

CONTENTS - *Continued*

PHYSICAL REVIEW A	THIRD SERIES, VOLUME 104, NUMBER 1	JULY 2021
Unconventional quantum correlations of light emitted by a single atom in free space (<i>8 pages</i>)		013724
D. Goncalves, M. W. Mitchell, and D. E. Chang		
Effects of losses on the sensitivity of an actively correlated Mach-Zehnder interferometer (<i>8 pages</i>)		013725
Gao-Feng Jiao, Qiang Wang, Zhifei Yu, L. Q. Chen, Weiping Zhang, and Chun-Hua Yuan		
COMMENTS		
Comment on “Separability of completely symmetric states in a multipartite system” (<i>2 pages</i>)		016401
Kil-Chan Ha		
Reply to “Comment on ‘Separability of completely symmetric states in a multipartite system’ ” (<i>2 pages</i>)		016402
Yi Shen, Lin Chen, Lilong Qian, and Delin Chu		
ERRATA		
Erratum: Suppressing decoherence in quantum plasmonic systems by the spectral-hole-burning effect [Phys. Rev. A 103 , 053517 (2021)] (<i>1 page</i>)		019901(E)
Jia-Bin You, Xiao Xiong, Ping Bai, Zhang-Kai Zhou, Wan-Li Yang, Ching Eng Png, Leong Chuan Kwek, and Lin Wu		
Erratum: Subspace stabilization analysis for a class of non-Markovian open quantum systems [Phys. Rev. A 101 , 042327 (2020)] (<i>1 page</i>)		019902(E)
Shikun Zhang, Kun Liu, Daoyi Dong, Xiaoxue Feng, and Feng Pan		

CONTENTS - *Continued*

PHYSICAL REVIEW A

THIRD SERIES, VOLUME 104, NUMBER 1

JULY 2021

Multiple-Fano-resonance-induced fast and slow light in the hybrid nanomechanical-resonator system (11 pages)	013708
Hua-Jun Chen	
Atom-modulated dynamic optical hysteresis in driven-dissipative systems (7 pages)	013709
Jianning Li, H. Z. Shen, Wei Wang, and Xuexi Yi	
Statistical parameter estimation of multimode multiphoton-subtracted thermal states of light (8 pages)	013710
G. V. Avosopiants, B. I. Bantysh, K. G. Katamadze, N. A. Bogdanova, Yu. I. Bogdanov, and S. P. Kulik	
Electromagnetically induced transparency in the strong blockade regime using the four-photon excitation process in thermal rubidium vapor (7 pages)	013711
Tanim Firdoshi, Sujit Garain, Vishu Gupta, Dushmanta Kara, and Ashok K. Mohapatra	
Two-beam light with simultaneous anticorrelations in photon-number fluctuations and sub-Poissonian statistics (12 pages)	013712
Jan Peřina, Jr., Václav Michálek, Radek Machulka, and Ondřej Haderka	
Quantum optomechanical system in a Mach-Zehnder interferometer (26 pages)	013713
Alberto Barchielli and Matteo Gregoratti	
QED theory for small-hole diffraction: Young diffraction from two Bethe holes (13 pages)	013714
Jesper Jung and Ole Keller	
Generating and detecting entangled cat states in dissipatively coupled degenerate optical parametric oscillators (9 pages)	013715
Zheng-Yang Zhou, Clemens Gneiting, J. Q. You, and Franco Nori	
Coherent perfect absorption of quantum light (17 pages)	013716
Anton N. Vetlugin	
Insights into Fano-type resonance fluorescence from quantum-dot-metal-nanoparticle molecules with a squeezed vacuum (14 pages)	013717
Shuting Shen, Zhiming Wu, Jiahua Li, and Ying Wu	
Kerr-spacetime geometric optics for vortex beams (9 pages)	013718
Fabrizio Tamburini, Fabiano Feleppa, Ignazio Licata, and Bo Thidé	
Collective effects in the photon statistics of thermal atomic ensembles (12 pages)	013719
Sofia Ribeiro, Thomas F. Cutler, Charles S. Adams, and Simon A. Gardiner	
Entanglement preparation and nonreciprocal excitation evolution in giant atoms by controllable dissipation and coupling (8 pages)	013720
Hongwei Yu, Zhihai Wang, and Jin-Hui Wu	
Optomechanically induced Faraday and splitting effects in a double-cavity optomechanical system (9 pages)	013721
Tie Wang, Cheng-Hua Bai, Dong-Yang Wang, Shutian Liu, Shou Zhang, and Hong-Fu Wang	
Beyond the Rabi model: Light interactions with polar atomic systems in a cavity (11 pages)	013722
Giovanni Scala, Karolina Słowik, Paolo Facchi, Saverio Pascazio, and Francesco V. Pepe	
Dimensional reduction of cavities with axial symmetry: A complete analysis of when an optical fiber is approximately one dimensional (13 pages)	013723
Daniel Grimmer, Richard Lopp, and Eduardo Martín-Martínez	

(Continued)

CONTENTS - *Continued*

PHYSICAL REVIEW A	THIRD SERIES, VOLUME 104, NUMBER 1	JULY 2021
Electro-optic effect of graded-pitch chiral photonic structures under oblique illumination (<i>12 pages</i>)		013519
Laura O. Palomares and J. Adrian Reyes		
Bright-soliton frequency combs and dressed states in $\chi^{(2)}$ microresonators (<i>21 pages</i>)		013520
D. N. Puzyrev, V. V. Pankratov, A. Villois, and D. V. Skryabin		
Enhancing the sensitivity of optomechanical mass sensors with a laser in a squeezed state (<i>7 pages</i>)		013521
T. Li, W. Wang, and Xuexi Yi		
Photonic realization of the κ -deformed Dirac equation (<i>8 pages</i>)		013522
P. Majari, E. Sadurní, M. R. Setare, J. A. Franco-Villafañe, and T. H. Seligman		
Random singlet phase of cold atoms coupled to a photonic crystal waveguide (<i>9 pages</i>)		013523
David Z. Li, Marco T. Manzoni, and Darrick E. Chang		
Aberrated optical cavities (<i>17 pages</i>)		013524
Matt Jaffe, Lukas Palm, Claire Baum, Lavanya Taneja, and Jonathan Simon		
Higher-order Stokes-parameter correlation to restore the twisted wave front propagating through a scattering medium (<i>10 pages</i>)		013525
Tushar Sarkar, Reajmina Parvin, Maruthi M. Brundavanam, and Rakesh Kumar Singh		
Multihump thermo-reorientational solitary waves in nematic liquid crystals: Modulation theory solutions (<i>11 pages</i>)		013526
Gaetano Assanto, Cassandra Khan, and Noel F. Smyth		
Quantum optics		
Quantum simulation with fully coherent dipole-dipole interactions mediated by three-dimensional subwavelength atomic arrays (<i>13 pages</i>)		013701
Katharina Brechtelsbauer and Daniel Malz		
Quantum spatial dynamics of high-gain parametric down-conversion accompanied by cascaded up-conversion (<i>13 pages</i>)		013702
A. V. Rasputnyi and D. A. Kopylov		
Deterministic generation of multidimensional photonic cluster states using time-delay feedback (<i>13 pages</i>)		013703
Yu Shi and Edo Waks		
Characterizing mixed-state entanglement through single-photon interference (<i>9 pages</i>)		013704
Mayukh Lahiri, Radek Lapkiewicz, Armin Hochrainer, Gabriela Barreto Lemos, and Anton Zeilinger		
Optimal two-photon excitation of bound states in non-Markovian waveguide QED (<i>9 pages</i>)		013705
Rahul Trivedi, Daniel Malz, Shuo Sun, Shanhui Fan, and Jelena Vučković		
Perfect higher-order squeezing via strong nonlinearity in microwave-modified electromagnetically induced transparency (<i>12 pages</i>)		013706
Jun Xu and Fei Wang		
Exact k -body representation of the Jaynes-Cummings interaction in the dressed basis: Insight into many-body phenomena with light (<i>23 pages</i>)		013707
Kevin C. Smith, Aniruddha Bhattacharya, and David J. Masiello		

(Continued)

CONTENTS - *Continued*

PHYSICAL REVIEW A

THIRD SERIES, VOLUME 104, NUMBER 1

JULY 2021

Polarization evolution on the higher-order Poincaré sphere via photonic Dirac points (<i>9 pages</i>)	013504
Wenhao Xu, Shizhen Chen, Shuangchun Wen, and Hailu Luo	
Free-space group-velocity dispersion induced in space-time wave packets by V-shaped spectra (<i>9 pages</i>)	013505
Layton A. Hall and Ayman F. Abouraddy	
Generalized self-similar propagation and amplification of optical pulses in nonlinear media with high-order normal dispersion (<i>8 pages</i>)	013506
Antoine F. J. Runge, Tristram J. Alexander, Harsh P. Talathi, Darren D. Hudson, Andrea Blanco-Redondo, and C. Martijn de Sterke	
Multimode parity-time symmetry and loss compensation in coupled waveguides with loss and gain (<i>10 pages</i>) . . .	013507
Anton V. Hlushchenko, Vitalii I. Shcherbinin, Denis V. Novitsky, and Vladimir R. Tuz	
Computation of internal optical forces using the Helmholtz tensor (<i>8 pages</i>)	013508
Liyong Cui, Neng Wang, and Jack Ng	
Calculating spatiotemporally modulated surfaces: A dynamical differential formalism (<i>9 pages</i>)	013509
Daigo Oue, Kun Ding, and J. B. Pendry	
Spin-orbit-coupled fluids of light in bulk nonlinear media (<i>16 pages</i>)	013510
Giovanni I. Martone, Tom Bienaimé, and Nicolas Cherroret	
Self-organized structures of two-component laser fields and their active control in a cold Rydberg atomic gas (<i>19 pages</i>)	013511
Zeyun Shi and Guoxiang Huang	
Time-domain formulation of electromagnetic scattering based on a polarization-mode expansion and the principle of least action (<i>22 pages</i>)	013512
Carlo Forestiere and Giovanni Miano	
Noise-robust computational ghost imaging with pink noise speckle patterns (<i>7 pages</i>)	013513
Xiaoyu Nie, Fan Yang, Xiangpei Liu, Xingchen Zhao, Reed Nessler, Tao Peng, M. Suhail Zubairy, and Marlan O. Scully	
Characterizing ultrashort laser pulses by the rotational Doppler effect (<i>10 pages</i>)	013514
E. Szmygel, P. Béjot, A. Dubrouil, F. Billard, B. Lavorel, O. Faucher, and E. Hertz	
Dissipation-enhanced collapse singularity of a nonlocal fluid of light in a hot atomic vapor (<i>8 pages</i>)	013515
Pierre Azam, Adrien Fusaro, Quentin Fontaine, Josselin Garnier, Alberto Bramati, Antonio Picozzi, Robin Kaiser, Quentin Glorieux, and Tom Bienaimé	
Structure of transverse spin in focused random light (<i>8 pages</i>)	013516
Yahong Chen, Fei Wang, Zhen Dong, Yangjian Cai, Andreas Norrman, José J. Gil, Ari T. Friberg, and Tero Setälä	
Enhancing terahertz radiation from femtosecond laser filaments using local gas density modulation (<i>8 pages</i>) . . .	013517
Haicheng Xiao, Shengfeng Wang, Yan Peng, Daniel M. Mittleman, Jiayu Zhao, Zuanming Jin, Yiming Zhu, and Songling Zhuang	
Time-domain calculation of forerunners in Drude dispersive media without collisions (<i>9 pages</i>)	013518
Ivan V. Pavlenko, Igor O. Girka, Oleksandr V. Trush, and Sofia V. Hnatiuk	

(Continued)

CONTENTS - *Continued*

PHYSICAL REVIEW A	THIRD SERIES, VOLUME 104, NUMBER 1	JULY 2021
Selection rule for topological amplifiers in Bogoliubov–de Gennes systems (<i>11 pages</i>)		013305
Hong Y. Ling and Ben Kain		
Multiorder topological superfluid phase transitions in a two-dimensional optical superlattice (<i>8 pages</i>)		013306
Yu-Biao Wu, Guang-Can Guo, Zhen Zheng, and Xu-Bo Zou		
Tractor atom interferometry (<i>7 pages</i>)		013307
A. Duspayev and G. Raithel		
Intertwined space-time symmetry, orbital magnetism, and dynamical Berry connection in a circularly shaken optical lattice (<i>7 pages</i>)		013308
Hua Chen and W. Vincent Liu		
Loading ultracold atoms onto nonlinear Bloch states and soliton states in bichromatic lattices (<i>13 pages</i>)		013309
Tomotake Yamakoshi and Shinichi Watanabe		
Phases of supersolids in confined dipolar Bose-Einstein condensates (<i>7 pages</i>)		013310
Yong-Chang Zhang, Thomas Pohl, and Fabian Maucher		
Coherently delocalized states in dipole interacting Rydberg ensembles: The role of internal degeneracies (<i>9 pages</i>)		013311
Ghassan Abumwis, Christopher W. Wächtler, Matthew T. Eiles, and Alexander Eisfeld		
Extension of the rotation-rate measurement range with no sensitivity loss in a cold-atom gyroscope (<i>10 pages</i>) . . .		013312
Yuan Zhao, Xuguang Yue, Fusheng Chen, and Chen Huang		
Spontaneous quantum superradiant emission in atomic Bose-Einstein condensates subject to a synthetic vector potential (<i>14 pages</i>)		013313
Luca Giacomelli and Iacopo Carusotto		
Wigner function for noninteracting fermions in hard-wall potentials (<i>22 pages</i>)		013314
Benjamin De Bruyne, David S. Dean, Pierre Le Doussal, Satya N. Majumdar, and Grégory Schehr		
Topological inheritance in two-component Hubbard models with single-component Su-Schrieffer-Heeger dimerization (<i>6 pages</i>)		013315
Suman Mondal, Sebastian Greschner, Luis Santos, and Tapan Mishra		
Phase diagram of vortices in the polar phase of spin-1 Bose-Einstein condensates (<i>15 pages</i>)		013316
Hiromitsu Takeuchi		
Three-body recombination near the <i>d</i> -wave resonance in ultracold ^{85}Rb - ^{87}Rb mixtures (<i>12 pages</i>)		013317
Cai-Yun Zhao, Hui-Li Han, and Ting-Yun Shi		
Sensitive detection of entanglement in exciton-polariton condensates via spin squeezing (<i>13 pages</i>)		013318
Jingyan Feng, Ebubechukwu O. Ilo-Okeke, Alexey N. Pyrkov, Alexis Askitopoulos, and Tim Byrnes		
Photonics, nonlinear optics, and optomechanics		
Master-equation treatment of nonlinear optomechanical systems with optical loss (<i>19 pages</i>)		013501
Sofia Qvarfort, Michael R. Vanner, P. F. Barker, and David Edward Bruschi		
Energy-level attraction and heating-resistant cooling of mechanical resonators with exceptional points (<i>11 pages</i>)		013502
Cheng Jiang, Yu-Long Liu, and Mika A. Sillanpää		
Slow and stopped light in dynamic Moiré gratings (<i>9 pages</i>)		013503
Thomas E. Maybour, Devin H. Smith, and Peter Horak		

(Continued)

CONTENTS - *Continued*

PHYSICAL REVIEW A

THIRD SERIES, VOLUME 104, NUMBER 1

JULY 2021

Ultrabroadband microwave radiation from near- and mid-infrared laser-produced plasmas in air (<i>10 pages</i>)	013107
Alexander Englesbe, Jennifer Elle, Robert Schwartz, Travis Garrett, Daniel Woodbury, Dogeun Jang, Ki-Yong Kim, Howard Milchberg, Remington Reid, Adrian Lucero, Daniel Gordon, Ryan Phillips, Serge Kalmykov, and Andreas Schmitt-Sody	
Generation of maximal three-state field-free molecular orientation with terahertz pulses (<i>10 pages</i>)	013108
Qian-Qian Hong, Li-Bao Fan, Chuan-Cun Shu, and Niels E. Henriksen	
Dissecting subcycle interference in photoelectron holography (<i>12 pages</i>)	013109
Nicholas Werby, Andrew S. Maxwell, Ruaridh Forbes, Philip H. Bucksbaum, and Carla Figueira de Morisson Faria	
Two-center interference and stereo Wigner time delay in photoionization of asymmetric molecules (<i>9 pages</i>)	013110
Yijie Liao, Yueming Zhou, Liang-Wen Pi, Qinghua Ke, Jintai Liang, Yong Zhao, Min Li, and Peixiang Lu	
Directional population control beyond the exceptional point in a non-Hermitian system (<i>6 pages</i>)	013111
C. He and R. R. Jones	
Spatial enantioseparation of gaseous chiral molecules (<i>7 pages</i>)	013113
Bo Liu, Chong Ye, C. P. Sun, and Yong Li	
Dynamical phase shift in x-ray absorption and ionization spectra by two delayed x-ray laser fields (<i>9 pages</i>)	013114
Viktoriia Savchenko, Faris Gel'mukhanov, Tim Laarmann, Sergey P. Polyutov, and Victor Kimberg	
Atomic photoionization by multiple temporal pairs of slits (<i>8 pages</i>)	013115
J. M. Ngoko Djiokap	
Classical backpropagation for probing the backward rescattering time of a tunnel-ionized electron in an intense laser field (<i>7 pages</i>)	013116
Yang Hwan Kim, Igor A. Ivanov, and Kyung Taec Kim	
Steady-state phonon occupation of electromagnetically-induced-transparency cooling: Higher-order calculations (<i>7 pages</i>)	013117
Shuo Zhang, Tian-Ci Tian, Zheng-Yang Wu, Zong-Sheng Zhang, Xin-Hai Wang, Wei Wu, Wan-Su Bao, and Chu Guo	
Free-bound excitation and predissociation of ytterbium dimers near the $^1S_0 - ^1P_1$ atomic transition (<i>8 pages</i>)	013118
Katsunari Enomoto, Ryota Takabatake, Takehiro Suzuki, Yosuke Takasu, Yoshiro Takahashi, and Masaaki Baba	
Ultracold systems and matter waves	
Ground-state phase diagram of ultrasoft bosons (<i>7 pages</i>)	013301
Alejandro Mendoza-Coto, Diogo de Souza Caetano, and Rogelio Díaz-Méndez	
Engineering spin-spin interactions with optical tweezers in trapped ions (<i>8 pages</i>)	013302
J. D. Arias Espinoza, M. Mazzanti, K. Fouka, R. X. Schüssler, Z. Wu, P. Corboz, R. Gerritsma, and A. Safavi-Naini	
Long-range-ordered phase in a quantum Heisenberg chain with interactions beyond nearest neighbors (<i>6 pages</i>)	013303
Zehan Li, Sayan Choudhury, and W. Vincent Liu	
State selective cooling of $SU(N)$ Fermi gases (<i>10 pages</i>)	013304
Aaron Merlin Müller, Miklós Lajkó, Florian Schreck, Frédéric Mila, and Jiří Minář	

(Continued)

CONTENTS - *Continued*

PHYSICAL REVIEW A

THIRD SERIES, VOLUME 104, NUMBER 1

JULY 2021

Structure and electron dynamics of planetary states of Sr below the Sr^+ $7d$ and $8p$ thresholds (12 pages)	012812
M. Génévriez, C. Rosen, and U. Eichmann	
Effect of chlorination on positron binding to hydrocarbons: Experiment and theory (15 pages)	012813
A. R. Swann, G. F. Gribakin, J. R. Danielson, S. Ghosh, M. R. Natisin, and C. M. Surko	
Calculations of time-reversal-symmetry-violation sensitivity parameters based on analytic relativistic coupled-cluster gradient theory (7 pages)	012814
Chaoqun Zhang, Xuechen Zheng, and Lan Cheng	
Pump-probe photoemission simulated in real time: Revealing many-particle signatures (13 pages)	012815
Sebastian Hammon and Stephan Kümmel	
Peak, valley, and intermediate regimes in the lateral van der Waals force (11 pages)	012816
Edson C. M. Nogueira, Lucas Queiroz, and Danilo T. Alves	
Absolute triple differential cross sections for low-energy electron impact ionization of biochemically relevant systems: Water, tetrahydrofuran, and hydrated tetrahydrofuran (8 pages)	012817
Jiaqi Zhou, Esam Ali, Maomao Gong, Shaokui Jia, Yutian Li, Yingying Wang, Zhen Zhang, Xiaorui Xue, Dmitry V. Fursa, Igor Bray, Xiangjun Chen, Don Madison, Alexander Dorn, and Xueguang Ren	
QED calculation of two-electron one-photon transition probabilities in He-like ions (13 pages)	012818
Konstantin N. Lyashchenko, Oleg Yu. Andreev, and Deyang Yu	
Electron affinity of oganesson (10 pages)	012819
M. Y. Kaygorodov, L. V. Skripnikov, I. I. Tupitsyn, E. Eliav, Y. S. Kozhedub, A. V. Malyshev, A. V. Oleynichenko, V. M. Shabaev, A. V. Titov, and A. V. Zaitsevskii	
Determining the translational and internal temperatures of isolated metal clusters: A comprehensive approach based on molecular-beam-deflection experiments (12 pages)	012820
Thomas M. Fuchs, Filip Rivic, and Rolf Schäfer	

PART B

Light-induced processes in atomic-scale systems

Vibronic coherence and quantum beats of O_2^+ based on laser pump-probe dissociation dynamics (12 pages)	013101
Shan Xue, Shengjun Yue, Hongchuan Du, Bitao Hu, and Anh-Thu Le	
Elliptical dichroism in biharmonic ionization of atoms (9 pages)	013102
J. Hofbrucker, B. Böning, A. V. Volotka, and S. Fritzsche	
Auger decay in dispersing and absorbing environments (7 pages)	013103
Janine Franz, Robert Bennett, and Stefan Yoshi Buhmann	
Interference between harmonics of different crystal momentum channels in solid high-order harmonic generation (10 pages)	013104
Yong-Lin He, Jing Guo, Fang-Yan Gao, Zhi-Jie Yang, Si-Qi Zhang, and Xue-Shen Liu	
Single-cycle versus multicycle nonsequential double ionization of argon (10 pages)	013105
Fang Liu, Zhangjin Chen, Toru Morishita, Klaus Bartschat, Birger Böning, and Stephan Fritzsche	
Local most-probable routes and classical-quantum correspondence in strong-field two-dimensional tunneling ionization (16 pages)	013106
C. Chen, X. X. Ji, W. Y. Li, X. Han, and Y. J. Chen	

(Continued)

CONTENTS - *Continued*

PHYSICAL REVIEW A

THIRD SERIES, VOLUME 104, NUMBER 1

JULY 2021

Key-sifting algorithms for continuous-variable quantum key distribution (9 pages)	012616
Di Jin, Ying Guo, Yijun Wang, Yin Li, and Duan Huang	
☞ Controllable entangled-state distribution in a dual-rail reconfigurable optical network (9 pages)	012617
Shuto Osawa, David S. Simon, Vladimir S. Malinovsky, and Alexander V. Sergienko	
Realization of nonadiabatic holonomic multiqubit controlled gates with Rydberg atoms (11 pages)	012618
T. H. Xing, P. Z. Zhao, and D. M. Tong	
Improving nonstoquastic quantum annealing with spin-reversal transformations (7 pages)	012619
Eleni Marina Lykiardopoulou, Alex Zucca, Sam A. Scivier, and Mohammad H. Amin	
Atomic and molecular structure and dynamics; high-precision experiments	
Spectroscopy on the $A^1\Pi \leftarrow X^1\Sigma^+$ transition of buffer-gas-cooled AlCl (13 pages)	012801
John R. Daniel, Chen Wang, Kayla Rodriguez, Boerge Hemmerling, Taylor N. Lewis, Christopher Bardeen, Alexander Teplukhin, and Brian K. Kendrick	
<i>Ab initio</i> multiconfiguration Dirac-Hartree-Fock calculations of the In and Tl electron affinities and their isotope shifts (8 pages)	012802
Ran Si, Sacha Schiffmann, Kai Wang, Chong Yang Chen, and Michel Godefroid	
Confined hydrogenlike ions in plasma environments (21 pages)	012803
Neetik Mukherjee, Chandra N. Patra, and Amlan K. Roy	
Experimental and theoretical study of the Kr <i>L</i> -shell Auger decay (12 pages)	012804
N. Boudjemia, K. Jänkälä, T. Gejo, Y. Kohmura, M. Huttula, M. N. Piancastelli, M. Simon, M. Oura, and R. Püttner	
Absolute NMR shielding scales in methyl halides obtained from experimental and calculated nuclear spin-rotation constants (11 pages)	012805
Daniel F. E. Bajac, I. Agustín Aucar, and Gustavo A. Aucar	
Dispersion C_3 coefficients for physisorption of heavy ions and atoms with graphene and carbon nanotubes (10 pages)	012806
Harpreet Kaur, Neelam Shukla, Rajesh Srivastava, and Bindiya Arora	
Bohr's stopping-power formula derived for a classical free-electron gas (6 pages)	012807
P. L. Grande	
Hyperfine structure of the $EF^1\Sigma_g^+$ state in H_2 (9 pages)	012808
Hubert Jóźwiak, Hubert Cybulski, Antoni Grabowski, and Piotr Wcisło	
Electron-loss-to-continuum cusp in collisions of U^{89+} with N_2 and Xe (8 pages)	012809
P.-M. Hillenbrand, K. N. Lyashchenko, S. Hagmann, O. Yu. Andreev, D. Banaś, E. P. Benis, A. I. Bondarev, C. Brandau, E. De Filippo, O. Forstner, J. Glorius, R. E. Grisenti, A. Gumberidze, D. L. Guo, M. O. Herdrich, M. Lestinsky, Yu. A. Litvinov, E. V. Pagano, N. Petridis, M. S. Sanjari, D. Schury, U. Spillmann, S. Trotsenko, M. Vockert, A. B. Voitkiv, G. Weber, and Th. Stöhlker	
☞ Positronium collisions with O_2 and CO_2 (8 pages)	012810
R. S. Wilde, H. B. Ambalampitiya, and I. I. Fabrikant	
Electric-field-dependent <i>g</i> factor for the ground state of lead monofluoride, PbF (6 pages)	012811
V. V. Baturó, P. M. Rupasinghe, T. J. Sears, R. J. Mawhorter, J.-U. Grabow, and A. N. Petrov	

(Continued)

CONTENTS - *Continued*

PHYSICAL REVIEW A	THIRD SERIES, VOLUME 104, NUMBER 1	JULY 2021
Graph-state representation of the toric code (<i>16 pages</i>)		012432
Pengcheng Liao and David L. Feder		
Quantum technologies		
Bounding passive light-source side channels in quantum key distribution via Hong-Ou-Mandel interference (<i>9 pages</i>)		012601
Alexander Duplinskiy and Denis Sych		
Principle of majorization: Application to random quantum circuits (<i>8 pages</i>)		012602
Raúl O. Vallejos, Fernando de Melo, and Gabriel G. Carlo		
Color codes with twists: Construction and universal-gate-set implementation (<i>21 pages</i>)		012603
Manoj G. Gowda and Pradeep Kiran Sarvepalli		
Experimental test of search range in quantum annealing (<i>10 pages</i>)		012604
Nicholas Chancellor and Viv Kendon		
Impacts of noise and structure on quantum information encoded in a quantum memory (<i>12 pages</i>)		012605
Matthew Otten, Keshav Kapoor, A. Barış Özgüler, Eric T. Holland, James B. Kowalkowski, Yuri Alexeev, and Adam L. Lyon		
Scalable hyperfine qubit state detection via electron shelving in the $^2D_{5/2}$ and $^2F_{7/2}$ manifolds in $^{171}\text{Yb}^+$ (<i>11 pages</i>)		012606
C. L. Edmunds, T. R. Tan, A. R. Milne, A. Singh, M. J. Biercuk, and C. Hempel		
Quantum metrology with precision reaching beyond $1/N$ -scaling through N -probe entanglement-generating interactions (<i>9 pages</i>)		012607
Xing Deng, Shou-Long Chen, Mao Zhang, Xiao-Fan Xu, Jing Liu, Zhi Gao, Xiao-Chun Duan, Min-Kang Zhou, Lushuai Cao, and Zhong-Kun Hu		
Heralded quantum gates for hybrid systems via waveguide-mediated photon scattering (<i>12 pages</i>)		012608
Guo-Zhu Song, Jin-Liang Guo, Qian Liu, Hai-Rui Wei, and Gui-Lu Long		
Ultrahigh-fidelity composite rotational quantum gates (<i>12 pages</i>)		012609
Hayk L. Gevorgyan and Nikolay V. Vitanov		
Three approaches for analyzing the counterfactuality of counterfactual protocols (<i>16 pages</i>)		012610
Alon Wander, Eliahu Cohen, and Lev Vaidman		
Quantum simulation of nuclear inelastic scattering (<i>12 pages</i>)		012611
Weijie Du, James P. Vary, Xingbo Zhao, and Wei Zuo		
Heralded preparation of polarization entanglement via quantum scissors (<i>11 pages</i>)		012612
Dat Thanh Le, Warit Asavanant, and Nguyen Ba An		
Control of spectroscopic features of multiphoton transitions in two coupled qubits by driving fields (<i>13 pages</i>)		012613
V. O. Munyayev and M. V. Bastrakova		
Blinding quantum computation using alternative sources (<i>9 pages</i>)		012614
Chunfeng Huang, Tianyu Huang, Qianyu Lin, and Kejin Wei		
Quantum gates with weak van der Waals interactions of neutral Rydberg atoms (<i>7 pages</i>)		012615
Xiao-Feng Shi and Yan Lu		

(Continued)

CONTENTS - *Continued*

PHYSICAL REVIEW A	THIRD SERIES, VOLUME 104, NUMBER 1	JULY 2021
High-dimensional quantum Fourier transform of twisted light (<i>17 pages</i>)		012413
Jaroslav Kysela		
Quantum digital cooling (<i>13 pages</i>)		012414
Stefano Polla, Yaroslav Herasymenko, and Thomas E. O'Brien		
Efficient construction of matrix-product representations of many-body Gaussian states (<i>20 pages</i>)		012415
Alexander Nüßeler, Ish Dhand, Susana F. Huelga, and Martin B. Plenio		
Self-consistent state and measurement tomography with fewer measurements (<i>12 pages</i>)		012416
A. Stephens, J. M. Cutshall, T. McPhee, and M. Beck		
Witnessing negative conditional entropy (<i>9 pages</i>)		012417
Mahathi Vempati, Nirman Ganguly, Indranil Chakrabarty, and Arun K. Pati		
Visualizing quantum phase transitions in the XXZ model via the quantum steering ellipsoid (<i>9 pages</i>)		012418
Ming-Ming Du, Da-Jian Zhang, Zhao-Yi Zhou, and D. M. Tong		
Entanglement purification by counting and locating errors with entangling measurements (<i>32 pages</i>)		012419
F. Riera-Sàbat, P. Sekatski, A. Pirker, and W. Dür		
Mutually unbiased balanced functions and generalized random access codes (<i>12 pages</i>)		012420
Vaisakh M, Ram krishna Patra, Mukta Janpandit, Samrat Sen, Manik Banik, and Anubhav Chaturvedi		
Pulsed characteristic-function measurement of a thermalizing harmonic oscillator (<i>13 pages</i>)		012421
Ralf Betzholtz, Yu Liu, and Jianming Cai		
Risk-sensitive optimization for robust quantum controls (<i>7 pages</i>)		012422
Xiaozhen Ge and Re-Bing Wu		
Graph-connectivity-based strong quantum nonlocality with genuine entanglement (<i>10 pages</i>)		012424
Yan-Ling Wang, Mao-Sheng Li, and Man-Hong Yung		
Quantum hypothesis testing with group structure (<i>20 pages</i>)		012425
Zane M. Rossi and Isaac L. Chuang		
Multilinear monogamy relations for multiqubit states (<i>11 pages</i>)		012426
Xian Shi, Lin Chen, and Mengyao Hu		
Variational preparation of the thermofield double state of the Sachdev-Ye-Kitaev model (<i>13 pages</i>)		012427
Vincent Paul Su		
Quantum discord for multiqubit systems (<i>8 pages</i>)		012428
Bo Li, Chen-Lu Zhu, Xiao-Bin Liang, Biao-Liang Ye, and Shao-Ming Fei		
Noisy quantum input loophole in measurement-device-independent entanglement witnesses (<i>8 pages</i>)		012429
Kornikar Sen, Chirag Srivastava, Shiladitya Mal, Aditi Sen(De), and Ujjwal Sen		
Subsystem analysis of continuous-variable resource states (<i>20 pages</i>)		012430
Giacomo Pantaleoni, Ben Q. Baragiola, and Nicolas C. Menicucci		
Hidden qubit cluster states (<i>13 pages</i>)		012431
Giacomo Pantaleoni, Ben Q. Baragiola, and Nicolas C. Menicucci		

(Continued)

CONTENTS - *Continued*

PHYSICAL REVIEW A	THIRD SERIES, VOLUME 104, NUMBER 1	JULY 2021
Multilevel quantum thermodynamic swap engines (<i>11 pages</i>)		012217
Massimiliano F. Sacchi		
Coupling-induced nonunitary and unitary scattering in anti- $\mathcal{PT}$ -symmetric non-Hermitian systems (<i>8 pages</i>)		012218
H. S. Xu and L. Jin		
Uncertainty limits of the information exchange between a quantum system and an external meter (<i>8 pages</i>)		012219
Tomonori Matsushita and Holger F. Hofmann		
Nonclassical oscillations in pre- and post-selected quantum walks (<i>7 pages</i>)		012220
Xiao-Xiao Chen, Zhe Meng, Jian Li, Jia-Zhi Yang, An-Ning Zhang, Tomasz Kopyciuk, and Paweł Kurzyński		
☞ Onset of electron-seeded cascades in generic electromagnetic fields (<i>14 pages</i>)		012221
A. A. Mironov, E. G. Gelfer, and A. M. Fedotov		
Quantum information science		
U(1)-symmetric recurrent neural networks for quantum state reconstruction (<i>9 pages</i>)		012401
Stewart Morawetz, Isaac J. S. De Vlugt, Juan Carrasquilla, and Roger G. Melko		
Decoherence scaling transition in the dynamics of quantum information scrambling (<i>10 pages</i>)		012402
Federico D. Domínguez, María Cristina Rodríguez, Robin Kaiser, Dieter Suter, and Gonzalo A. Álvarez		
Beating classical heuristics for the binary paint shop problem with the quantum approximate optimization algorithm (<i>12 pages</i>)		012403
Michael Streif, Sheir Yarkoni, Andrea Skolik, Florian Neukart, and Martin Leib		
Quantifying dynamical coherence with coherence measures (<i>7 pages</i>)		012404
Sunho Kim, Chunhe Xiong, Asutosh Kumar, Guijun Zhang, and Junde Wu		
One qubit as a universal approximant (<i>15 pages</i>)		012405
Adrián Pérez-Salinas, David López-Núñez, Artur García-Sáez, P. Forn-Díaz, and José I. Latorre		
Finite-key analysis of loss-tolerant quantum key distribution based on random sampling theory (<i>17 pages</i>)		012406
Guillermo Currás-Lorenzo, Álvaro Navarrete, Margarida Pereira, and Kiyoshi Tamaki		
Symmetric multiqubit states: Stars, entanglement, and roto-sensors (<i>25 pages</i>)		012407
Chrysomalis Chrysomalakos, Louis Hanotel, Edgar Guzmán-González, Daniel Braun, Eduardo Serrano-Ensástiga, and Karol Życzkowski		
One-shot quantum error correction of classical and quantum information (<i>14 pages</i>)		012408
Yoshifumi Nakata, Eyuri Wakakuwa, and Hayata Yamasaki		
☞ Resource-efficient energy test and parameter estimation in continuous-variable quantum key distribution (<i>12 pages</i>)		012409
Cosmo Lupo		
Perfect quantum-state synchronization (<i>9 pages</i>)		012410
Jakub Czartowski, Ronny Müller, Karol Życzkowski, and Daniel Braun		
☞ Minimization of information leakage in continuous-variable quantum key distribution (<i>11 pages</i>)		012411
Matthew S. Winnel, Nedasadat Hosseindehaj, and Timothy C. Ralph		
☞ Adaptive filtering of projective quantum measurements using discrete stochastic methods (<i>12 pages</i>)		012412
Riddhi Swaroop Gupta and Michael J. Biercuk		

(Continued)

ARTICLES

Fundamental concepts

Bell-inequality violation and relativity of pre- and postselection (<i>6 pages</i>)	012201
G. Bacciagaluppi and R. Hermens	
Extracting the internal nonlocality from the dilated Hermiticity (<i>6 pages</i>)	012202
Minyi Huang, Ray-Kuang Lee, and Junde Wu	
Many-body anticommutator and its applications in the normalization of completely symmetric states with Majorana's stellar representations (<i>7 pages</i>)	012203
Xi Lu, Li-Yao Zhan, Jie Chen, Hao-Di Liu, Li-Bin Fu, and Xiao-Guang Wang	
Order from chaos in quantum walks on cyclic graphs (<i>7 pages</i>)	012204
Abhisek Panda and Colin Benjamin	
Generating high-order quantum exceptional points in synthetic dimensions (<i>13 pages</i>)	012205
Ievgen I. Arkhipov, Fabrizio Minganti, Adam Miranowicz, and Franco Nori	
Finding optimal Bell inequalities using the cone-projection technique (<i>13 pages</i>)	012206
Fabian Bernards and Otfried Gühne	
Sharp estimates for the integrated density of states in Anderson tight-binding models (<i>11 pages</i>)	012207
Perceval Desforges, Svitlana Mayboroda, Shiwen Zhang, Guy David, Douglas N. Arnold, Wei Wang, and Marcel Filoche	
Vacuum radiation pressure fluctuations on atoms (<i>8 pages</i>)	012208
L. H. Ford	
Quantized transport induced by topology transfer between coupled one-dimensional lattice systems (<i>12 pages</i>)	012209
Lukas Wawer, Rui Li, and Michael Fleischhauer	
Ruling out bipartite nonsignaling nonlocal models for tripartite correlations (<i>16 pages</i>)	012210
Peter Bierhorst	
Improving the estimation of environment parameters via initial probe-environment correlations (<i>11 pages</i>)	012211
Hamza Ather and Adam Zaman Chaudhry	
Apparent quantum paradoxes as simple interference: Quantum violation of the pigeonhole principle and exchange of properties between quantum particles (<i>6 pages</i>)	012212
Raul Corrêa and Pablo L. Saldanha	
Non-Markovian effects in the spin-boson model at zero temperature (<i>9 pages</i>)	012213
S. Wenderoth, H.-P. Breuer, and M. Thoss	
Impossibility of achieving Landauer's bound for almost every quantum state (<i>13 pages</i>)	012214
Paul M. Riechers and Mile Gu	
Coherent dynamical control of quantum processes (<i>17 pages</i>)	012215
V. Rezvani and A. T. Rezakhani	
Topological protection of coherence in disordered open quantum systems (<i>14 pages</i>)	012216
Yu Yao, Henning Schlömer, Zhengzhi Ma, Lorenzo Campos Venuti, and Stephan Haas	

(Continued)

The Table of Contents is a total listing of Parts A and B.
Part A consists of pages L010201–012820, and Part B pages 013101–019902(E).

PART A

LETTERS

Fundamental concepts

- Detection loophole in quantum causality and its countermeasures (6 pages) L010201
Zhu Cao

Quantum information science

- Parameter concentrations in quantum approximate optimization (6 pages) L010401
V. Akshay, D. Rabinovich, E. Campos, and J. Biamonte
- Maximum violation of monogamy of entanglement for indistinguishable particles by measures that are monogamous for distinguishable particles (7 pages) L010402
Goutam Paul, Soumya Das, and Anindya Banerji

Atomic and molecular structure and dynamics; high-precision experiments

- Asymmetry in emission of photons with left- and right-hand circular polarizations in two-photon decay (5 pages) L010801
Konstantin N. Lyashchenko, Victoria A. Knyazeva, Oleg Yu. Andreev, and Deyang Yu
- Precision characterization of the $^2D_{5/2}$ state and the quadratic Zeeman coefficient in $^{171}\text{Yb}^+$ (6 pages) L010802
T. R. Tan, C. L. Edmunds, A. R. Milne, M. J. Biercuk, and C. Hempel

Ultracold systems and matter waves

-  Studying the low-entropy Mott transition of bosons in a three-dimensional optical lattice by measuring the full momentum-space density (5 pages) L011301
Ga etan Herc e, C ecile Carcy, Antoine Tenart, Jan-Philipp Bureik, Alexandre Dareau, David Cl ement, and Tommaso Roscilde
- Bragg scattering of an ultracold dipolar gas across the phase transition from Bose-Einstein condensate to supersolid in the free-particle regime (6 pages) L011302
D. Petter, A. Patscheider, G. Natale, M. J. Mark, M. A. Baranov, R. van Bijnen, S. M. Roccuzzo, A. Recati, B. Blakie, D. Baillie, L. Chomaz, and F. Ferlaino

