

*The Table of Contents is a total listing of Parts A and B.
Part A consists of pages L060201–062609, and Part B pages 062801–069902(E).*

PART A

LETTERS

Fundamental concepts

- Robustness of nonlocality in many-body open quantum systems (6 pages) L060201
Carlo Marconi, Andreu Riera-Campenya, Anna Sanpera, and Albert Aloy

Quantum information science

- Creating and destroying coherence with quantum channels (5 pages) L060401
Masaya Takahashi, Swapna Rana, and Alexander Streltsov

Atomic and molecular structure and dynamics; high-precision experiments

- High-precision solution of the Dirac equation for the hydrogen molecular ion by an iterative method (5 pages) ... L060801
Hugo D. Nogueira, Vladimir I. Korobov, and Jean-Philippe Karr
- Gradient-based reconstruction of molecular Hamiltonians and density matrices from time-dependent quantum observables (7 pages) L060802
Wucheng Zhang, Ilya Tutunnikov, Ilya Sh. Averbukh, and Roman V. Krems

Light-induced processes in atomic-scale systems

-  Magneto-optical trapping of a group-III atom (6 pages) L061101
Xianquan Yu, Jinchao Mo, Tiangao Lu, Ting You Tan, and Travis L. Nicholson

Ultracold systems and matter waves

- How to realize a homogeneous dipolar Bose gas in the roton regime (7 pages) L061301
Péter Juhász, Milan Krstajić, David Strachan, Edward Gandar, and Robert P. Smith
- Long-lifetime supersolid in a two-component dipolar Bose-Einstein condensate (7 pages) L061302
Shaoyong Li, Uyen Ngoc Le, and Hiroki Saito

Photonics, nonlinear optics, and optomechanics

- Engineering Casimir interactions with epsilon-near-zero materials (6 pages) L061501
Miguel Camacho, Tao Gong, Benjamin Spreng, Iñigo Liberal, Nader Engheta, and Jeremy N. Munday



Copyright 2022 by American Physical Society

(Continued)



2469-9926(202206)105:6:B;1-U

CONTENTS - *Continued*

PHYSICAL REVIEW A	THIRD SERIES, VOLUME 105, NUMBER 6	JUNE 2022
Observation of edge-to-edge topological transport in a photonic lattice (7 pages)		L061502
Weijie Liu, Chaohua Wu, Yuechen Jia, Suotang Jia, Gang Chen, and Feng Chen		
Superkicks and the photon angular and linear momentum density (6 pages)		L061503
Andrei Afanasev, Carl E. Carlson, and Asmita Mukherjee		
Optomechanically induced thermal bistability in an optical microresonator (7 pages)		L061504
Zhoutian Fu and Lan Yang		

ARTICLES

Fundamental concepts

Giant diamagnetism of a quantum charged particle after inversion of the magnetic field (7 pages)	062201
V. V. Dodonov and A. V. Dodonov	
Locality of three-qubit Greenberger-Horne-Zeilinger-symmetric states (7 pages)	062202
Dian Zhu, Gang-Gang He, and Fu-Lin Zhang	
Collective effects and quantum coherence in dissipative charging of quantum batteries (11 pages)	062203
Franco Mayo and Augusto J. Roncaglia	
Lyapunov equation in open quantum systems and non-Hermitian physics (19 pages)	062204
Archak Purkayastha	
Solvable dilation model of time-dependent $\mathcal{PT}$ -symmetric systems (8 pages)	062205
Minyi Huang, Ray-Kuang Lee, Qing-hai Wang, Guo-Qiang Zhang, and Junde Wu	
Observation of quantum phase synchronization in a nuclear-spin system (9 pages)	062206
V. R. Krithika, Parvinder Solanki, Sai Vinjanampathy, and T. S. Mahesh	
Non-Markovian dynamics of a single excitation within many-body dissipative systems (15 pages)	062207
Adam Burgess and Marian Florescu	
Relativistic free-motion time-of-arrival operator for massive spin-0 particles with positive energy (13 pages)	062208
Philip Caesar Flores and Eric A. Galapon	
Macroscopic delayed choice and retrocausality: Quantum eraser, Leggett-Garg, and dimension witness tests with cat states (22 pages)	062209
Manushan Thenabadu and M. D. Reid	
Universal relation for operator complexity (10 pages)	062210
Zhong-Ying Fan	
Zitterbewegung of massless particles (12 pages)	062211
Alexander J. Silenko	
Conditions for local transformations between sets of quantum states (10 pages)	062212
Somshubhro Bandyopadhyay, Saronath Halder, and Ritabrata Sengupta	
Eigenstates of Maxwell's equations in multiconstituent microstructures (9 pages)	062213
David J. Bergman	

(Continued)

CONTENTS - Continued

PHYSICAL REVIEW A

THIRD SERIES, VOLUME 105, NUMBER 6

JUNE 2022

Encircling exceptional points in non-Hermitian systems with quasidegenerate energy levels (8 pages)	062214
Ming-Xuan Shi, X. M. Su, and Xu-Lin Zhang	
Robust coincidence Bell inequalities for the noisy n -qutrit Greenberger-Horne-Zeilinger state (12 pages)	062215
Hui-Xian Meng, Zhong-Yan Li, Xing-Yan Fan, Jia-Le Miao, Hong-Ye Liu, Yi-Jia Liu, Wei-Min Shang, Jie Zhou, and Jing-Ling Chen	
Indefinite causal orders from superpositions in time (5 pages)	062216
David Felce, Nicetu Tibau Vidal, Vlatko Vedral, and Eduardo O. Dias	
Fluctuation theorems for multitime processes (12 pages)	062217
Zhiqiang Huang (黄志强)	
Quantum quench thermodynamics at high temperatures (9 pages)	062218
Adalberto D. Varizi, Raphael C. Drumond, and Gabriel T. Landi	
Counting statistics of energy transport across squeezed thermal reservoirs (14 pages)	062219
Hari Kumar Yadalam, Bijay Kumar Agarwalla, and Upendra Harbola	
Quantum information science	
Verifying angular-position entanglement by Hardy's paradox with multisetting high-dimensional systems (7 pages)	062401
Dongkai Zhang, Xiaodong Qiu, Wuhong Zhang, and Lixiang Chen	
Entanglement polygon inequality in qudit systems (10 pages)	062402
Xue Yang, Yan-Han Yang, and Ming-Xing Luo	
Short quantum circuits in reinforcement learning policies for the vehicle routing problem (13 pages)	062403
Fabio Sanches, Sean Weinberg, Takanori Ide, and Kazumitsu Kamiya	
Measurement error mitigation in quantum computers through classical bit-flip correction (24 pages)	062404
Lena Funcke, Tobias Hartung, Karl Jansen, Stefan Kühn, Paolo Stornati, and Xiaoyang Wang	
Optimal entanglement enhancing via conditional measurements (8 pages)	062405
Jiru Liu, Yusef Maleki, and M. Suhail Zubairy	
Quantum annealing for hard 2-satisfiability problems: Distribution and scaling of minimum energy gap and success probability (16 pages)	062406
Vrinda Mehta, Fengping Jin, Hans De Raedt, and Kristel Michielsen	
Teleportation of discrete-variable qubits via continuous-variable lossy channels (11 pages)	062407
Mingjian He, Robert Malaney, and Ryan Aguinaldo	
Unified generation and fast emission of arbitrary single-photon multimode W states (10 pages)	062408
Juncong Zheng, Jie Peng, Pinghua Tang, Fei Li, and Na Tan	
Coarse-grained intermolecular interactions on quantum processors (25 pages)	062409
Lewis W. Anderson, Martin Kiffner, Panagiotis Kl. Barkoutsos, Ivano Tavernelli, Jason Crain, and Dieter Jaksch	
Collisional open quantum dynamics with a generally correlated environment: Exact solvability in tensor networks (7 pages)	062410
Sergey N. Filippov and Ilia A. Luchnikov	

(Continued)

CONTENTS - *Continued*

PHYSICAL REVIEW A

THIRD SERIES, VOLUME 105, NUMBER 6

JUNE 2022

Multiparameter quantum metrology with discrete-time quantum walks (<i>11 pages</i>)	062411
Mostafa Annabestani, Majid Hassani, Dario Tamascelli, and Matteo G. A. Paris	
Classical analogs of the covariance matrix, purity, linear entropy, and von Neumann entropy (<i>14 pages</i>)	062412
Bogar Díaz, Diego González, Daniel Gutiérrez-Ruiz, and J. David Vergara	
Entanglement witnessing by arbitrarily many independent observers recycling a local quantum shared state (<i>6 pages</i>)	062413
Chirag Srivastava, Mahasweta Pandit, and Ujjwal Sen	
Direct measurement of density-matrix elements with a phase-shifting technique on a quantum photonic chip (<i>6 pages</i>)	062414
Congxiu Li, Yaxin Wang, Tianfeng Feng, Zhihao Li, Changliang Ren, and Xiaoqi Zhou	
Using gradient-based algorithms to determine ground-state energies on a quantum computer (<i>11 pages</i>)	062415
Tomislav Piskor, Jan-Michael Reiner, Sebastian Zanker, Nicolas Vogt, Michael Marthaler, Frank K. Wilhelm, and Florian G. Eich	
Performance-tradeoff relation for locating two incoherent optical point sources (<i>10 pages</i>)	062416
Jingjing Shao and Xiao-Ming Lu	
Key graph properties affecting transport efficiency of flip-flop Grover percolated quantum walks (<i>15 pages</i>)	062417
J. Mareš, J. Novotný, M. Štefaňák, and I. Jex	
Measurement-based logical qubit entanglement purification (<i>16 pages</i>)	062418
Pei-Shun Yan, Lan Zhou, Wei Zhong, and Yu-Bo Sheng	
Convex-roof entanglement measures of density matrices block diagonal in disjoint subspaces for the study of thermal states (<i>12 pages</i>)	062419
Mikołaj Jędrzejewski, Kacper Kinastowski, and Katarzyna Roszak	
Geodesic quantum walks (<i>7 pages</i>)	062420
Giuseppe Di Molfetta and Victor Deng	
Simulating time evolution with fully optimized single-qubit gates on parametrized quantum circuits (<i>20 pages</i>)	062421
Kaito Wada, Rudy Raymond, Yu-ya Ohnishi, Eriko Kaminishi, Michihiko Sugawara, Naoki Yamamoto, and Hiroshi C. Watanabe	
Path-orbital-angular-momentum high-dimensional hyperentangled photons from a warm atomic ensemble (<i>6 pages</i>)	062422
Qiwu Hu, Yuan Ren, Xutong Wang, Xiao-Min Hu, and Jietai Jing	
Estimating quantum coherence by noncommutativity of any observable and its incoherent part (<i>5 pages</i>)	062423
Tanaya Ray, Ahana Ghoshal, Arun Kumar Pati, and Ujjwal Sen	
Many-fermion simulation from the contracted quantum eigensolver without fermionic encoding of the wave function (<i>11 pages</i>)	062424
Scott E. Smart and David A. Mazziotti	
Optimal linear-optical noiseless quantum amplifiers driven by auxiliary multiphoton Fock states (<i>8 pages</i>)	062425
Jaromír Fiurášek	

(Continued)

CONTENTS - *Continued*

PHYSICAL REVIEW A	THIRD SERIES, VOLUME 105, NUMBER 6	JUNE 2022
Nonreciprocal quantum correlations and dense coding (7 pages)		062426
Muzzamal Iqbal Shaukat		
Gravity-enhanced quantum spatial target detection (7 pages)		062428
Qianqian Liu, Cuihong Wen, Zehua Tian, Jiliang Jing, and Jieci Wang		
Relation between non-Markovianity and Landauer's principle (8 pages)		062429
Hao-Ran Hu, Lei Li, Jian Zou, and Wu-Ming Liu		
Straddling-gates problem in multipartite quantum systems (6 pages)		062430
Yuxuan Zhang		
Statistical complexity of quantum circuits (19 pages)		062431
Kaifeng Bu, Dax Enshan Koh, Lu Li, Qingxian Luo, and Yaobo Zhang		
Optimal supplier of single-error-type entanglement via coherent-state transmission (12 pages)		062432
Koji Azuma, Nobuyuki Imoto, and Masato Koashi		
Thermodynamic length and work optimization for Gaussian quantum states (12 pages)		062434
Mohammad Mehboudi and Harry J. D. Miller		
Quantum and classical annealing in a continuous space with multiple local minima (18 pages)		062435
Yang Wei Koh and Hidetoshi Nishimori		
Single-step implementation of a hybrid controlled-NOT gate with one superconducting qubit simultaneously controlling multiple target cat-state qubits (11 pages)		062436
Qi-Ping Su, Yu Zhang, and Chui-Ping Yang		
Efficiency of photonic state tomography affected by fiber attenuation (11 pages)		062437
Artur Czerwinski and Jakub Szlachetka		
Nonlinear quantum error correction (11 pages)		062438
Maximilian Reichert, Louis W. Tessler, Marcel Bergmann, Peter van Loock, and Tim Byrnes		
Tensor-network discriminator architecture for classification of quantum data on quantum computers (17 pages)		062439
Michael L. Wall, Paraj Titum, Gregory Quiroz, Michael Foss-Feig, and Kaden R. A. Hazzard		
Preparing many copies of a quantum state in the black-box model (5 pages)		062440
Yassine Hamoudi		
Optical control of the complex phase of a quantum ground-state amplitude (12 pages)		062441
Adam Kinosh, Mogens Dalgaard, and Klaus Mølmer		
Incompatibility measures in multiparameter quantum estimation under hierarchical quantum measurements (29 pages)		062442
Hongzhen Chen, Yu Chen, and Haidong Yuan		
Robust optimization for quantum reinforcement learning control using partial observations (12 pages)		062443
Chen Jiang, Yu Pan, Zheng-Guang Wu, Qing Gao, and Daoyi Dong		
Quantum signal processing for simulating cold plasma waves (18 pages)		062444
I. Novikau, E. A. Startsev, and I. Y. Dodin		

(Continued)

CONTENTS - *Continued*

PHYSICAL REVIEW A

THIRD SERIES, VOLUME 105, NUMBER 6

JUNE 2022

Quantum state transfer between a frequency-encoded photonic qubit and a quantum-dot spin in a nanophotonic waveguide (<i>14 pages</i>)	062445
Ming Lai Chan, Ziv Aqua, Alexey Tiranov, Barak Dayan, Peter Lodahl, and Anders S. Sørensen	
Deterministic Gaussian conversion protocols for non-Gaussian single-mode resources (<i>14 pages</i>)	062446
Oliver Hahn, Patric Holmvall, Pascal Stadler, Giulia Ferrini, and Alessandro Ferraro	
Measurement disturbance tradeoffs in three-qubit unsupervised quantum classification (<i>11 pages</i>)	062447
Hector Spencer-Wood, John Jeffers, and Sarah Croke	
Experimental investigation of equivalent Laplacian and adjacency quantum walks on irregular graphs (<i>7 pages</i>)	062448
Dengke Qu, Lei Xiao, Kunkun Wang, Xiang Zhan, and Peng Xue	
Analysis of quantum correlations within the ground state of a three-level Lipkin model (<i>11 pages</i>)	062449
Javier Faba, Vicente Martín, and Luis Robledo	
Entanglement resonance in the asymmetric quantum Rabi model (<i>9 pages</i>)	062450
Yu-Qing Shi, Lei Cong, and Hans-Peter Eckle	
Quantum cost of dense coding and teleportation (<i>11 pages</i>)	062451
Xinyu Qiu and Lin Chen	
Progress toward larger molecular simulation on a quantum computer: Simulating a system with up to 28 qubits accelerated by point-group symmetry (<i>12 pages</i>)	062452
Changsu Cao, Jiaqi Hu, Wengang Zhang, Xusheng Xu, Dechin Chen, Fan Yu, Jun Li, Han-Shi Hu, Dingshun Lv, and Man-Hong Yung	
Asymptotically improved circuit for a d -ary Grover's algorithm with advanced decomposition of the n -qudit Toffoli gate (<i>12 pages</i>)	062453
Amit Saha, Ritajit Majumdar, Debasri Saha, Amlan Chakrabarti, and Susmita Sur-Kolay	
Long-distance distribution of qubit-qubit entanglement using Gaussian-correlated photonic beams (<i>14 pages</i>)	062454
J. Agustí, Y. Minoguchi, J. M. Fink, and P. Rabl	
Hard-instance learning for quantum adiabatic prime factorization (<i>9 pages</i>)	062455
Jian Lin, Zhengfeng Zhang, Junping Zhang, and Xiaopeng Li	
Efficient generation of spin cat states with twist-and-turn dynamics via machine optimization (<i>10 pages</i>)	062456
Jiahao Huang, Hongtao Huo, Min Zhuang, and Chaohong Lee	
Effective spin models of Kerr-nonlinear parametric oscillators for quantum annealing (<i>9 pages</i>)	062457
Ryoji Miyazaki	
Fidelity-disturbance-entropy tradeoff in quantum channels (<i>9 pages</i>)	062458
Yuan Sun, Nan Li, and Shunlong Luo	
Detecting entanglement between modes of light (<i>9 pages</i>)	062459
Madhura Ghosh Dastidar and Gniewomir Sarbicki	
Quantum technologies	
Simultaneous stoquasticity (<i>10 pages</i>)	062601
Jacob Bringewatt and Lucas T. Brady	

(Continued)

CONTENTS - Continued

PHYSICAL REVIEW A

THIRD SERIES, VOLUME 105, NUMBER 6

JUNE 2022

One-step implementation of Rydberg nonadiabatic noncyclic geometric quantum computation in decoherence-free subspaces (8 pages)	062602
Li-Na Sun, F.-Q. Guo, Zheng Shan, M. Feng, L.-L. Yan, and Shi-Lei Su	
Quantum limits to resolution and discrimination of spontaneous emission lifetimes (12 pages)	062603
Cheyenne S. Mitchell and Mikael P. Backlund	
Quantum error correction in the noisy intermediate-scale quantum regime for sequential quantum computing (10 pages)	062604
Arvid Rolander, Adam Kinos, and Andreas Walther	
Combating fluctuations in relaxation times of fixed-frequency transmon qubits with microwave-dressed states (12 pages)	062605
Peng Zhao, Teng Ma, Yirong Jin, and Haifeng Yu	
Multipartite entanglement to boost superadditivity of coherent information in quantum communication lines with polarization-dependent losses (8 pages)	062606
Sergey N. Filippov	
Partial-ignorance communication tasks in quantum theory (13 pages)	062607
Oskari Kerppo	
 Proposal for transduction between microwave and optical photons using ^{167}Er -doped yttrium orthosilicate (8 pages)	062608
Faezeh Kimiaee Asadi, Jia-Wei Ji, and Christoph Simon	
Influence of spherical anisotropy on optical mass sensing in plasmonic-molecular optomechanics (12 pages)	062609
Elnaz Aleebrahim, Malek Bagheri Harouni, and Ehsan Amooghorban	

PART B

Atomic and molecular structure and dynamics; high-precision experiments

Triple-differential cross section for the twisted-electron-impact ionization of the water molecule (11 pages)	062801
Nikita Dhankhar and R. Choubisa	
End-to-end entanglement in a polar-molecule array under intrinsic decoherence (10 pages)	062802
Ying-Yen Liao	
Fixed-point quantum Monte Carlo method: A combination of density-matrix quantum Monte Carlo method and stochastic unravellings (10 pages)	062803
Romain Chessex, Massimo Borrelli, and Hans Christian Öttinger	
Larmor time of a bound electron wave packet tunneling through a barrier (5 pages)	062804
Lijuan Jia, Haijun Xing, and Libin Fu	
Ionization potentials and electron affinities of Rg, Cn, Nh, and Fl superheavy elements (9 pages)	062805
M. Y. Kaygorodov, D. P. Usov, E. Eliav, Y. S. Kozhedub, A. V. Malyshev, A. V. Oleynichenko, V. M. Shabaev, L. V. Skripnikov, A. V. Titov, I. I. Tupitsyn, and A. V. Zaitsevskii	
Two-photon annihilation of positrons with K -shell electrons of H-like ions (8 pages)	062806
Z. A. Mandrykina, V. A. Zaytsev, V. A. Yerokhin, and V. M. Shabaev	

(Continued)

CONTENTS - *Continued*

PHYSICAL REVIEW A

THIRD SERIES, VOLUME 105, NUMBER 6

JUNE 2022

Fragmentation of the $^4\text{He}_2$ dimer by relativistic highly charged projectiles in collisions with small kinetic energy release (<i>11 pages</i>)	062807
B. Najjari, S. F. Zhang, X. Ma, and A. B. Voitkiv	
Distinctive onset of electron correlation in molecular tautomers (<i>6 pages</i>)	062808
Kalyani Chordiya, Victor Despré, Mousumi U. Kahaly, and Alexander I. Kuleff	
Relativistic frequency shifts in Cr, Ti, Fe, Ni, Ca, Na, and V to search for variations in the fine-structure constant (<i>4 pages</i>)	062809
V. A. Dzuba, V. V. Flambaum, M. T. Murphy, and D. A. Berke	
State-resolved differential cross sections of single-electron capture in swift collisions of $\text{C}^{4+}(1s2s^3S)$ ions with gas targets (<i>17 pages</i>)	062810
I. Madesis, A. Laoutaris, S. Nanos, S. Passalidis, A. Dubois, T. J. M. Zouros, and E. P. Benis	
Electric dipole moments and static dipole polarizabilities of alkali-metal–alkaline-earth-metal molecules: Nonrelativistic versus relativistic coupled-cluster-theory analysis (<i>12 pages</i>)	062811
R. Mitra, B. K. Sahoo, and V. S. Prasanna	
Relative intensities of hyperfine components of rovibrational transitions in molecular hydrogen (<i>8 pages</i>)	062812
Hubert Jóźwiak and Piotr Wcisło	
Angular and polarization properties of the Lyman- α_1 line $2p_{3/2} \rightarrow 1s_{1/2}$ following electron-impact excitation of hydrogenlike ions (<i>7 pages</i>)	062813
Z. W. Wu, Z. M. He, Z. Q. Tian, C. Z. Dong, and S. Fritzsche	
Stopping-power calculations and the Levine-Mermin dielectric function for inner shells (<i>8 pages</i>)	062814
J. P. Peralta, M. Fiori, A. M. P. Mendez, and C. C. Montanari	
Relativistic normal coupled-cluster theory analysis of second- and third-order electric polarizabilities of Zn I (<i>11 pages</i>)	062815
A. Chakraborty, S. K. Rithvik, and B. K. Sahoo	
Sign inversion in the lateral van der Waals force (<i>9 pages</i>)	062816
Edson C. M. Nogueira, Lucas Queiroz, and Danilo T. Alves	
Differential and integral cross sections for the valence-shell excitations in D_2O studied by fast electron impact (<i>8 pages</i>)	062817
Zi-Ru Ma, Shu-Xing Wang, Yi-Geng Peng, Jian-Hui Zhu, Yuan-Chen Xu, Xiao-Jiao Du, Li-Han Wang, Wei-Qing Xu, Yong Wu, Jian-Guo Wang, and Lin-Fan Zhu	
Parabolic quasi-Sturmian approach to proton-impact ionization of helium (<i>14 pages</i>)	062818
A. S. Zaytsev, D. S. Zaytseva, S. A. Zaytsev, L. U. Ancarani, and K. A. Kouzakov	
Unusual behavior of Cooper minima of ns subshells in high- Z atoms (<i>9 pages</i>)	062819
S. Baral, S. Saha, K. A. Dubey, J. Jose, P. C. Deshmukh, A. K. Razavi, and S. T. Manson	
Concentration asymmetry and carbon enrichment in titanium carbide and silicon carbide clusters (<i>8 pages</i>)	062820
José I. Martínez and Julio A. Alonso	
☞ Vibrational excitation in the $e+\text{CO}_2$ system: Nonlocal model of $\Sigma\Pi$ vibronic coupling through the continuum (<i>24 pages</i>)	062821
Jan Dvořák, Karel Houfek, and Martin Čížek	

(Continued)

CONTENTS - Continued

PHYSICAL REVIEW A

THIRD SERIES, VOLUME 105, NUMBER 6

JUNE 2022

Electron emission from water vapor under the impact of 250-keV protons (9 pages)	062822
Abhijeet Bhogale, S. Bhattacharjee, M. Roy Chowdhury, Chandan Bagdia, M. F. Rojas, J. M. Monti, A. Jorge, M. Horbatsch, T. Kirchner, R. D. Rivarola, and L. C. Tribedi	
Rotational level spacings in HD from vibrational saturation spectroscopy (8 pages)	062823
F. M. J. Cozijn, M. L. Diouf, V. Hermann, E. J. Salumbides, M. Schlösser, and W. Ubachs	
Electron-impact high-lying N_2^- resonant states (10 pages)	062824
He Su, Xinlu Cheng, Bridgette Cooper, Jonathan Tennyson, and Hong Zhang	
Storage-ring study of the mutual neutralization of N^+ with O^- (8 pages)	062825
Mathias Poline, Stefan Rosén, MingChao Ji, Ansgar Simonsson, Peter Reinhed, Mats Larsson, Henning T. Schmidt, Richard D. Thomas, Arnaud Dochain, Xavier Urbain, Jon Grumer, Paul S. Barklem, Shaun G. Ard, Nicholas S. Shuman, and Albert A. Viggiano	
Light-induced processes in atomic-scale systems	
Determination of transition dipole moments of solids with high-order harmonics driven by multicycle ultrashort pulses (6 pages)	063101
Di Wu, Liang Li, Yuntian Zhan, Tengfei Huang, Hubin Cui, Jiapeng Li, Pengfei Lan, and Peixiang Lu	
Strong-field approximation with leading-order nondipole corrections (10 pages)	063102
Rešad Kahvedžić and Stefanie Gräfe	
Probing the effect of orbital deformation on the atomic tunneling-ionization-time distribution by phase-of-the-phase spectroscopy (9 pages)	063103
Miao Yu, Yueming Zhou, Min Li, and Peixiang Lu	
Measurements of blackbody-radiation-induced transition rates between high-lying S , P , and D Rydberg levels (8 pages)	063104
M. Archimi, M. Ceccanti, M. Distefano, L. Di Virgilio, R. Franco, A. Greco, C. Simonelli, E. Arimondo, D. Ciampini, and O. Morsch	
Capturing the stereoconfiguration of $(C_6H_6)_2Ar$ by Coulomb-explosion imaging (7 pages)	063105
Xitao Yu, Yuqian Liu, Ke Deng, Xinyu Zhang, Pan Ma, Xiaokai Li, Chuncheng Wang, Zhonghua Cui, Sizuo Luo, and Dajun Ding	
Dynamic extension of the Keldysh-Rutherford model for attoclocks (11 pages)	063106
Vladislav V. Serov and Anatoli S. Kheifets	
Multipolariton control in attosecond transient absorption of autoionizing states (8 pages)	063107
S. Yanez-Pagans, C. Cariker, M. Shaikh, L. Argenti, and A. Sandhu	
☞ Optically enhanced discharge excitation and trapping of ^{39}Ar (10 pages)	063108
Y.-Q. Chu, Z.-F. Wan, F. Ritterbusch, W.-K. Hu, J.-Q. Gu, S.-M. Hu, Z.-H. Jia, W. Jiang, Z.-T. Lu, L.-T. Sun, A.-M. Tong, J. S. Wang, and G.-M. Yang	
Tunneling ionization in ultrashort laser pulses: Edge effect and remedy (8 pages)	063109
M. Klaiber, Q. Z. Lv, K. Z. Hatsagortsyan, and C. H. Keitel	
Reconstruction of attosecond beating by interference of two-photon transitions on the lithium atom with Rabi oscillations (11 pages)	063110
Yijie Liao, Yueming Zhou, Liang-Wen Pi, Jintai Liang, Qinghua Ke, Yong Zhao, Min Li, and Peixiang Lu	

(Continued)

CONTENTS - *Continued*

PHYSICAL REVIEW A

THIRD SERIES, VOLUME 105, NUMBER 6

JUNE 2022

Simple, passive design for large optical trap arrays for single atoms (<i>12 pages</i>)	063111
P. Huft, Y. Song, T. M. Graham, K. Jooya, S. Deshpande, C. Fang, M. Kats, and M. Saffman	
Ionization of magnesium atoms in femtosecond 400-nm laser fields (<i>7 pages</i>)	063112
Jie Zhou, Bradford K. Talbert, Yu Hang Lai, Sha Li, Cosmin I. Blaga, Pierre Agostini, Xu Wang, and Louis F. DiMauro	
Ultracold systems and matter waves	
Manipulating Goldstone modes via superradiant light in a bosonic lattice gas inside a cavity (<i>10 pages</i>)	063301
Huan Wang, Shuai Li, Maksims Arzamasovs, W. Vincent Liu, and Bo Liu	
Supersolid phases of lattice dipoles tilted in three dimensions (<i>9 pages</i>)	063302
Jin Zhang, Chao Zhang, Jin Yang, and Barbara Capogrosso-Sansone	
Mobile impurity probing a two-dimensional superfluid phase transition (<i>8 pages</i>)	063303
R. Alhyder and G. M. Bruun	
Superfluid transition temperature and fluctuation theory of spin-orbit- and Rabi-coupled fermions with tunable interactions (<i>18 pages</i>)	063304
Philip D. Powell, Gordon Baym, and C. A. R. Sá de Melo	
Dynamics of optomechanical droplets in a Bose-Einstein condensate (<i>8 pages</i>)	063305
J. G. M. Walker, G. R. M. Robb, G.-L. Oppo, and T. Ackemann	
Characterizing quantum criticality and steered coherence in the <i>XY</i> -Gamma chain (<i>15 pages</i>)	063306
Zhuan Zhao, Tian-Cheng Yi, Ming Xue, and Wen-Long You	
Determination of the scattering length of erbium atoms (<i>12 pages</i>)	063307
A. Patscheider, L. Chomaz, G. Natale, D. Petter, M. J. Mark, S. Baier, B. Yang, R. R. W. Wang, J. L. Bohn, and F. Ferlaino	
Quantum phases of spin-orbital-angular-momentum-coupled bosonic gases in optical lattices (<i>10 pages</i>)	063308
Rui Cao, Jinsen Han, Jianhua Wu, Jianmin Yuan, Lianyi He, and Yongqiang Li	
Dynamical fermionization in a one-dimensional Bose-Fermi mixture (<i>20 pages</i>)	063309
Ovidiu I. Pâtu	
Three-body problem in a multiband Hubbard model (<i>6 pages</i>)	063310
M. Iskin	
Homonuclear ion-atom collisions: Application to $\text{Li}^+ - \text{Li}$ (<i>8 pages</i>)	063311
N. Joshi, M. Niranjana, A. Pandey, Olivier Dulieu, Robin Côté, and S. A. Rangwala	
Nonlinear Hall response in the driving dynamics of ultracold atoms in optical lattices (<i>7 pages</i>)	063312
Xiao-Long Chen and Wei Zheng	
Robust macroscopic matter-wave interferometry with solids (<i>8 pages</i>)	063313
Julen S. Pedernales and Martin B. Plenio	
Detecting entrainment in Fermi-Bose mixtures (<i>13 pages</i>)	063315
Khalid Hossain, Subhadeep Gupta, and Michael McNeil Forbes	
Bragg-diffraction-induced imperfections of the signal in retroreflective atom interferometers (<i>15 pages</i>)	063316
Jens Jenewein, Sabrina Hartmann, Albert Roura, and Enno Giese	

(Continued)

CONTENTS - Continued

PHYSICAL REVIEW A

THIRD SERIES, VOLUME 105, NUMBER 6

JUNE 2022

Pairing patterns in polarized unitary Fermi gases above the superfluid transition (6 pages)	063317
Felipe Attanasio, Lukas Rammelmüller, Joaquín E. Drut, and Jens Braun	
Phase separation and multistability of a two-component Bose-Einstein condensate in an optical cavity (9 pages)	063318
Abid Ali, Farhan Saif, and Hiroki Saito	
Faraday patterns in spin-orbit-coupled Bose-Einstein condensates (9 pages)	063319
Huan Zhang, Sheng Liu, and Yong-Sheng Zhang	
Quantum membrane phases in synthetic lattices of cold molecules or Rydberg atoms (8 pages)	063320
Chunhan Feng, Hannah Manetsch, Valery G. Rousseau, Kaden R. A. Hazzard, and Richard Scalettar	
Turbulence in rotating Bose-Einstein condensates (9 pages)	063321
Julian Amette Estrada, Marc E. Brachet, and Pablo D. Mininni	
Two-photon Raman transition channels of NaCs predicted from <i>ab initio</i> calculations (12 pages)	063322
Jingbo Wei, Peng Li, Jizhou Wu, Vladimir Sovkov, Wenliang Liu, Yuqing Li, Yongming Fu, Feng Xie, and Jie Ma	
Localization of ultracold atoms in Zeeman lattices with incommensurate spin-orbit coupling (9 pages)	063323
Dmitry A. Zezyulin and Vladimir V. Konotop	
Optical-plug-assisted spin vortex in a ^{87}Rb dipolar spinor Bose-Einstein condensate (8 pages)	063324
Hui Tang, Peng Du, Lei Jing, Su Yi, and Wenxian Zhang	
Superfluid vortex multipoles and soliton stripes on a torus (18 pages)	063325
J. D'Ambroise, R. Carretero-González, P. Schmelcher, and P. G. Kevrekidis	
Direct diagonalization method for a few particles trapped in harmonic potentials (8 pages)	063326
Abel Rojo-Francàs, Felipe Isaule, and Bruno Juliá-Díaz	
Topological Anderson insulators with different bulk states in quasiperiodic chains (11 pages)	063327
Ling-Zhi Tang, Shu-Na Liu, Guo-Qing Zhang, and Dan-Wei Zhang	
Vortices in quantum droplets of heteronuclear Bose mixtures (13 pages)	063328
Matteo Caldara and Francesco Ancilotto	
 Unitary Fermi superfluid near the critical temperature: Thermodynamics and sound modes from elementary excitations (6 pages)	063329
G. Bighin, A. Cappellaro, and L. Salasnich	
Photonics, nonlinear optics, and optomechanics	
Two emitters coupled to a bath with Kerr-like nonlinearity: Exponential decay, fractional populations, and Rabi oscillations (17 pages)	063501
J. Talukdar and D. Blume	
Observation of microcavity fine structure (7 pages)	063502
C. Koks, F. B. Baalbergen, and M. P. van Exter	
Bistable soliton switching dynamics in a $\mathcal{PT}$ -symmetric coupler with saturable nonlinearity (8 pages)	063503
Ambaresh Sahoo, Dipti Kanika Mahato, A. Govindarajan, and Amarendra K. Sarma	

(Continued)

CONTENTS - *Continued*

PHYSICAL REVIEW A

THIRD SERIES, VOLUME 105, NUMBER 6

JUNE 2022

Saddle-point exciton signature on high-order harmonic generation in two-dimensional hexagonal nanostructures (9 pages)	063504
H. K. Avetissian, S. S. Israelyan, H. H. Matevosyan, and G. F. Mkrtchian	
Effect of symmetry breaking on bound states in the continuum in waveguide arrays (7 pages)	063505
J. Petráček and V. Kuzmiak	
Combination of dissipative and dispersive coupling in the cavity optomechanical systems (10 pages)	063506
Alexandr Karpenko and Sergey P. Vyatchanin	
Quantum states of cylindrical surface charge density for modeling plasmonic circuit elements: Nanowires, nanorods, cavities, and waveguides (18 pages)	063507
M. Bagherian and A. Passian	
Coupling of magnetic and optomechanical structuring in cold atoms (9 pages)	063508
T. Ackemann, G. Labeyrie, A. Costa Boquete, G. Baio, J. G. M. Walker, R. Kaiser, G.-L. Oppo, and G. R. M. Robb	
Nonlinear magnetoelectric effect in atomic vapor and its application to precision radio-frequency magnetometry (7 pages)	063509
Sushree S. Sahoo, Soumya R. Mishra, G. Rajalakshmi, and Ashok K. Mohapatra	
Approximating transmission and reflection spectra near isolated nondegenerate resonances (8 pages)	063510
Hongyao Wu, Lijun Yuan, and Ya Yan Lu	
Linear and nonlinear Bragg diffraction by electromagnetically induced gratings with $\mathcal{PT}$ symmetry and their active control in a Rydberg atomic gas (15 pages)	063511
Jie Gao, Chao Hang, and Guoxiang Huang	
Truncated optical Bessel modes (9 pages)	063512
K. Koksál, M. Babiker, V. E. Lembessis, and J. Yuan	
Light propagation in a random three-dimensional ensemble of point scatterers in a waveguide: Size-dependent switching between diffuse radiation transfer and Anderson localization of light (6 pages)	063513
A. S. Kuraptsev and I. M. Sokolov	
Manipulating the transverse spin angular momentum and Belinfante momentum of spin-polarized light by a tilted stratified medium in optical tweezers (9 pages)	063514
Sauvik Roy, Nirmalya Ghosh, Ayan Banerjee, and Subhasish Dutta Gupta	
Pinpointing the macroscopic signatures of attosecond transient absorption in helium: Reshaped spectral splitting and persistent quantum beating (10 pages)	063515
Jiajia Liu, Wei Cao, Qingbin Zhang, and Peixiang Lu	
Thermodynamic forces and flows between a thermal bath and a squeezed thermal bath: Application to optomechanical systems (12 pages)	063516
Sareh Shahidani	
Optical force between two coupled identical parallel optical nanofibers (7 pages)	063517
Fam Le Kien, Síle Nic Chormaic, and Thomas Busch	
Control of harmonic orbital angular momentum in second-harmonic generation of perfect vortices (7 pages)	063518
Zhi-Feng Liu (刘志峰), Zhi-Cheng Ren (任志成), Yan-Chao Lou (娄严超), Zi-Mo Cheng (程子默), Yu-Xiang Yang (杨雨翔), Yongnan Li (李勇男), Jianping Ding (丁剑平), Xi-Lin Wang (汪喜林), and Hui-Tian Wang (王慧田)	

(Continued)

CONTENTS - Continued

PHYSICAL REVIEW A	THIRD SERIES, VOLUME 105, NUMBER 6	JUNE 2022
Unusual scenarios in four-wave-mixing instability (6 pages)		063519
Shalva Amiranashvili and Uwe Bandelow		
Observation and analysis of nonlinear scattering using the scattered-light imaging method (8 pages)		063520
Kelly C. Jorge, Anderson M. Amaral, Albert S. Reyna, Leonardo de S. Menezes, and Cid B. de Araújo		
Quantum optics		
Collective bosonic effects in an array of transmon devices (24 pages)		063701
Tuure Orell, Maximilian Zanner, Mathieu L. Juan, Aleksei Sharafiev, Romain Albert, Stefan Oleschko, Gerhard Kirchmair, and Matti Silveri		
Quantum statistics engineering in a hybrid nanoparticle-emitter-cavity system (20 pages)		063702
Shuting Shen, Jiahua Li, and Ying Wu		
Distinguishability in quantum interference with multimode squeezed states (19 pages)		063703
Valery Shchesnovich		
Entanglement enhancement in cavity magnomechanics by an optical parametric amplifier (7 pages)		063704
Bakht Hussain, Shahid Qamar, and Muhammad Irfan		
Phase-stable source of high-quality three-photon polarization entanglement by cascaded down-conversion (6 pages)		063705
Zachary M. E. Chaisson, Patrick F. Poitras, Micaël Richard, Yannick Castonguay-Page, Paul-Henry Glinel, Véronique Landry, and Deny R. Hamel		
Almost indistinguishable single photons via multiplexing cascaded biphotons with cavity modulation and phase compensation (8 pages)		063706
Y.-E. Wong, T. H. Chang, and H. H. Jen		
Simple way to incorporate loss when modeling multimode-entangled-state generation (16 pages)		063707
Colin Vendromin and Marc M. Dignam		
Weak-measurement method for surface-roughness estimation (7 pages)		063708
Hui-Chao Qu, Ya Xiao, Xin-Hong Han, Shan-Chuan Dong, and Yong-Jian Gu		
Unresolved sideband photon recoil spectroscopy of molecular ions (18 pages)		063709
Emilie H. Clausen, Vincent Jarlaud, Karin Fisher, Steffen Meyer, Cyrille Solaro, and Michael Drewsen		
Constraints between concurrence and polarization for mixed states subjected to open system dynamics (7 pages)		063710
Y. Yugra, C. Montenegro, and F. De Zela		
Resonant dipole-dipole interactions in electromagnetically induced transparency (12 pages)		063711
H. H. Jen, G.-D. Lin, and Y.-C. Chen		
Time-resolved observation of a dynamical phase transition with atoms in a cavity (8 pages)		063712
T. W. Clark, A. Dombi, F. I. B. Williams, Á. Kurkó, J. Fortágh, D. Nagy, A. Vukics, and P. Domokos		
Fourth-order moment of the light field in the atmosphere for moderate and strong turbulence (10 pages)		063713
Roman Baskov		
Guiding and polarization shaping of vector beams in anisotropic media (9 pages)		063714
Nilamoni Daloi, Pardeep Kumar, and Tarak Nath Dey		

(Continued)

CONTENTS - *Continued*

PHYSICAL REVIEW A	THIRD SERIES, VOLUME 105, NUMBER 6	JUNE 2022
Advantages of the frequency-conversion technique in quantum interference (7 pages)		063715
Chen Yang, Su-Jian Niu, Zhi-Yuan Zhou, Yan Li, Yin-Hai Li, Zheng Ge, Ming-Yuan Gao, Zhao-Qi-Zhi Han, Ren-Hui Chen, Guang-Can Guo, and Bao-Sen Shi		
Photocounting statistics of superconducting nanowire single-photon detectors (15 pages)		063716
V. A. Uzunova and A. A. Semenov		
Experimental preparation of generalized cat states for itinerant microwave photons (14 pages)		063717
Zenghui Bao, Zhiling Wang, Yukai Wu, Yan Li, Weizhou Cai, Weiting Wang, Yuwei Ma, Tianqi Cai, Xiyue Han, Jiahui Wang, Yipu Song, Luyan Sun, Hongyi Zhang, and Luming Duan		
Controlling quantum coherence and entanglement in cavity magnomechanical systems (10 pages)		063718
Wenyue Qiu, Xiaohan Cheng, Aixi Chen, Yueheng Lan, and Wenjie Nie		
Interference-induced directional emission from an unpolarized two-level emitter into a circulating cavity (13 pages)		063719
Lucas Ostrowski, Scott Parkins, Morito Shirane, and Mark Sadgrove		
Nonlocal quantum state interferography (10 pages)		063720
Dhilipan P. and Raghavan G.		
Single-photon sources based on asymmetric spatial multiplexing with optimized inputs (14 pages)		063721
Peter Adam, Ferenc Bodog, Matyas Koniorczyk, and Matyas Mechler		
Nonclassical correlations of radiation in relation to Bell nonlocality (14 pages)		063722
V. S. Kovtoniuk, I. S. Yermenko, S. Ryl, W. Vogel, and A. A. Semenov		
Phase-space dynamics of a single-atom laser: Nonclassicality and bistability (15 pages)		063723
A. B. Mikhalychev, S. V. Vlasenko, and S. Ya. Kilin		
Tunable quantum interference effects in Floquet two- and three-level systems (9 pages)		063724
Yingying Han, Minchen Qiao, Xiao-Qing Luo, Tie-Fu Li, Wenxian Zhang, Xiu-Hao Deng, J. Q. You, and Dapeng Yu		

ERRATA

Erratum: Sufficient conditions and constraints for reversing general quantum errors [Phys. Rev. A 102 , 062415 (2020)] (1 page)	069901(E)
Alvin Gonzales, Daniel Dilley, and Mark Byrd	
Erratum: Rotating and vibrating symmetric-top molecule RaOCH_3 in fundamental $\mathcal{P}$, $\mathcal{T}$ -violation searches [Phys. Rev. A 105 , 032811 (2022)] (2 pages)	069902(E)
Anna Zakharova	