A 91 , 032309 (2015)] (1 page)	039903(E)
Eyob A. Sete and H. Eleuch	