PHYSICAL REVIEW A™

For editorial and subscription correspondence, please see inside front cover
(ISSN: 2469-9926)

PERIODICALS
Postmaster send address changes to:

APS Subscription Services
P.O. Box 41
Annapolis Junction, MD 20701

THIRD SERIES, VOLUME 109, NUMBER 6
PARTS A AND B

CONTENTS

JUNE 2024

The Table of Contents is a total listing of Parts A and B.
Part A consists of pages L060201–062620, and Part B pages 062801–069901(E).

PART A

LETTERS

Fundamental concepts

Bypassing thermalization timescales in temperature estimation using prethermal probes *(7 pages)* L060201
Nicholas Anto-Sztrikacs, Harry J. D. Miller, Ahsan Nazir, and Dvira Segal

Quantum technologies

Weak-measurement-based pseudospin pointer: A cost-effective scheme for precision measurement *(6 pages)* L060601
Ling Ye, Lan Luo, An Wang, Rongchun Ge, and Zhiyou Zhang

Atomic and molecular structure and dynamics; high-precision experiments

Charge transfer via temporary bonds in $C_{60} + C_{60}^{+}$ molecular collisions *(6 pages)* L060801
J. Smucker, J. A. Montgomery, Jr., M. Bredice, M. G. Rozman, E. Yankson, R. Côté, and V. Kharchenko

Chiral photoelectron spectroscopy using unpolarized light *(8 pages)* L060802
Yoshi-Ichi Suzuki

Ultracold systems and matter waves

Antiferromagnetic behavior in self-bound one-dimensional composite bosons *(5 pages)* L061301
M. C. Gordillo

Conformal invariance in out-of-equilibrium Bose-Einstein condensates governed by the Gross-Pitaevskii equation *(5 pages)* L061302
J. Amette Estrada, M. Noseda, P. J. Cobelli, and P. D. Mininni

Ultracold coherent control of molecular collisions at a Förster resonance *(6 pages)* L061303
Thibault Delarue and Goulven Quéméner

Two-mode squeezing in Floquet-engineered power-law interacting spin models *(6 pages)* L061304
Arman Duha and Thomas Bilitewski

Photonics, nonlinear optics, and optomechanics

Mesoscopic non-Hermitian skin effect *(6 pages)* L061501
Alexander Poddubny, Janet Zhong, and Shanhui Fan

(Continued)

2469-9926(202406)109:6:B;1-O

This paper was highlighted in the APS publication *Physics* (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).

PHYSICAL REVIEW A THIRD SERIES, VOLUME 109, NUMBER 6 JUNE 2024

Topological phase transition in fluctuating imaginary gauge fields *(6 pages)* L061502
Bikashkali Midya

Topological winding guaranteed coherent orthogonal scattering *(9 pages)* L061503
Cheng Guo and Shanhui Fan

ARTICLES

Fundamental concepts

Generalized-rate-operator quantum jumps via realization-dependent transformations *(12 pages)* 062201
Federico Settimo, Kimmo Luoma, Dariusz Chruściński, Bassano Vacchini, Andrea Smirne, and Jyrki Piilo

Retrievability of information in quantum and realistic hidden-variable theories *(14 pages)* 062202
Roope Uola, Erkka Haapasalo, Juha-Pekka Pellonpää, and Tom Kuusela

Semi-device-independent certification of the number of measurements *(7 pages)* 062203
Isadora Veeren, Martin Plávala, Leevi Leppäjärvi, and Roope Uola

Probing quantum chaos with the entropy of decoherent histories *(11 pages)* 062204
Evgeny Polyakov and Nataliya Arefyeva

Gauge invariance of the Aharonov-Bohm effect in a quantum electrodynamics framework *(6 pages)* 062205
Pablo L. Saldanha

Complete positivity violation of the reduced dynamics in higher-order quantum adiabatic elimination *(25 pages)* 062206
Masaaki Tokieda, Cyril Elouard, Alain Sarlette, and Pierre Rouchon

Unveiling quantum complementarity tradeoffs in relativistic scenarios *(12 pages)* 062207
Marcos L. W. Basso, Ismael L. Paiva, and Pedro R. Dieguez

Strong local passive state in the minimal quantum energy teleportation model *(9 pages)* 062208
Feng-Lin Wu, Hao Fan, Lu Wang, Shu-Qian Liu, Si-Yuan Liu, and Wen-Li Yang

Tests of macrorealism in meson oscillation physics *(8 pages)* 062209
Massimo Blasone, Fabrizio Illuminati, Luciano Petruzziello, Kyrylo Simonov, and Luca Smaldone

Quantum polyspectra approach to the dynamics of blinking quantum emitters at low photon rates without binning: Making every photon count *(10 pages)* 062210
M. Sifft, A. Kurzmann, J. Kerski, R. Schott, A. Ludwig, A. D. Wieck, A. Lorke, M. Geller, and D. Hägele

Effective-medium approach to the resonance distribution of wave scattering in a random point field *(13 pages)* . . . 062211
David Gaspard and Jean-Marc Sparenberg

Noninterferometric rotational test of the continuous spontaneous localization model: Enhancement of the collapse noise through shape optimization *(8 pages)* 062212
Davide Giordano Ario Altamura, Matteo Carlesso, Sandro Donadi, and Angelo Bassi

Relating completely positive divisibility of dynamical maps with compatibility of channels *(11 pages)* 062213
Arindam Mitra, Debashis Saha, Samyadeb Bhattacharya, and A. S. Majumdar

Efficient representation of Gaussian fermionic pure states in noncomputational bases *(12 pages)* 062214
Babak Tarighi, Reyhaneh Khasseh, and M. A. Rajabpour

(Continued)

This paper was highlighted in the APS publication *Physics* (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).

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 109, NUMBER 6** **JUNE 2024**

Liouville-space neural network representation of density matrices *(12 pages)* 062215
Simon Kothe and Peter Kirton

Tsirelson inequalities: Detecting cheating and quantumness in a single framework *(6 pages)* 062216
Martin Plávala, Teiko Heinosaari, Stefan Nimmrichter, and Otfried Gühne

Chiral dynamics of three-mode non-Hermitian systems with a periodical driving *(7 pages)* 062218
La-Tai You, Yu-Jia Gao, Guang-Tao Wang, and Gong-Ping Zheng

Degeneracy in excited-state quantum phase transitions of two-level bosonic models and its influence on system dynamics *(14 pages)* 062219
Jamil Khalouf-Rivera, Qian Wang, Lea F. Santos, José-Enrique García-Ramos, Miguel Carvajal, and Francisco Pérez-Bernal

Berry phase and quantum entanglement in a nonreciprocal composite system *(12 pages)* 062220
Xin Wang, H. D. Liu, and X. X. Yi

Conserved photon current *(5 pages)* 062221
Margaret Hawton

Real-time parameter estimation for two-qubit systems based on hybrid control *(13 pages)* 062222
Yue Tian, Xiujuan Lu, Sen Kuang, and Daoyi Dong

Evolution of strictly localized states in noninteracting quantum field theories with background fields *(10 pages)* 062223
M. Alkhateeb and A. Matzkin

Probability vector representation of the Schrödinger equation and Leggett-Garg-type experiments *(13 pages)* 062224
Masahiro Hotta and Sebastian Murk

Recovering an accurate Lindblad equation from the Bloch-Redfield equation for general open quantum systems *(11 pages)* 062225
Diego Fernández de la Pradilla, Esteban Moreno, and Johannes Feist

Quantum phase transition and critical behavior between the gapless topological phases *(12 pages)* 062226
Hao-Long Zhang, Han-Ze Li, Sheng Yang, and Xue-Jia Yu

Robustness of higher-dimensional nonlocality against dual noise and sequential measurements *(10 pages)* 062227
Saptarshi Roy, Asmita Kumari, Shiladitya Mal, and Aditi Sen(De)

Moment expansion method for composite open quantum systems including a damped oscillator mode *(19 pages)* 062228
Masaaki Tokieda

Time-periodic Klein-Gordon media: Tunable wave-vector gaps and Dirac dispersion with an exceptional point of degeneracy *(9 pages)* 062229
A. Paliovaios, V. Achilleos, G. Theocharis, D. Frantzeskakis, and N. Stefanou

Quantum information science

Relations between Markovian and non-Markovian correlations in multitime quantum processes *(11 pages)* 062401
Guilherme Zambon and Diogo O. Soares-Pinto

(Continued)

This paper was highlighted in the APS publication *Physics* (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).

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 109, NUMBER 6** **JUNE 2024**

Simulating the spin-boson model with a controllable reservoir in an ion trap *(8 pages)* 062402
G.-X. Wang, Y.-K. Wu, R. Yao, W.-Q. Lian, Z.-J. Cheng, Y.-L. Xu, C. Zhang, Y. Jiang, Y.-Z. Xu, B.-X. Qi, P.-Y. Hou, Z.-C. Zhou, L. He, and L.-M. Duan

Investigating controlled teleportation capability of quantum states with respect to k-separability *(6 pages)* 062403
Minjin Choi, Jeonghyeon Shin, Gunho Lee, and Eunok Bae

Active learning for quantum mechanical measurements *(8 pages)* 062404
Ruidi Zhu, Ciara Pike-Burke, and Florian Mintert

Sufficient conditions, lower bounds, and trade-off relations for quantumness in Kirkwood-Dirac quasiprobability *(12 pages)* 062405
Agung Budiyono

Classical shadow tomography with mutually unbiased bases *(12 pages)* 062406
Yu Wang and Wei Cui

Quantum multigraph states and multihypergraph states *(13 pages)* 062407
Xiao-Dong Zhang, Bin-Bin Cai, and Song Lin

Beating one bit of communication with quantum correlations in smaller dimensions *(5 pages)* 062408
Peter Sidajaya and Valerio Scarani

Hexapartite coherent feedback control in four-wave mixing with a spatially structured pump *(13 pages)* 062409
Haiyan He, Kai Zhang, and Jietai Jing

All-optical correlated noisy channel and its application in recovering quantum coherence *(8 pages)* 062410
Dan Lei, Disheng Guo, Jun Xin, and Xiao-Ming Lu

Concatenating quantum error-correcting codes with decoherence-free subspaces and vice versa *(12 pages)* 062411
Nihar Ranjan Dash, Sanjoy Dutta, R. Srikanth, and Subhashish Banerjee

Enhanced observable estimation through classical optimization of informationally overcomplete measurement data: Beyond classical shadows *(6 pages)* 062412
Joonas Malmi, Keijo Korhonen, Daniel Cavalcanti, and Guillermo García-Pérez

Partial-transpose-guided entanglement classes and minimum noise filtering in many-body Gaussian quantum systems *(15 pages)* 062413
Boyu Gao and Natalie Klco

Quantum control for the Zeno effect with noise *(21 pages)* 062414
Haorui Chen and Shengshi Pang

Dual-frame optimization for informationally complete quantum measurements *(12 pages)* 062415
Laurin E. Fischer, Timothée Dao, Ivano Tavernelli, and Francesco Tacchino

One-shot and asymptotic classical capacity in general physical theories *(10 pages)* 062416
Shintaro Minagawa and Hayato Arai

User-friendly confidence regions for quantum state tomography *(14 pages)* 062417
Carlos de Gois and Matthias Kleinmann

Reexamination of quantum state transformations with zero communication *(21 pages)* 062418
Ian George and Eric Chitambar

(Continued)

This paper was highlighted in the APS publication *Physics* (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).

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 109, NUMBER 6** **JUNE 2024**

Identification of a natural fieldlike entanglement resource in trapped-ion chains *(17 pages)* 062419
Natalie Klco and D. H. Beck

Information carried by a single particle in quantum multiple-access channels *(22 pages)* 062420
Xinan Chen, Yujie Zhang, Andreas Winter, Virginia O. Lorenz, and Eric Chitambar

Scalable algorithms for calculating power functions of random quantum states in the noisy intermediate-scale quantum era *(14 pages)* 062421
Ruyu Yang, Wencheng Zhao, and Tingting Chen

Exploring thermal equilibria of the Fermi-Hubbard model with variational quantum algorithms *(7 pages)* 062422
Jack Y. Araz, Michael Spannowsky, and Matthew Wingate

Manipulation of tunable nonreciprocal entanglement and one-way steering induced by two-photon driving *(8 pages)* 062423
Si-Yu Guan, Hong-Fu Wang, and Xuexi Yi

Generalized physically incoherent operations *(14 pages)* 062424
Ping Li and Yongming Li

Quantum sequential scattering model for quantum state learning *(18 pages)* 062425
Mingrui Jing, Geng Liu, Hongbin Ren, and Xin Wang

Near-threshold qudit stabilizer codes with efficient encoding circuits for magic-state distillation *(22 pages)* 062426
Abhi Kumar Sharma and Shayan Srinivasa Garani

Multiparticle entanglement classification with the ergotropic gap *(6 pages)* 062427
Xue Yang, Yan-Han Yang, Shao-Ming Fei, and Ming-Xing Luo

Enhancement of nonstabilizerness within indefinite causal order *(11 pages)* 062428
Yin Mo, Chengkai Zhu, Zhiping Liu, Mingrui Jing, and Xin Wang

Parameter shift rule with optimal phase selection *(13 pages)* 062429
Liubov Markovich, Savvas Malikis, Stefano Polla, and Jordi Tura

Nonreciprocity detector arrays for high-efficiency detection of itinerant microwave photons *(11 pages)* 062430
Suirong He, Penghui Ouyang, Haiyan Gao, Yufen Li, Jiaxing He, and L. F. Wei

Doubling the order of approximation via the randomized product formula *(11 pages)* 062431
Chien-Hung Cho, Dominic W. Berry, and Min-Hsiu Hsieh

Resonator-qutrit quantum battery *(9 pages)* 062432
Fang-Mei Yang and Fu-Quan Dou

Estimate of the time required to perform a nonadiabatic holonomic quantum computation *(9 pages)* 062433
Ole Sönnerborn

Mode-resolved thermometry of a trapped ion with deep learning *(7 pages)* 062434
Yi Tao, Ting Chen, Hongyang Wang, Jie Zhang, Ting Zhang, Yi Xie, Pingxing Chen, and Wei Wu

Reassessing the advantage of indefinite causal orders for quantum metrology *(27 pages)* 062435
Raphaël Mothe, Cyril Branciard, and Alastair A. Abbott

(Continued)

This paper was highlighted in the APS publication *Physics* (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).

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 109, NUMBER 6** **JUNE 2024**

Unitary averaging with fault and loss tolerance *(13 pages)* 062436
Ryan J. Marshman, Deepesh Singh, Timothy C. Ralph, and Austin P. Lund

Combining matrix product states and noisy quantum computers for quantum simulation *(13 pages)* 062437
Baptiste Anselme Martin, Thomas Ayral, François Jamet, Marko J. Rančić, and Pascal Simon

Implementing fault-tolerant non-Clifford gates using the [[8,3,2]] color code *(13 pages)* 062438
Daniel Honciuc Menendez, Annie Ray, and Michael Vasmer

Cooper-pair beam splitter as a feasible source of entangled electrons *(10 pages)* 062439
B. Sharmila, F. M. Souza, H. M. Vasconcelos, and L. Sanz

Quantum illumination using non-Gaussian states with conditional measurements *(10 pages)* 062440
Huan Zhang, Ying Xia, Wei Ye, Shoukang Chang, and Zeyang Liao

Quantum technologies

Observing algebraic variety of Lee-Yang zeros in asymmetrical systems via a quantum probe *(11 pages)* 062601
Arijit Chatterjee, T. S. Mahesh, Mounir Nisse, and Yen-Kheng Lim

Energy landscapes for the quantum approximate optimization algorithm *(18 pages)* 062602
Choy Boy and David J. Wales

Simulation of a feedback-based algorithm for quantum optimization for a realistic neutral-atom system with an optimized small-angle controlled-phase gate *(10 pages)* 062603
S. X. Li, W. L. Mu, J. B. You, and X. Q. Shao

Variational protocols for emulating digital gates using analog control with always-on interactions *(11 pages)* 062604
Claire Chevallier, Joseph Vovrosh, Julius de Hond, Mario Dagrada, Alexandre Dauphin, and Vincent E. Elfving

Quantum Fisher information maximization in an unbalanced lossy interferometer *(21 pages)* 062605
Stefan Ataman and Karunesh K. Mishra

Cross quantum homomorphic encryption based on the butterfly network *(7 pages)* 062606
Xing-bo Pan, Yu-Ting Lei, Xiang-jie Li, Xiu-bo Chen, and Gui-lu Long

Characterization of overparametrization in the simulation of realistic quantum systems *(28 pages)* 062607
Matthew Duschenes, Juan Carrasquilla, and Raymond Laflamme

Hermitian-preserving ansatz and variational open quantum eigensolver *(7 pages)* 062608
Zhong-Xia Shang

Applications of model-aware reinforcement learning in Bayesian quantum metrology *(28 pages)* 062609
Federico Belliardo, Fabio Zoratti, and Vittorio Giovannetti

Effective nonadiabatic holonomic SWAP gate with Rydberg atoms using invariant-based reverse engineering *(12 pages)* 062610
Yang Xiao, Yi-Hao Kang, Ri-Hua Zheng, Jie Song, Ye-Hong Chen, and Yan Xia

$\mathcal{PT}$-symmetric quantum sensing: Advantages and restrictions *(17 pages)* 062611
Yan-Yi Wang, Chun-Wang Wu, Wei Wu, and Ping-Xing Chen

(Continued)

This paper was highlighted in the APS publication *Physics* (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).

PHYSICAL REVIEW A THIRD SERIES, VOLUME 109, NUMBER 6 JUNE 2024

Optimal ultrarobust quantum gates by inverse optimization *(23 pages)* 062613
Ghassen Dridi, Xavier Laforgue, Mohamed Mejatty, and Stéphane Guérin

Experimental demonstration of a Maxwell's demon quantum battery in a superconducting noisy intermediate-scale quantum processor *(26 pages)* 062614
Jiale Yu, Shiyu Wang, Kangqiao Liu, Chen Zha, Yulin Wu, Fusheng Chen, Yangsen Ye, Shaowei Li, Qingling Zhu, Shaojun Guo, Haoran Qian, He-Liang Huang, Youwei Zhao, Chong Ying, Daojin Fan, Dachao Wu, Hong Su, Hui Deng, Hao Rong, Kaili Zhang, Sirui Cao, Jin Lin, Yu Xu, Cheng Guo, Na Li, Futian Liang, Gang Wu, Yong-Heng Huo, Chao-Yang Lu, Cheng-Zhi Peng, Kae Nemoto, W. J. Munro, Xiaobo Zhu, Jian-Wei Pan, and Ming Gong

Intermode-interaction-induced dynamics of continuous-variable quantum-key-distribution observables *(10 pages)* 062615
Andrei Gaidash, Alexei D. Kiselev, George Miroshnichenko, and Anton Kozubov

Quantum variational solving of nonlinear and multidimensional partial differential equations *(18 pages)* 062616
Abhijat Sarma, Thomas W. Watts, Mudassir Moosa, Yilian Liu, and Peter L. McMahon

Probabilistic error cancellation for dynamic quantum circuits *(13 pages)* 062617
Riddhi S. Gupta, Ewout van den Berg, Maika Takita, Diego Ristè, Kristan Temme, and Abhinav Kandala

Multichromatic Floquet engineering of quantum dissipation *(11 pages)* 062618
François Impens and David Guéry-Odelin

Coherent excitation transport through ring-shaped networks *(18 pages)* 062619
Francesco Perciavalle, Oliver Morsch, Davide Rossini, and Luigi Amico

Universal quantum computation using atoms in cross-cavity systems *(10 pages)* 062620
Luiz O. R. Solak, Daniel Z. Rossatto, and Celso J. Villas-Boas

PART B

Atomic and molecular structure and dynamics; high-precision experiments

Positron annihilation and binding in aromatic and other ring molecules *(14 pages)* 062801
E. Arthur-Baidoo, J. R. Danielson, C. M. Surko, J. P. Cassidy, S. K. Gregg, J. Hofierka, B. Cunningham, C. H. Patterson, and D. G. Green

Convergence-acceleration approach to partial-wave expansion of two-electron self-energy contributions to the Lamb shift *(16 pages)* 062802
A. V. Malyshev, E. A. Prokhorchuk, and V. M. Shabaev

Complex scaling calculation of phase shifts for positron collisions with positive ions *(12 pages)* 062803
Taishi Sano, Takuma Yamashita, and Yasushi Kino

Absolute rate coefficient measurements of the reactions of vibrationally cold HD^+ and H_3^+ ions with neutral C atoms *(17 pages)* 062804
Florian Grussie, Lukas Berger, Manfred Grieser, Ábel Kálosi, Damian Müll, Oldřich Novotný, Aigars Znotins, Fabrice Dayou, Xavier Urbain, and Holger Kreckel

Ruling out a saddle-point mechanism of ionization in intermediate-energy ion-atom collisions *(9 pages)* 062805
K. H. Spicer, C. T. Plowman, N. W. Antonio, M. S. Schöffler, M. Schulz, and A. S. Kadyrov

Isotope-shift analysis with the $4f^{14}6s^2\ {}^1S_0$–$4f^{13}5d6s^2(J = 2)$ transition in ytterbium *(10 pages)* 062806
Akio Kawasaki, Takumi Kobayashi, Akiko Nishiyama, Takehiko Tanabe, and Masami Yasuda

(Continued)

This paper was highlighted in the APS publication *Physics* (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).

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 109, NUMBER 6** **JUNE 2024**

Single ionization of H_2O and C_4H_8O by electron impact: Single-center description of the final state *(12 pages)* 062807
Emiliano Acebal and Sebastian Otranto

Spin symmetry in thermally-assisted-occupation density-functional theory *(10 pages)* 062808
Yu-Yang Wang and Jeng-Da Chai

Measurement of the ratio of the scalar polarizability to the vector polarizability for the $6s\ ^2S_{1/2} \rightarrow 7s\ ^2S_{1/2}$ transition in cesium *(8 pages)* 062809
Jonah A. Quirk, Carol E. Tanner, and D. S. Elliott

Correlated Coulomb-Volkov approach and its application to the angular distributions of two-photon double ionization of helium *(10 pages)* 062810
Arnaud Denabe, M. Silenou Mengoue, and M. G. Kwato Njock

Model description of the transit-time problem for fast particles crossing a laser beam *(8 pages)* 062811
S. D. Chekhovskoi and L. N. Labzowsky

Bound-state stability of Coulomb three-body systems using numerical tensor methods *(12 pages)* 062812
Kammegne Tcheugam Brice, Michael Melgaard, and Hazel Cox

Comparative experimental and theoretical study on doubly differential electron-impact ionization cross sections of pyrimidine *(16 pages)* 062813
M. Dinger, W. Y. Baek, and H. Rabus

Experimental determination of the diffusion coefficient in a coated cell *(15 pages)* 062814
Junhe Zheng, Ekrem Abdukerim, Baichuan Li, Teng Wu, and Hong Guo

Light-induced processes in atomic-scale systems

Observation of spin bistability with paraffin-coated vapor cells *(11 pages)* 063101
Shuyuan Chen, Wentian Xiang, Xingqing Jin, Wei Xiao, Xiang Peng, and Hong Guo

Monitoring the ultrafast buildup of Rabi oscillations in the time domain *(13 pages)* 063102
Xu Zhang, Yijie Liao, Yongkun Chen, Miao Yu, Siyu Li, Mingrui He, Kunlong Liu, Peixiang Lu, and Yueming Zhou

Noninteger high-order harmonic generation from extended correlated systems *(10 pages)* 063103
Christian Saugbjerg Lange, Thomas Hansen, and Lars Bojer Madsen

High-harmonic spectroscopy of strongly bound excitons in solids *(12 pages)* 063104
Simon Vendelbo Bylling Jensen, Lars Bojer Madsen, Angel Rubio, and Nicolas Tancogne-Dejean

State-insensitive wavelengths for light shifts and photon scattering from Zeeman states *(19 pages)* 063105
Stuart J. Masson, Zhenjie Yan, Jacquelyn Ho, Yue-Hui Lu, Dan M. Stamper-Kurn, and Ana Asenjo-Garcia

Probing field-driven electron dynamics of gapped graphene by intensity-dependent valley polarization *(10 pages)* 063106
Miao Yu, Hongchuan Du, Jia Tan, Kunlong Liu, Peixiang Lu, and Yueming Zhou

Continuous loading of a magneto-optical trap of Rb using a narrow transition *(6 pages)* 063107
Rajnandan Choudhury Das, Thilagaraj Ravi, Samir Khan, and Kanhaiya Pandey

(Continued)

This paper was highlighted in the APS publication *Physics* (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).

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 109, NUMBER 6** **JUNE 2024**

Natural-linewidth measurements of the 3*C* and 3*D* soft-x-ray transitions in Ni XIX *(9 pages)* 063108
Chintan Shah, Steffen Kühn, Sonja Bernitt, René Steinbrügge, Moto Togawa, Lukas Berger, Jens Buck, Moritz Hoesch, Jörn Seltmann, Mikhail G. Kozlov, Sergey G. Porsev, Ming Feng Gu, F. Scott Porter, Thomas Pfeifer, Maurice A. Leutenegger, Charles Cheung, Marianna S. Safronova, and José R. Crespo López-Urrutia

Intra- and intercycle analysis of intraband high-order harmonic generation *(6 pages)* 063109
Asbjørn Tornøe Andersen, Simon Vendelbo Bylling Jensen, and Lars Bojer Madsen

Detangling the quantum tapestry of intrachannel interference in below-threshold nonsequential double ionization with few-cycle laser pulses *(31 pages)* 063110
S. Hashim, R. Tenney, and C. Figueira de Morisson Faria

Relativistic equation-of-motion coupled-cluster-theory analysis of blackbody radiation shift in the clock transition of Zn I *(11 pages)* 063111
Somesh Chamoli, Anmol Mishra, Achintya Kumar Dutta, Richa Sharma Kesarkar, and B. K. Sahoo

Spinning linearly polarized harmonic generation via polarization shaping *(8 pages)* 063112
Qingyi Li, Yulong Li, Fuming Guo, Yujun Yang, Mingxing Jin, Xi Zhao, and Jun Wang

Generation and control of population difference gratings in a three-level hydrogen atomic medium using half-cycle attosecond pulses nonoverlapping in the medium *(7 pages)* 063113
Rostislav Arkhipov, Mikhail Arkhipov, Anton Pakhomov, Olga Diachkova, and Nikolay Rosanov

Multicenter continuum-state approach to molecular-frame photoelectron angular distributions: From plane-wave to twisted photons *(15 pages)* 063114
Jiahao Duan, Maomao Gong, Yongjun Cheng, and Song Bin Zhang

$^{229}Th^{3+}$ as an ionic optical clock for fine-structure-constant variations *(8 pages)* 063115
Shi-Cheng Yu, Wen-Ting Gan, Xia Hua, Xin Tong, and Cheng-Bin Li

Hyperfine interaction in the Autler-Townes effect: Control of two-photon selection rules in the Morris-Shore basis *(18 pages)* 063116
Arturs Cinins, Dmitry K. Efimov, Martins Bruvelis, Kaspars Miculis, Teodora Kirova, Nikolai N. Bezuglov, Igor I. Ryabtsev, Marcis Auzinsh, and Aigars Ekers

Decoupling the complex amplitudes of partial waves in two-photon ionization *(10 pages)* 063117
Yi-Jia Mao, Zhao-Han Zhang, Tao Chen, Hong-Bin Yao, Yang Li, and Feng He

Ultracold systems and matter waves

Universal relations for dilute systems with two-body decays in reduced dimensions *(10 pages)* 063301
Mingyuan He, Chenwei Lv, and Qi Zhou

Dynamical formation of a prethermal Bose-Einstein condensate in a Floquet-engineered lattice *(14 pages)* 063302
J. Maslek, C. A. Bracamontes, and J. V. Porto

Interacting Bose gas across a narrow Feshbach resonance *(9 pages)* 063303
Fan Yang and Ran Qi

Nonuniversal equation of state of a quasi-two-dimensional Bose gas in dimensional crossover *(11 pages)* 063304
Xiaoran Ye, Tao Yu, and Zhaoxin Liang

(Continued)

This paper was highlighted in the APS publication *Physics* (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).

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 109, NUMBER 6** **JUNE 2024**

Dissipative-interaction-induced polaron-molecule transition in three-dimensional Fermi polarons *(6 pages)* 063305
Lijun Yang

Two-dimensional non-Hermitian fermionic superfluidity with spin imbalance *(7 pages)* 063306
Tingting Shi, Siqi Wang, Zhiyue Zheng, and Wei Zhang

Spontaneous-emission-induced ratchet in atom-optics kicked-rotor quantum walks *(12 pages)* 063307
Nikolai Bolik and Sandro Wimberger

Quantum-information-theoretical measures to distinguish fermionized bosons from noninteracting fermions *(12 pages)* 063308
Barnali Chakrabarti, Arnaldo Gammal, N. D. Chavda, and Mantile Leslie Lekala

Pairing properties of an odd-frequency superfluid Fermi gas *(15 pages)* 063309
Shumpei Iwasaki, Taira Kawamura, Koki Manabe, and Yoji Ohashi

Fast transport and splitting of spin-orbit-coupled spin-1 Bose-Einstein condensates *(10 pages)* 063310
Yaning Xu, Yuanyuan Chen, and Xi Chen

Spectral properties and observables in ultracold Fermi gases *(17 pages)* 063311
Eugen Dizer, Jan Horak, and Jan M. Pawlowski

Inequivalence of stochastic and Bohmian arrival times in time-of-flight experiments *(10 pages)* 063312
Pascal Naidon

Spectral function of Fermi polarons at finite temperature from a self-consistent many-body T-matrix approach in real frequency *(11 pages)* 063313
Hui Hu and Xia-Ji Liu

Beliaev damping of gapped excitations in a two-component Bose-Einstein condensate *(7 pages)* 063314
Rukuan Wu

Spin-charge separation in the quantum boomerang effect *(8 pages)* 063315
Pablo Capuzzi, Luca Tessieri, Zehra Akdeniz, Anna Minguzzi, and Patrizia Vignolo

Observation of collapse and revival of atomic four-wave mixing in Bose gases *(8 pages)* 063316
Wei-Tao Wu, Zhi-Xin Duan, and Sheng-Jun Yang

Realizing limit cycles in dissipative bosonic systems *(10 pages)* 063317
Jim Skulte, Phatthamon Kongkhambut, Hans Keßler, Andreas Hemmerich, Ludwig Mathey, and Jayson G. Cosme

High-temperature transport in the one-dimensional mass-imbalanced Fermi-Hubbard model *(12 pages)* 063318
Thomas G. Kiely and Erich J. Mueller

Mutual dipolar drag in a bilayer Fermi gas *(9 pages)* 063319
B. Renklioglu, Ben Yu-Kuang Hu, M. Ö. Oktel, and B. Tanatar

Controllable generation of vortices with varied charges by dark-soliton seeds through adiabatic manipulation *(7 pages)* 063320
Xiao-Lin Li and Li-Chen Zhao

Induced supersolidity in a Dy-Er mixture *(12 pages)* 063321
Soumyadeep Halder, Subrata Das, and Sonjoy Majumder

(Continued)

This paper was highlighted in the APS publication *Physics* (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).

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 109, NUMBER 6** **JUNE 2024**

Finite-temperature quantum matter with Rydberg or molecule synthetic dimensions *(9 pages)* 063322
Sohail Dasgupta, Chunhan Feng, Bryce Gadway, Richard T. Scalettar, and Kaden R. A. Hazzard

Vortex-pair dynamics in three-dimensional homogeneous dipolar superfluids *(12 pages)* 063323
Srivatsa B. Prasad, Nick G. Parker, and Andrew W. Baggaley

Coherent pair injection as a route towards the enhancement of supersolid order in many-body bosonic models *(19 pages)* 063324
Emmanouil Grigoriou, Zhiyao Ning, Hang Su, Benjamin Löckler, Ming Li, Yoshitomo Kamiya, and Carlos Navarrete-Benlloch

Violation of Bell inequalities in an analog black hole *(23 pages)* 063325
Giorgio Ciliberto, Stephanie Emig, Nicolas Pavloff, and Mathieu Isoard

Density-wave-type supersolid of two-dimensional tilted dipolar bosons *(8 pages)* 063326
A. N. Aleksandrova, I. L. Kurbakov, A. K. Fedorov, and Yu. E. Lozovik

Quantum echo in two-component Bose-Einstein condensates *(9 pages)* 063327
Chang-Yan Wang

Three-body scattering area for particles with infinite or zero scattering length in two dimensions *(14 pages)* 063328
Junjie Liang and Shina Tan

Non-Hermitian skin effect in periodically driven dissipative ultracold atoms *(11 pages)* 063329
Zhao-Fan Cai, Tao Liu, and Zhongmin Yang

Methods for studying Tan's contact in the BCS-BEC crossover *(10 pages)* 063330
Manuel Jäger and Johannes Hecker Denschlag

Ultracold dipolar bosons trapped in atomtronic circuits *(8 pages)* 063331
Marc Rovirola, Héctor Briongos-Merino, Bruno Juliá-Díaz, and Montserrat Guilleumas

Proposal for detecting degenerate bands with topological invariants in optical lattices *(13 pages)* 063332
Jing-Xin Liu, Jian-Te Wang, and Hai-Tao Ding

Controlling vortex lattice structure of binary Bose-Einstein condensates via disorder-induced vortex pinning *(10 pages)* 063333
Dibyendu Kuiri, Thudiyangal Mithun, and Bishwajyoti Dey

Photonics, nonlinear optics, and optomechanics

Tunable focus and multiple plasmonic bottles from the superposition of half Pearcey plasmons *(8 pages)* 063501
JunXi Zhang, YanRu Chen, Zhang Ruan, ZiEn Feng, ZeHong Liang, HeChong Chen, GuangHui Wang, and DongMei Deng

Chiroptical responses modulated by competitions between structural chiralities and magnetizations *(5 pages)* 063502
Chunchao Wen, Jianfa Zhang, Chaofan Zhang, Shiqiao Qin, Zhihong Zhu, and Wei Liu

Self-modulation of nonlinear light in a vacuum enhanced by orbital angular momentum *(9 pages)* 063503
Akitaka Watanabe and Kazunori Shibata

Chiral spontaneous emission propagation based on a honeycomb photonic crystal slab *(13 pages)* 063504
Zhiyuan Qian, Xuefan Yin, Xinyi Zhou, Feifan Wang, Ye Chen, and Chao Peng

(Continued)

This paper was highlighted in the APS publication *Physics* (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).

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 109, NUMBER 6** **JUNE 2024**

Enhancement and control of a coherent localized surface plasmon through pump-pulse engineering *(9 pages)* 063505
Ankit Purohit and Akhilesh Kumar Mishra

Non-Euclidean conformal devices with continuously varying refractive-index profiles based on bispheres *(8 pages)* 063506
Wenjing Lv, Jiaojiao Zhou, Y. Liu (刘泱杰), and Lin Xu

Stability of topologically protected slow light against disorder *(10 pages)* 063507
Jonas F. Karcher, Sarang Gopalakrishnan, and Mikael C. Rechtsman

Optimal control of linear Gaussian quantum systems via quantum learning control *(13 pages)* 063508
Yu-Hong Liu, Yexiong Zeng, Qing-Shou Tan, Daoyi Dong, Franco Nori, and Jie-Qiao Liao

Spectral switches of light in curved space *(9 pages)* 063509
Suting Ju, Chenni Xu, and Li-Gang Wang

Proposal and efficiency analysis of cascaded adiabatic frequency conversion in coupled microrings *(18 pages)* . . . 063510
Luis Cortes-Herrera, Xiaotong He, Jaime Cardenas, and Govind P. Agrawal

High-order harmonic spectroscopy for probing intraband and interband dynamics *(7 pages)* 063511
Gan Wang, Yu-Xuan Chen, Mingjie Li, and Tao-Yuan Du

Self-pulsing dynamics in microscopic lasers with dispersive mirrors *(13 pages)* 063512
Kristian Seegert, Mikkel Heuck, Yi Yu, and Jesper Mørk

Strong frequency correlation and anticorrelation between a Raman laser and its pump laser for positive and negative dispersions *(12 pages)* 063513
Zifan Zhou, Ruoxi Zhu, and Selim M. Shahriar

Negative refraction in isotropic achiral and chiral materials *(11 pages)* 063514
Y. B. Band, Igor Kuzmenko, and Marek Trippenbach

Trapping capability of circular swallowtail beams *(5 pages)* 063515
Huanpeng Liang, Xiaofang Lu, Kaijian Chen, Haixia Wu, Nana Liu, Liu Tan, Shaozhou Jiang, and Yi Liang

Compact topological edge modes through hybrid coupling of orbital angular momentum modes *(9 pages)* 063516
Yang Wang, Chuang Jiang, Miaomiao Zhao, Dong Zhao, and Shaolin Ke

Parametric resonances in a photonic time crystal with periodic square modulation of its permittivity $\varepsilon(t)$ *(9 pages)* 063517
J. L. Valdez-García and P. Halevi

All-dielectric photonic higher-order topological insulator induced by a staggered bianisotropy *(9 pages)* 063518
Xiaoting Sang, Junpeng Hou, Yazhou Gu, Ya-Jie Wu, and Zhitong Li

Non-Gaussianity in the quantum parametric oscillator *(11 pages)* 063519
Marcello Calvanese Strinati and Claudio Conti

Light storage in a wavy dielectric grating with Kerr nonlinearity *(7 pages)* 063520
Ma Luo

Broadband Kerr frequency comb in fiber Fabry-Perot resonators induced by switching waves *(8 pages)* 063521
Thomas Bunel, Matteo Conforti, Julien Lumeau, Antonin Moreau, and Arnaud Mussot

(Continued)

This paper was highlighted in the APS publication *Physics* (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).

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 109, NUMBER 6** **JUNE 2024**

Enhanced second-harmonic generation in high-Q all-dielectric metasurfaces with backward frequency conversion *(7 pages)* 063522
Xu Tu, Siqi Feng, Jiajun Li, Yangguang Xing, Feng Wu, Tingting Liu, and Shuyuan Xiao

Nonlinearity-enabled localization in driven-dissipative photonic lattices *(13 pages)* 063523
A. Muñoz de las Heras, A. Amo, and A. González-Tudela

Quantum optics

Enhanced photon-pair generation under coherent control *(9 pages)* 063701
Ke-Shuang Cui, Xiao-Jun Zhang, and Jin-Hui Wu

Waveguide QED with Mössbauer nuclei *(26 pages)* 063702
Petar Andrejić, Leon Merten Lohse, and Adriana Pálffy

Single-photon scattering in giant-atom waveguide systems with chiral coupling *(13 pages)* 063703
Shu-Yu Li, Ze-Quan Zhang, Lei Du, Yong Li, and Huaizhi Wu

Coherent multidimensional spectroscopy in polariton systems *(13 pages)* 063704
Daniela Gallego-Valencia, Lars Mewes, Johannes Feist, and José Luis Sanz-Vicario

Hermitian stochastic methodology for x-ray superfluorescence *(17 pages)* 063705
Stasis Chuchurka, Vladislav Sukharnikov, and Nina Rohringer

Coherence via reiterated beam splitting *(10 pages)* 063706
Guillermo Díez, Laura Ares, and Alfredo Luis

Fundamental mechanisms of energy exchanges in autonomous measurements based on dispersive qubit-light interaction *(17 pages)* 063707
Nicolò Piccione, Maria Maffei, Xiayu Linpeng, Andrew N. Jordan, Kater W. Murch, and Alexia Auffèves

Single-photon scattering and bound states in a one-dimensional waveguide with a topological giant atom *(7 pages)* 063708
Wei Zhao, Tian Tian, and Zhihai Wang

Chiral and nonreciprocal transmission of single photons in coupled-resonator-waveguide systems *(12 pages)* 063709
Jun-Cong Zheng, Xing-Liang Dong, Jia-Qiang Chen, Xin-Lei Hei, Xue-Feng Pan, Xiao-Yu Yao, Yu-Meng Ren, Yi-Fan Qiao, and Peng-Bo Li

Single-photon manipulations based on optically controlled chiral couplings in waveguide structures of Rydberg giant atoms *(18 pages)* 063710
Yao-Tong Chen, Lei Du, Zhihai Wang, M. Artoni, G. C. La Rocca, and Jin-Hui Wu

Quantum nondemolition measurement operator with spontaneous emission *(17 pages)* 063711
Ebubechukwu O. Ilo-Okeke and Tim Byrnes

(Continued)

This paper was highlighted in the APS publication *Physics* (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).

PHYSICAL REVIEW A **THIRD SERIES, VOLUME 109, NUMBER 6** **JUNE 2024**

COMMENTS

Comment on "Saturating quantum advantages in postselected metrology with the positive Kirkwood-Dirac distribution" *(3 pages)* 066401
David R. M. Arvidsson-Shukur, Crispin H. W. Barnes, Hugo V. Lepage, Seth Lloyd, Noah Lupu-Gladstein, Wilfred Salmon, and Flavio Salvati

Reply to "Comment on 'Saturating quantum advantages in postselected metrology with the positive Kirkwood-Dirac distribution' " *(2 pages)* 066402
Sourav Das, Subhrajit Modak, and Manabendra Nath Bera

ERRATA

Erratum: Control of spin polarization through recollisions [Phys. Rev. A **108**, 043104 (2023)] *(1 page)* . . . . . 069901(E)
Stefanos Carlström, Jan Marcus Dahlström, Misha Yu Ivanov, Olga Smirnova, and Serguei Patchkovskii

This paper was highlighted in the APS publication *Physics* (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).