

CONTENTS - *Continued*

PHYSICAL REVIEW A

THIRD SERIES, VOLUME 111, NUMBER 6

JUNE 2025

Anomalous dependence of sensitivity on observation time caused by memory retention in a system with broken time-translation symmetry (7 pages)	063708
Timofey T. Sergeev, Alexander A. Zyablovsky, and Evgeny S. Andrianov	
Geometric phase and wave-particle duality of the photon (6 pages)	063709
Elvis Pillinen, Atri Halder, Ari T. Friberg, Tero Setälä, and Andreas Norrman	
Theory of symmetry-protected two-photon coherence (6 pages)	063710
Xuanying Lai, Shengwang Du, and Yue Jiang	
Realizing the optimal measurement scheme for an SU(1,1) interferometer in <i>ab initio</i> phase estimation (6 pages)	063711
Mingchen Liu, Haixing Miao, and Lijian Zhang	

COMMENTS

Comment on “Association between quantum paradoxes based on weak values and a realistic interpretation of quantum measurements” (5 pages)	066201
Juan Jose Seoane, Xabier Oianguren-Asua, Albert Solé, and Xavier Oriols	
Reply to “Comment on ‘Association between quantum paradoxes based on weak values and a realistic interpretation of quantum measurements’ ” (2 pages)	066202
Alice M. Aredes and Pablo L. Saldanha	
Comment on “Energy-level shift of quantum systems via the scalar electric Aharonov-Bohm effect” (3 pages) . . .	066203
Shan Gao	
Reply to “Comment on ‘Energy-level shift of quantum systems via the scalar electric Aharonov-Bohm effect’ ” (4 pages)	066204
R. Y. Chiao, H. Hart, M. Scheibner, J. Sharping, N. A. Inan, D. A. Singleton, and M. E. Tobar	

ERRATA

Erratum: Compression, spectral broadening, and collimation in multiple, femtosecond pulse filamentation in atmosphere [Phys. Rev. A 86 , 033834 (2012)] (1 page)	069901(E)
J. P. Palastro, T. M. Antonsen, Jr., and H. M. Milchberg	

CONTENTS - *Continued*

PHYSICAL REVIEW A

THIRD SERIES, VOLUME 111, NUMBER 6

JUNE 2025

Spectral reorganization of space-time wave packets in the presence of normal group-velocity dispersion (<i>12 pages</i>)	063515
Layton A. Hall and Ayman F. Abouraddy	
Tunable autofocusing and optical trapping with symmetric butterfly Gaussian beams (<i>14 pages</i>)	063516
Yujie Wu, Zijing Zhang, Man Tao, Zhenhang Xu, Chuhong Zhuang, Zihan Liu, Zan Zhang, Weiting Wang, Hongwei Gong, Shigen Ouyang, and Dongmei Deng	
X-wave formation in the subnanosecond backward-wave optical parametric oscillator (<i>9 pages</i>)	063517
T. Latvys, J. Banyys, V. Jarutis, J. Vengelis, and V. Tamulienė	
Time-reversal-symmetry bounds on electromagnetic fields (<i>14 pages</i>)	063518
Wenchao Ma, Raphaël Pestourie, and Steven G. Johnson	
Enhanced tunable photon-pair generation from a nonlinear metasurface with a guided-mode cavity (<i>9 pages</i>)	063519
Tongmiao Fan, Jihua Zhang, and Andrey A. Sukhorukov	
Nonreciprocal open quantum battery network in a photonic waveguide array (<i>7 pages</i>)	063520
Yaowu Guo, Lianzhen Cao, and Jiaqiang Zhao	
Effect of temperature on the dynamic properties of extreme pulses in interband cascade lasers (<i>9 pages</i>)	063521
X. Y. Zhu, W. Feng, J. C. Cao, and C. Wang	
Predicting microwave resonances in aqueous spheroids with a standing-wave approach (<i>11 pages</i>)	063522
Yuchen Song, Miao Hu, and Aaron D. Slepko	
Loss-free enhancement of photonic spin Hall shift by electromagnetically induced transparency (<i>9 pages</i>)	063523
Aizaz Khan, Kezhou Du, Lei Gao, Muzamil Shah, Xinxing Zhou, and Dongliang Gao	
Quantum optics	
Giant emitter magnetometer (<i>8 pages</i>)	063701
Xiaojun Zhang, Xiang Guo, and Zhihai Wang	
Manipulating spectral transitions and photonic transmission in a non-Hermitian optical system through nanoparticle perturbations (<i>11 pages</i>)	063702
Bo-Wang Zhang, Cheng Shang, J. Y. Sun, Zhuo-Cheng Gu, and X. X. Yi	
Mechanically induced magnonic frequency combs via the magnetostrictive effect (<i>8 pages</i>)	063703
Bao Wang, Xiao-Hu Lu, Xiao Jia, and Hao Xiong	
Hierarchies of quantum non-Gaussian coherences for bosonic systems: A theoretical study (<i>10 pages</i>)	063704
Lukáš Lachman, Beate E. Asenbeck, Ambroise Boyer, Priyanka Giri, Alban Urvoy, Julien Laurat, and Radim Filip	
Experimental investigation of the uncertainty relation in pre- and postselected systems (<i>5 pages</i>)	063705
Yue Zhang, Xinyang Che, Yuanbang Wei, Rui Tian, Yi-an Li, Miao Zhang, Shuai Li, and Bo Liu	
Enhanced sensing by geometric tuning of YIG spheres: Noise reduction, signal amplification, and directional magnetic-field detection (<i>18 pages</i>)	063706
Zheng Liu, Ding-hui Xu, Yi-jia Yang, and Chang-shui Yu	
Postselected von Neumann measurement with superpositions of orbital angular momentum pointer states (<i>14 pages</i>)	063707
Janarbek Yuanbek, Yi-Fang Ren, and Yusuf Turek	

(Continued)

Solving the $SU(N)$ orbital Hatsugai-Kohmoto model (10 pages)	063316
Nico A. Hackner, Peizhi Mai, and Philip W. Phillips	
Interaction-induced moiré systems in twisted bilayer optical lattices (12 pages)	063317
Jian-Hua Zeng, Qizhong Zhu, and Liang He	
Photonics, nonlinear optics, and optomechanics	
Three-photon Rabi oscillations in N_2^+ lasing at 391 nm (9 pages)	063501
Ping Li, Wenli Yang, Xiaofei Li, Shan Xue, Jinbin Li, and Hongchuan Du	
High-gain squeezing in lossy resonators: An asymptotic-field approach (20 pages)	063502
M. Sloan, A. Viola, M. Liscidini, and J. E. Sipe	
Internal dynamics and fission of pure-quartic soliton molecules (11 pages)	063503
Zhixiang Deng, Rui Ma, Chunxiang Zhang, Boris Malomed, Dianyuan Fan, Jingsong He, and Jun Liu	
Reinforcement-learning-assisted nonreciprocal optomechanical gyroscope (12 pages)	063504
Qing-Shou Tan, Ya-Feng Jiao, Yunlan Zuo, Lan Xu, Jie-Qiao Liao, and Le-Man Kuang	
Bound states and chiral excitation in the effective Floquet continuum within tilted waveguide lattices (11 pages)	063505
Tian-Ze Sheng, Li-Feng Liu, Ying Zhang, Jun Qian, Xiao-Lin Li, Yue-Ping Niu, and Shang-Qing Gong	
Optical pattern formation in self-focusing and self-defocusing diffractively thick media (8 pages)	063506
G. Labeyrie, I. Kresic, R. Kaiser, and T. Ackemann	
Self-pulsing laser cavity solitons: Interaction dynamics and transverse carrier diffusion (9 pages)	063507
M. Eslami, A.-R. Samadi, A. Ghaed Amini, R. Golzarian, R. Kheradmand, and F. Prati	
Bisingular surface polaritons at the interface of two uniaxial media (9 pages)	063508
K. Yu. Golenitskii and N. S. Averkiev	
Dual-resonance metagrating for enhancing or annihilating third-harmonic generation at terahertz frequencies (11 pages)	063509
Cong Wang, Songsong Li, Yu Chen, Qingjia Zhou, Jie Luo, Shaojun Wang, Lei Gao, and Yadong Xu	
Generalized polarization matrix approach to near-field optical chirality (6 pages)	063510
Kayn A. Forbes and David L. Andrews	
Low-order-mode optical trapping of microspheres in hollow-core photonic crystal fibers (8 pages)	063511
Alessandro Porcelli, Peter Seigo Kincaid, Antonio Alvaro Ranha Neves, Ennio Arimondo, Andrea Camposeo, Dario Pisignano, and Donatella Ciampini	
Optical force and torque on a spinning dielectric sphere (8 pages)	063512
Hengzhi Li, Wanyue Xiao, Tong Fu, Zheng Yang, and Shubo Wang	
Highly sensitive temperature sensing via quadratic optomechanical coupling (9 pages)	063513
Yu-Sheng Tang, Xun-Wei Xu, Jie-Qiao Liao, Hui Jing, and Le-Man Kuang	
Efficient chiral mode conversion in topological waveguide arrays by encircling moving exceptional points (13 pages)	063514
Jia-Ning Zhang, Ming Gao, Jia-bao Yao, Cheng Lv, Pei-geng Zhong, Jie Song, and Yong-Yuan Jiang	

(Continued)

Ultracold systems and matter waves

Topological phases protected by projective space-time inversion symmetry in alkaline-earth-metal-like atoms (8 pages)	063301
Xiaofan Zhou, Suotang Jia, and Jian-Song Pan	
 Coherent backscattering and coherent forward-scattering effects in variations of the random quantum kicked rotor (12 pages)	063302
Hugo Thomas, Julien Hébraud, Bertrand Georgeot, Gabriel Lemarié, Christian Miniatura, and Olivier Giraud	
Double unstable avoided crossings and complex-domain-pattern formation in spin-orbit-coupled spin-1 condensates (16 pages)	063303
Sanu Kumar Gangwar, Rajamanickam Ravisankar, Henrique Fabrelli, Paulsamy Muruganandam, and Pankaj Kumar Mishra	
Coherent coupling of momentum states: Selectivity and phase control (7 pages)	063304
Charlie Leprince, Victor Gondret, Clothilde Lamirault, Rui Dias, Quentin Marolleau, Denis Boiron, and Christoph I. Westbrook	
Band-edge superfluid of Bose-Einstein condensates in the spin-orbit-coupled Zeeman lattice (12 pages)	063305
Huaxin He, Fengtao Pang, Hao Lyu, and Yongping Zhang	
Topologically nontrivial and trivial flat bands via weak and strong interlayer coupling in twisted bilayer honeycomb optical lattices for ultracold atoms (9 pages)	063306
Wenjie Sui, Wei Han, Zheng Vitto Han, Zengming Meng, and Jing Zhang	
Edge-edge correlations without edge states: η -clustering state as the ground state of the extended attractive SU(3) Hubbard chain (12 pages)	063307
Hironobu Yoshida, Niclas Heinsdorf, and Hosho Katsura	
Two-dimensional bosonic droplets in a harmonic trap (11 pages)	063308
Fabian Brauneis, Artem G. Volosniev, and Hans-Werner Hammer	
Wave-function microscopy: Derivation and anatomy of exact algebraic spinful wave functions and full Wigner-molecular spectra of a few highly correlated rapidly rotating ultracold fermionic atoms (14 pages)	063309
Constantine Yannouleas and Uzi Landman	
Finite-temperature entanglement and coherence in asymmetric bosonic Josephson junctions (13 pages)	063310
Cesare Vianello, Matteo Ferraretto, and Luca Salasnich	
Supersolid dipolar phases in planar geometry: Effects of tilted polarization (11 pages)	063311
Daniel Lima, Matheus Grossklags, Vinicius Zamprônio, Fabio Cinti, and Alejandro Mendoza-Coto	
Optimal control in phase space applied to minimal-time transfer of thermal atoms in optical traps (15 pages)	063312
Omar Morandi, Sara Nicoletti, Vladislav Gavryusev, and Leonardo Fallani	
Fate of the spatial-temporal order under quantum fluctuation (8 pages)	063313
Xiaotian Nie and Wei Zheng	
Three-body physics in the impurity limit of ^{39}K Bose-Einstein condensates (10 pages)	063314
A. M. Morgen, S. S. Balling, M. T. Strøe, T. G. Skov, M. R. Skou, A. G. Volosniev, and J. J. Arlt	
Nonequilibrium quench dynamics of Bose-Einstein condensates of microwave-shielded polar molecules (9 pages)	063315
Abdelâali Boudjemâa	

(Continued)

Light-induced processes in atomic-scale systems

Perturbation-theory approach for predicting vibronic selectivity by entangled-photon-pair absorption (20 pages)	063101
C. D. Rodríguez-Camargo, H. Ó. Gestsson, C. Nation, A. R. Jones, and A. Olaya-Castro	
Direct observation of two-photon-resonance Autler-Townes splitting of atomic sodium (8 pages)	063102
Wankai Li, Yixuan Wang, Xing Li, Tao Yang, Dongdong Zhang, and Dajun Ding	
Terahertz-field-modulated high-order harmonic generation in monolayer MoS ₂ (10 pages)	063103
Xiulan Liu, Jianing Zhang, Yong-Kang Fang, Guanglu Yuan, Zhengliang Li, and Liang-You Peng	
Quantitative comparison of high-order harmonic yields in ring-shaped organic molecules calculated using time-dependent density-functional theory (11 pages)	063104
Kyle A. Hamer, Stephanie N. Armond, Ravi Bhardwaj, Francois Mauger, Kenneth Lopata, Kenneth J. Schafer, and Mette B. Gaarde	
High-order harmonic generation in a crystal driven by quantum light (16 pages)	063105
Rasmus Vesterager Gothelf, Christian Saugbjerg Lange, and Lars Bojer Madsen	
Noise budget of a trapped on-chip cold-atom ⁸⁷ Rb clock (16 pages)	063106
M. Dupont-Nivet, B. Wirtschafter, S. Hello, and C. I. Westbrook	
☞ Three-path interferences in the reconstruction of attosecond beatings by interference of two-photon transitions in molecules (13 pages)	063107
Jorge Delgado, Celso M. González-Collado, Piero Decleva, Alicia Palacios, and Fernando Martín	
Exactly solvable two-level model with time-dependent coupling, detuning, and loss: Application to strong-field resonance ionization (9 pages)	063108
Ayoub Ait Elarabi and András Csehi	
High-order harmonic generation in the vanadium monoanion and its hexacarbonyl complex (11 pages)	063109
Xi Chu	
Interaction of a Poincaré beam with optically polarized atoms in the presence of a constant magnetic field (10 pages)	063110
S. Ramakrishna and S. Fritzsche	
Stimulated x-ray Raman scattering for selective preparation of dark states bypassing optical selection rules (11 pages)	063111
Francesco Montorsi, Shaul Mukamel, Filippo Tamassia, Marco Garavelli, Francesco Segatta, and Artur Nenov	
Signatures of intervalley interferences and valley asymmetries in high-order harmonic generation in pristine graphene (10 pages)	063112
Xi Liu, Dongdong Liu, Yan Sun, Yujie Li, and Cui Zhang	
Coherent control of ion-photoelectron dynamics through Rabi oscillations: An <i>ab initio</i> study (9 pages)	063113
Bo-Ren Shen, Yi-Jia Mao, Zhao-Han Zhang, Yang Li, Takeshi Sato, Kenichi L. Ishikawa, and Feng He	
Background reduction in ¹³⁶ Xe double-beta-decay experiments through direct barium-ion detection (12 pages)	063114
A. Peralta Conde	

(Continued)

CONTENTS - *Continued*

PHYSICAL REVIEW A

THIRD SERIES, VOLUME 111, NUMBER 6

JUNE 2025

Polarizabilities of low-lying states of silver (7 pages)	062809
S. G. Porsev, D. Filin, C. Cheung, and M. S. Safronova	
Measurement of the electric dipole moment of AlCl by Stark-level spectroscopy (7 pages)	062810
Li-Ren Liu, Miguel Aguirre, Jr., Stephen R. Kane, Brian K. Kendrick, and Boerge Hemmerling	
Projectile excitation to the $2s2p\ ^3P$ and 1P autoionizing states in swift collisions of He-like carbon and oxygen mixed-state ($1s^2$, $1s2s\ ^3,^1S$) ion beams with helium (26 pages)	062811
A. Laoutaris, S. Passalidis, S. Nanos, A. Biniskos, E. P. Benis, A. Dubois, and T. J. M. Zouros	
Demonstrating correlation trends in the electric dipole polarizabilities of many low-lying states in Cs I through first-principles calculations (11 pages)	062812
A. Chakraborty and B. K. Sahoo	
Ionization cross section of the Cu K shell by electron impact from the K threshold to 90 keV, determined on the basis of diagram lines, satellite lines, and the radiative Auger effect (16 pages)	062813
Suelen F. Barros, Kai L. Dardengo, Nora L. Maidana, Alessio Mangiarotti, Vito R. Vanin, and José M. Fernández-Varea	
Ultracold silver-atom collisions and the formation of silver dimers by photo- and magneto-association (17 pages)	062814
Eite Tiesinga, Jacek Kłos, Hui Li, Svetlana Kotochigova, and David DeMille	
Prospects for measuring the electron's electric dipole moment with polyatomic molecules in an optical lattice (15 pages)	062815
Roman Bause, Nithesh Balasubramanian, Ties Fikkers, Eifion H. Prinsen, Kees Steinebach, Arian Jadbabaie, Nicholas R. Hutzler, I. Agustín Aucar, Lukáš F. Pašteka, Anastasia Borschevsky, and Steven Hoekstra	
Ionization and kinetic-energy release in electron-impact dissociation of H_3^+ and D_3^+ (16 pages)	062817
Reese K. Horton, Michael V. Pak, Igor Bray, and Dmitry V. Fursa	
Progress toward a formulation of density-functional theory for matrix representations (10 pages)	062818
Michael Filatov(Gulak) and Seung Kyu Min	
Blackbody radiation Zeeman shift in Rydberg atoms (6 pages)	062819
K. Beloy, B. D. Hunt, R. C. Brown, T. Bothwell, Y. S. Hassan, J. L. Siegel, T. Grogan, and A. D. Ludlow	
Resonant photon scattering in the presence of external fields and its applications for the CERN Gamma Factory project (15 pages)	062820
Jan Richter, Mieczyslaw Witold Krasny, Jan Gilles, and Andrey Surzhykov	
Thermal nonequilibrium relaxation of methane-nitrogen system investigated by state-resolved deep-potential-energy molecular dynamics (14 pages)	062821
Yongxin Hu, Changmin Guo, Hongwei Song, and Jianyi Ma	
Electric-field-dependent g factors of ThF^+ (7 pages)	062822
Alexander Petrov and Leonid V. Skripnikov	
Spin versus position conjugation in quantum simulations with atoms: Application to quantum chemistry (19 pages)	062823
N. A. Moroz, K. S. Tikhonov, L. V. Gerasimov, A. D. Manukhova, I. B. Bobrov, S. S. Straupe, and D. V. Kupriyanov	

(Continued)

Nearest-neighbor synthesis of controlled-NOT circuits on general quantum architectures (22 pages)	062617
Xinyu Chen, Mingqiang Zhu, Xueyun Cheng, Zhijin Guan, Shiguang Feng, and Pengcheng Zhu	
Fidelity and efficiency analysis for heralded entanglement swapping in lossy channels: Linear and nonlinear optical approaches (9 pages)	062618
Kejie Fang and Elizabeth A. Goldschmidt	
Quantum metrology of a structured reservoir (14 pages)	062619
Youssef Aiache, Asghar Ullah, Özgür E. Müstecaplıoğlu, and Abderrahim El Allati	
Utilizing evolution time as a resource to enhance quantum sensing by probe qubit dephasing (11 pages)	062620
Ji-Bing Yuan, Hai-Fei Liu, Ya-Ju Song, Shi-Qing Tang, Xin-Wen Wang, and Le-Man Kuang	
Parallel teleportation of partially unknown quantum operations with multiple degrees of freedom based on the nitrogen-vacancy-center system (10 pages)	062621
Xiao-Ming Xiu, Zi-Lin Zhao, Zi-Qing Yuan, Si-Ge Chen, Xin-Yi Zhang, Yan-Qiang Ji, and Li Dong	
Resonator-activated entangling gates for spin qubits in quantum dots (13 pages)	062622
Wan-Qin He, Jin-Rong Liu, and Xing-Yu Zhu	
Combining quantum noise reduction resources: A practical approach (14 pages)	062623
Sohitri Ghosh, Matthew A. Feldman, Seongjin Hong, Claire E. Marvinney, Alberto M. Marino, Raphael C. Pooser, and Jacob M. Taylor	

PART B

Atomic and molecular structure and dynamics; high-precision experiments

 Electronic emission in a single ion-nanoparticle collision (9 pages)	062801
Thibault Nguyen Trung, Michel Du Chalard, Marin Chabot, Olivier Sublemontier, Emmanuel Dartois, Thomas Pino, Isabelle Ribaud, Benoit Gervais, Eric Giglio, Jean Duprat, and Karine Béroff	
Determination of quantum defects and core polarizability of atomic cesium via terahertz and radio-frequency spectroscopy in thermal vapor (12 pages)	062802
Gianluca Allinson, Lucy A. Downes, C. Stuart Adams, and Kevin J. Weatherill	
Unraveling the structures in the van der Waals interactions of alkali-metal Rydberg atoms (19 pages)	062803
Karen Wadenpfuhl and C. Stuart Adams	
Quantum chemical computations of Raman intensities: An ambiguity of the Placzek approximation (8 pages)	062804
Jaroslav Šebestík and Petr Bouř	
Benchmarking direct and indirect dipolar spin-exchange interactions between two Rydberg atoms (11 pages)	062806
Gabriel Emperauger, Mu Qiao, Guillaume Bornet, Cheng Chen, Romain Martin, Yuki Torii Chew, Bastien Gély, Lukas Klein, Daniel Barredo, Antoine Browaeys, and Thierry Lahaye	
Experimental triple-differential cross sections for electron-impact ionization of 1-methyl-5-nitroimidazole at 97-eV impact energy (9 pages)	062807
Deepthy Maria Mootheril, Maomao Gong, Xueguang Ren, Carlos Guerra Castillo, Xiangjun Chen, Gustavo Garcia, Thomas Pfeifer, and Alexander Dorn	
Cascading interatomic Coulombic electron capture induced by a single incident electron in two- and three-center atomic systems (9 pages)	062808
L. M. Ellerbrock, A. B. Voitkiv, and C. Müller	

(Continued)

State learning from pairs of states (<i>10 pages</i>)	062428
Pranjal Agarwal, Nada Ali, Camilla Polvara, Martin-Isbjörn Trappe, Berthold-Georg Englert, and Mark Hillery	
Quantum technologies	
Anomalous slow dynamics of inhomogeneous quantum annealing (<i>14 pages</i>)	062601
Mohammadhossein Dadgar and Christopher L. Baldwin	
Noisy Stark probes as quantum-enhanced sensors (<i>11 pages</i>)	062602
Saubhik Sarkar and Abolfazl Bayat	
Minimum optical depth multiport interferometers for approximating arbitrary unitary operations and pure states (<i>7 pages</i>)	062603
Luciano Pereira, Alejandro Rojas, Gustavo Lima, Aldo Delgado, Gustavo Cañas, and Adán Cabello	
Efficient learning and optimizing non-Gaussian correlated noise in digitally controlled qubit systems (<i>33 pages</i>)	062605
Wenzheng Dong, Yuanlong Wang, and Muhammad Qasim Khan	
Cost of emulating a small quantum annealing problem in the circuit model (<i>21 pages</i>)	062606
Javier Gonzalez-Conde, Zachary Morrell, Marc Vuffray, Tameem Albash, and Carleton Coffrin	
Experimental secure entanglement-free quantum remote sensing over 50 km of optical fiber (<i>8 pages</i>)	062607
Wenjie He, Chunfeng Huang, Rui Guan, Ye Chen, Zhenrong Zhang, and Kejin Wei	
Mitigation of birefringence in cavity-based quantum networks using frequency-encoded photons (<i>12 pages</i>)	062608
Chengxi Zhang, Justin Phillips, Inder Monga, Erhan Saglamyurek, Qiming Wu, and Hartmut Haeflner	
Real-time adaptation of quantum noise channel estimates (<i>14 pages</i>)	062609
Lucas Daguerre and Mohan Sarovar	
Quantum algorithm for Green's-function measurements in the Fermi-Hubbard model (<i>19 pages</i>)	062610
Gino Bishop, Dmitry Bagrets, and Frank K. Wilhelm	
Quantum repeaters based on stationary Gottesman-Kitaev-Preskill qubits (<i>23 pages</i>)	062611
Stefan Häussler and Peter van Loock	
Four-body coupler for superconducting qubits based on Josephson parametric oscillators (<i>16 pages</i>)	062612
Ryoji Miyazaki and Tsuyoshi Yamamoto	
Mapping of a many-qubit state onto an oscillator using controlled displacements (<i>10 pages</i>)	062613
Anders J. E. Bjerrem, Ulrik L. Andersen, and Peter Rabl	
Integrating measurement-device-independent quantum-key-distribution systems into an optical transport network (<i>13 pages</i>)	062614
Irina Vorontsova, Roman Goncharov, Alexei Santev, Fedor Kiselev, Eduard Samsonov, and Vladimir Egorov	
Estimation of Imbert-Fedorov shifts based on SU(1,1) interferometer breaking through the shot-noise limit (<i>10 pages</i>)	062615
Yuetao Chen, Jing Wang, Qiang Ma, Gaiqing Chen, Mengmeng Luo, Shoukang Chang, and Shaoyan Gao	
Reservoir-assisted quantum battery charging at finite temperatures (<i>22 pages</i>)	062616
Y. Yao and X. Q. Shao	

(Continued)

CONTENTS - *Continued*

PHYSICAL REVIEW A	THIRD SERIES, VOLUME 111, NUMBER 6	JUNE 2025
Dispersive qubit readout of temperature (9 pages)		062412
Dong Xie and Chunling Xu		
Clifford circuit initialization for variational quantum algorithms (12 pages)		062413
M. H. Cheng, K. E. Khosla, C. N. Self, M. Lin, B. X. Li, A. C. Medina, and M. S. Kim		
Typical behavior of genuine multimode entanglement of pure Gaussian states (8 pages)		062414
Saptarshi Roy		
Temporal correlating power of quantum channels (8 pages)		062415
Yi Guo and Shunlong Luo		
Comparison of encoding schemes for quantum computing of $S > 1/2$ spin chains (17 pages)		062416
Erik Lötstedt and Kaoru Yamanouchi		
Nonstabilizerness of a boundary time crystal (14 pages)		062417
Gianluca Passarelli, Angelo Russomanno, and Procolo Lucignano		
Enhanced Hamiltonian learning precision with multistage neural networks (11 pages)		062418
Zhengjie Kang, Hao Li, Shuo Wang, Jiaojiao Li, Yuanjie Zhang, and Zhihuang Luo		
Monogamy-of-entanglement-inspired protocol for quantifying bipartite entanglement using spin squeezing (12 pages)		062419
Diego Fallas Padilla, Mingjian Zhu, and Han Pu		
Low-depth phase oracle using a parallel piecewise circuit (14 pages)		062420
Zhu Sun, Gregory Boyd, Zhenyu Cai, Hamza Jnane, Bálint Koczor, Richard Meister, Romy Minko, Benjamin Pring, Simon C. Benjamin, and Nikitas Stamatopoulos		
Quantum framework for reinforcement learning: Integrating the Markov decision process, quantum arithmetic, and trajectory search (19 pages)		062421
Thet Htar Su, Shaswot Shresthamali, and Masaaki Kondo		
Power-optimized amplitude modulation for robust trapped-ion entangling gates: A study of gate-timing errors (14 pages)		062422
Luke Ellert-Beck and Wenchao Ge		
No-broadcasting of coherence in terms of Wigner-Yanase skew information (8 pages)		062423
Zijian Zhang, Nan Li, and Shunlong Luo		
Wide-band magnetometry based on color centers with transverse zero-field splitting (7 pages)		062424
Xiayan Ding, Lu Chen, and Qiong Chen		
Quantum observable's reality erasure with spacelike-separated operations (9 pages)		062425
J. S. Araújo, D. S. Starke, A. S. Coelho, J. Maziero, G. H. Aguilar, and R. M. Angelo		
Super-Heisenberg scaling of quantum Fisher information using spin-motion states (10 pages)		062426
Venelin P. Pavlov and Peter A. Ivanov		
Efficient implementation of the unitary coupled-cluster ansatz in high-dimensional trapped-ion systems (10 pages)		062427
Peng Wang, Xueying Yang, Chun-Wang Wu, Chunyan Li, Wei Wu, and Ping-Xing Chen		

(Continued)

CONTENTS - *Continued*

PHYSICAL REVIEW A

THIRD SERIES, VOLUME 111, NUMBER 6

JUNE 2025

Efficient measure of information backflow with a quasistochastic process (7 pages)	062214
Kelvin Onggadinata and Teck Seng Koh	
Quantum coherence and distinguishability as complementary resources: A resource-theoretic perspective from wave-particle duality (12 pages)	062215
Zhiping Liu, Chengkai Zhu, Hua-Lei Yin, and Xin Wang	
Effective Floquet Lindblad generators from spectral unwinding (11 pages)	062216
Görkem D. Dinc, André Eckardt, and Alexander Schnell	
Identifying quantum resources in convex resource theories with Kirkwood-Dirac quasiprobabilities (9 pages)	062217
Kok Chuan Tan and Souradeep Sasmal	
Quantum information science	
Strict advantage of complex quantum theory in a communication task (8 pages)	062401
Thomas J. Elliott	
Quantum error mitigation for rotation-symmetric bosonic codes with symmetry expansion (17 pages)	062402
Suguru Endo, Yasunari Suzuki, Kento Tsubouchi, Rui Asaoka, Kaoru Yamamoto, Yuichiro Matsuzaki, and Yuuki Tokunaga	
Operational simultaneous correlations in complementary bases of bipartite states via one-sided semi-device-independent steering (12 pages)	062403
Chellasamy Jebarathinam, Debarshi Das, Huan-Yu Ku, Debasis Sarkar, and Hsi-Sheng Goan	
Variational quantum algorithm based on Lagrange polynomial encoding to solve differential equations (21 pages)	062404
Josephine Hunout, Sylvain Laizet, and Lorenzo Iannucci	
Nonlinear classification capability of quantum neural networks due to emergent quantum metastability (15 pages)	062405
Mario Boneberg, Federico Carollo, and Igor Lesanovsky	
Feedback-based optimally controlled quantum states (12 pages)	062406
Lucas T. Brady and Stuart Hadfield	
Choi-defined resource theories (23 pages)	062407
Elia Zanoni and Carlo Maria Scandolo	
Heisenberg-scaling precision in the estimation of two parameters in a Mach-Zehnder interferometer (13 pages)	062408
Atmadev Rai, Danilo Triggiani, Paolo Facchi, and Vincenzo Tamma	
Optimal estimation of three parallel spins with genuine and restricted collective measurements (16 pages)	062409
Changhao Yi, Kai Zhou, Zhibo Hou, Guo-Yong Xiang, and Huangjun Zhu	
Quantum machine learning for multiclass classification beyond kernel methods (20 pages)	062410
Chao Ding, Shi Wang, Yaonan Wang, and Weibo Gao	
Lower bounds on the number of rounds of the quantum approximate optimization algorithm required for guaranteed approximation ratios (16 pages)	062411
Naphan Benchasattabuse, Andreas Bärttschi, Luis Pedro García-Pintos, John Golden, Nathan Lemons, and Stephan Eidenbenz	

(Continued)

Photonics, nonlinear optics, and optomechanics

- Observation of transition radiation carrying orbital angular momentum (*6 pages*) L061501
 Y. Takabayashi, H. Takeda, E. Magome, K. Sumitani, P. O. Kazinski, P. S. Korolev,
 O. V. Bogdanov, and T. A. Tikhfatullin

Quantum optics

- Chiral-extended photon-emitter dressed states in non-Hermitian topological baths (*8 pages*) L061701
 Zhao-Fan Cai, Xin Wang, Zi-Xuan Liang, Tao Liu, and Franco Nori

ARTICLES**Fundamental concepts**

- Single-qubit probes for temperature estimation in the presence of collective baths (*18 pages*) 062201
 Asghar Ullah, Marco Cattaneo, and Özgür E. Müstecaplıoğlu
- Phase diagram of the Schwinger model by adiabatic preparation of states on a quantum simulator (*15 pages*) 062202
 Oleg Kaikov, Theo Saporiti, Vasily Sazonov, and Mohamed Tamaazousti
- Quantum information with quantumlike bits (*15 pages*) 062203
 Graziano Amati and Gregory D. Scholes
- Autonomous coarse-grained cooling of the coldest reservoir not restricted by the second law
 of thermodynamics (*11 pages*) 062204
 I. V. Vovchenko, A. A. Zyablovsky, A. A. Pukhov, and E. S. Andrianov
- Thermodynamics of coherent energy exchanges between lasers and two-level systems (*32 pages*) 062205
 Ariane Soret and Massimiliano Esposito
- Analytical solutions of bilinear bosonic models and exact characterization of non-Markovian dynamics (*10 pages*) 062206
 Zhao-Ming Wang, S. L. Wu, Mark S. Byrd, and Lian-Ao Wu
- Violation of steering inequality for generalized equiangular measurements (*8 pages*) 062207
 Adam Rutkowski and Katarzyna Siudzińska
- Effect of self-interaction on Feynman's interpretation of the Lamb shift (*5 pages*) 062208
 Peter W. Milonni, Paul R. Berman, and Kanu Sinha
- Investigation of the topological quantum phase transition in a superconducting system via quantum
 walks (*21 pages*) 062209
 Yi-Hao Kang, Qi-Ping Su, Yu Wang, Lijiong Shen, and Chui-Ping Yang
- Time-evolving matrix product operator method in a nondiagonal basis set based on the derivative
 of the path-integral expression (*8 pages*) 062210
 Shuocang Zhang and Qiang Shi
- Lindblad dynamics of open multimode bosonic systems: Algebra of quadratic superoperators, exceptional points,
 and speed of evolution (*19 pages*) 062211
 Andrei Gaidash, Alexei D. Kiselev, Anton Kozubov, and George Miroshnichenko
- Quantum thermal machine regimes in the transverse-field Ising model (*9 pages*) 062213
 Vishnu Muraleedharan Sajitha, Bodhaditya Santra, Matthew J. Davis, and L. A. Williamson

(Continued)

*The Table of Contents is a total listing of Parts A and B.
Part A consists of pages L060201–062623, and Part B pages 062801–069901(E).*

PART A

LETTERS

Fundamental concepts

- ☞ Uncertainty relations relative to phase-space quantum reference frames (6 pages) L060201
Miguel Jorquera Riera and Leon Loveridge

- Effects of superradiance on relativistic Foldy-Wouthuysen densities (5 pages) L060202
F. Daem and A. Matzkin

Quantum information science

- Multivariate bicycle codes (6 pages) L060401
Lukas Voss, Sim Jian Xian, Tobias Haug, and Kishor Bharti

- Experimental virtual quantum broadcasting (7 pages) L060402
Yuxuan Zheng, Xinfang Nie, Hongfeng Liu, Yutong Luo, Dawei Lu, and Xiangjing Liu

Atomic and molecular structure and dynamics; high-precision experiments

- Precise determination of electric quadrupole moments and isotope shift constants of Yb^+ in pursuance of probing fundamental physics and nuclear radii (6 pages) L060801
B. K. Sahoo

Light-induced processes in atomic-scale systems

- Simultaneous imaging of vibrational, rotational, and electronic wave-packet dynamics in a triatomic molecule (8 pages) L061101
Huynh Van Sa Lam, Van-Hung Hoang, Anbu Selvam Venkatachalam, Surjendu Bhattacharyya, Keyu Chen, Sina Jacob, Sanduni Kudagama, Tu Thanh Nguyen, Daniel Rolles, Uwe Thumm, Artem Rudenko, and Vinod Kumarappan

Ultracold systems and matter waves

- ☐ All-optical production of Bose-Einstein condensates with a 2-Hz repetition rate (4 pages) L061301
Mareike Hetzel, Martin Quensen, Jan Simon Haase, and Carsten Klempt

- Polaronic dressing of bound states (8 pages) L061302
L. A. Peña Ardila and A. Camacho-Guardian



(Continued)



2469-9926(202506)111:6:A;1-T