

CONTENTS - *Continued*

PHYSICAL REVIEW A

THIRD SERIES, VOLUME 102, NUMBER 1

JULY 2020

Reply to “Comment on ‘How to observe and quantify quantum-discord states via correlations’ ” (2 pages)	016402
Matthew A. Hunt, Igor V. Lerner, Igor V. Yurkevich, and Yuval Gefen	

ERRATA

Erratum: Excitation of superpositions of resonances by two time-delayed ultrafast pulses: Multistate semianalytic formalism and application to inner-hole states of carbon at the <i>K</i> absorption edge [Phys. Rev. A 101 , 053420 (2020)] (1 page)	019901(E)
Y. Komninos, Th. Mercouris, and C. A. Nicolaides	
Erratum: Pulse reverse engineering for controlling two-level quantum systems [Phys. Rev. A 101 , 023822 (2020)] (1 page)	019902(E)
Du Ran, Wu-Jiang Shan, Zhi-Cheng Shi, Zhen-Biao Yang, Jie Song, and Yan Xia	
Erratum: Complete energy conversion between light beams carrying orbital angular momentum using coherent population trapping for a coherently driven double- Λ atom-light-coupling scheme [Phys. Rev. A 100 , 023811 (2019)] (1 page)	019903(E)
Hamid Reza Hamed, Emmanuel Paspalakis, Giedrius Žlabys, Gediminas Juzeliūnas, and Julius Ruseckas	
Erratum: Photonic quantum memory using an intra-atomic frequency comb [Phys. Rev. A 99 , 052314 (2019)] (2 pages)	019904(E)
G. P. Teja, Christoph Simon, and Sandeep K. Goyal	

CONTENTS - *Continued*

PHYSICAL REVIEW A

THIRD SERIES, VOLUME 102, NUMBER 1

JULY 2020

Quantum-enhanced estimation of the optical phase gradient by use of image-inversion interferometry (6 pages)	013712
Walker Larson and Bahaa E. A. Saleh	
Nonlocal dispersion cancellation for three or more photons (7 pages)	013713
I. C. Nodurft, S. U. Shringarpure, B. T. Kirby, T. B. Pittman, and J. D. Franson	
Adiabatic elimination for ensembles of emitters in cavities with dissipative couplings (12 pages)	013714
D. Hagenmüller, S. Schütz, G. Pupillo, and J. Schachenmayer	
Dynamical blockade in a bosonic Josephson junction using optimal coupling (8 pages)	013716
Dionisis Stefanatos and Emmanuel Paspalakis	
Two-level quantum system as a macroscopic scatterer for ultraconfined two-dimensional photonic modes (7 pages)	013717
Rituraj, Meir Orenstein, and Shanhui Fan	
Spontaneous decay processes in a classical strong low-frequency laser field (7 pages)	013718
Mihai Macovei, Jörg Evers, and Christoph H. Keitel	
Time-resolved multiphoton effects in the fluorescence spectra of two-level systems at rest and in motion (18 pages)	013719
Emil Viñas Boström, Andrea D’Andrea, Michele Cini, and Claudio Verdozzi	
Optical response of a topological-insulator–quantum-dot hybrid interacting with a probe electric field (12 pages)	013720
L. A. Castro-Enriquez, L. F. Quezada, and A. Martín-Ruiz	
Spontaneous emission in anisotropic dielectrics (10 pages)	013721
Anette Messinger, Niclas Westerberg, and Stephen M. Barnett	
Criticality in two-mode interferometers (6 pages)	013722
Hongbin Liang, Yuguo Su, Xiao Xiao, Yanming Che, Barry C. Sanders, and Xiaoguang Wang	
Asymmetric coupling between two quantum emitters (21 pages)	013723
C. A. Downing, J. C. López Carreño, A. I. Fernández-Domínguez, and E. del Valle	
☞ Master equation for multilevel interference in a superradiant medium (12 pages)	013724
Aleksei Konovalov and Giovanna Morigi	
Analytical description of quantum emission in optical analogs to gravity (18 pages)	013725
Maxime J. Jacquet and Friedrich König	
☞ Theory of waveguide QED with moving emitters (18 pages)	013726
Eduardo Sánchez-Burillo, Alejandro González-Tudela, and Carlos Gonzalez-Ballester	
Diagrammatic approach for analytical non-Markovian time evolution: Fermi’s two-atom problem and causality in waveguide quantum electrodynamics (19 pages)	013727
Fatih Dinc	

COMMENTS

Comment on “How to observe and quantify quantum-discord states via correlations” (3 pages)	016401
Parveen Kumar and Kyrlo Snizhko	

(Continued)

CONTENTS - *Continued*

PHYSICAL REVIEW A	THIRD SERIES, VOLUME 102, NUMBER 1	JULY 2020
Compression of laser pulses due to Raman amplification of plasma noises (<i>8 pages</i>)		013516
A. A. Balakin, D. S. Levin, and S. A. Skobelev		
Translationally invariant metamirrors for spatial filtering of light beams (<i>7 pages</i>)		013517
P. Y. Wang, R. Herrero, M. Botey, Y. C. Cheng, and K. Staliunas		
Two-color flat-top solitons in microresonator-based optical parametric oscillators (<i>10 pages</i>)		013518
Valery E. Lobanov		
Harmonic frequency combs in quantum cascade lasers: Time-domain and frequency-domain theory (<i>17 pages</i>)		013519
Yongrui Wang and Alexey Belyanin		
Synthesis of ultrafast waveforms using coherent Raman sidebands (<i>6 pages</i>)		013520
Aysan Bahari, Alexandra A. Zhdanova, Mariia Shutova, and Alexei V. Sokolov		
Quantum optics		
Nonequilibrium cavity QED model accounting for dipole-dipole interaction in strong-, ultrastrong-, and deep-strong-coupling regimes (<i>14 pages</i>)		013701
Asha Devi, Sarath D. Gunapala, Mark I. Stockman, and Malin Premaratne		
Graded-index optical fiber transverse-spatial-mode entanglement (<i>8 pages</i>)		013702
Çağın Ekici and Mehmet Salih Dinleyici		
Cavity-assisted controlled phase-flip gates (<i>14 pages</i>)		013703
F. Kimiaee Asadi, S. C. Wein, and C. Simon		
Single- versus two-parameter Fisher information in quantum interferometry (<i>16 pages</i>)		013704
Stefan Ataman		
Collapse-free action at a distance by multiple photon annihilations and tracking the action with a photon-number measurement (<i>11 pages</i>)		013705
ShengLi Zhang		
Experimental creation of single Rydberg excitations via adiabatic passage (<i>5 pages</i>)		013706
Ming-Ti Zhou, Jian-Long Liu, Peng-Fei Sun, Zi-Ye An, Jun Li, Xiao-Hui Bao, and Jian-Wei Pan		
 Light dressing of a diatomic superconducting artificial molecule (<i>18 pages</i>)		013707
G. P. Fedorov, V. B. Yursa, A. E. Efimov, K. I. Shiiyanov, A. Yu. Dmitriev, I. A. Rodionov, A. A. Dobronosova, D. O. Moskaev, A. A. Pishchimova, E. I. Malevannaya, and O. V. Astafiev		
Theory of all-optical switching based on the Kerr nonlinearity in metallic nanohybrids (<i>10 pages</i>)		013708
Mahi R. Singh		
Limits of photon-mediated interactions in one-dimensional photonic baths (<i>12 pages</i>)		013709
Eduardo Sánchez-Burillo, Diego Porras, and Alejandro González-Tudela		
Ramsey-like spectroscopy of superconducting qubits with dispersive evolution (<i>7 pages</i>)		013710
Yan Zhang, Tiantian Huan, Ri-gui Zhou, and Hou Ian		
Quantum information preserving computational electromagnetics (<i>10 pages</i>)		013711
Dong-Yeop Na, Jie Zhu, Weng C. Chew, and Fernando L. Teixeira		

(Continued)

 Producing and storing spin-squeezed states and Greenberger-Horne-Zeilinger states in a one-dimensional optical lattice (<i>14 pages</i>)	013328
Marcin Płodzień, Maciej Kościelski, Emilia Witkowska, and Alice Sinatra	
Photonics, nonlinear optics, and optomechanics	
Breach and recurrence of dissipative soliton resonance during period-doubling evolution in a fiber laser (<i>7 pages</i>)	013501
Yufei Wang, Lei Su, Shuai Wang, Limin Hua, Lei Li, Deyuan Shen, Dingyuan Tang, Andrey Komarov, Mariusz Klimczak, Songnian Fu, Ming Tang, Xiahui Tang, and Luming Zhao	
Observation of finite-size-induced emission decay rates in self-assembled photonic crystals (<i>7 pages</i>)	013502
Megha Khokhar, Priya, and Rajesh V. Nair	
Instantaneous radiation from time-varying electric and magnetic dipoles (<i>9 pages</i>)	013503
M. S. Mirmoosa, G. A. Ptitsyn, R. Fleury, and S. A. Tretyakov	
Generation of high-order harmonics with tunable photon energy and spectral width using double pulses (<i>6 pages</i>)	013504
Lénárd Gulyás Oldal, Tamás Csizmadia, Peng Ye, Nandiga Gopalakrishna Harshitha, Amelle Zaïr, Subhendu Kahaly, Katalin Varjú, Miklós Füle, and Balázs Major	
Optically levitated rotor at its thermal limit of frequency stability (<i>6 pages</i>)	013505
Fons van der Laan, René Reimann, Andrei Militaru, Felix Tebbenjohanns, Dominik Windey, Martin Frimmer, and Lukas Novotny	
 Spontaneous emission noise in mode-locked lasers and frequency combs (<i>12 pages</i>)	013506
Ruoyu Liao, Chao Mei, Youjian Song, Ayhan Demircan, and Günter Steinmeyer	
Quadrupole effects on nuclear-magnetic-resonance gyroscopes (<i>8 pages</i>)	013507
Yue Chang, Shuang-Ai Wan, and Jie Qin	
Fisher-information-based estimation of optomechanical coupling strengths (<i>10 pages</i>)	013508
Claudio Sanavio, József Zsolt Bernád, and André Xuereb	
Optical currents in Poincaré beams (<i>9 pages</i>)	013509
Ruchi and P. Senthilkumaran	
Interaction-induced topological states of photon pairs (<i>12 pages</i>)	013510
Andrei A. Stepanenko and Maxim A. Gorlach	
Generalized Ramsey methods in the spectroscopy of coherent-population-trapping resonances (<i>12 pages</i>)	013511
M. Yu. Basalaev, V. I. Yudin, D. V. Kovalenko, T. Zanon-Willette, and A. V. Taichenachev	
Cooling in a parametrically driven optomechanical cavity (<i>12 pages</i>)	013512
Pablo Yanes-Thomas, Pablo Barberis-Blostein, and Marc Bienert	
Optimization of multiplexed single-photon sources operated with photon-number-resolving detectors (<i>12 pages</i>)	013513
Ferenc Bodog, Matyas Mechler, Matyas Koniorczyk, and Peter Adam	
Dirac equation on a square waveguide lattice with site-dependent coupling strengths and the gravitational Aharonov-Bohm effect (<i>15 pages</i>)	013514
Christian Koke, Changsuk Noh, and Dimitris G. Angelakis	
Phase-shifted $\mathcal{PT}$ -symmetric periodic structures (<i>14 pages</i>)	013515
S. Vignesh Raja, A. Govindarajan, A. Mahalingam, and M. Lakshmanan	

(Continued)

CONTENTS - *Continued*

PHYSICAL REVIEW A

THIRD SERIES, VOLUME 102, NUMBER 1

JULY 2020

Cooperative cooling in a one-dimensional chain of optically bound cold atoms (<i>8 pages</i>)	013312
Angel T. Gisbert, Nicola Piovella, and Romain Bachelard	
Pseudogap regime of a strongly interacting two-dimensional Fermi gas with and without confinement-induced effective range of interactions (<i>11 pages</i>)	013313
Brendan C. Mulkerin, Xia-Ji Liu, and Hui Hu	
Stationary and dynamical properties of two harmonically trapped bosons in the crossover from two dimensions to one (<i>20 pages</i>)	013314
G. Bougas, S. I. Mistakidis, G. M. Alshalan, and P. Schmelcher	
Stoner-Wohlfarth switching of the condensate magnetization in a dipolar spinor gas and the metrology of excitation damping (<i>17 pages</i>)	013315
Seong-Ho Shinn, Daniel Braun, and Uwe R. Fischer	
Ground-state phase diagram and excitation spectrum of a Bose-Einstein condensate with spin-orbital-angular-momentum coupling (<i>7 pages</i>)	013316
Ke-Ji Chen, Fan Wu, Jianshen Hu, and Lianyi He	
Adiabatic spin-dependent momentum transfer in an $SU(N)$ degenerate Fermi gas (<i>7 pages</i>)	013317
P. Bataille, A. Litvinov, I. Manai, J. Huckans, F. Wiotte, A. Kaladjian, O. Gorceix, E. Maréchal, B. Laburthe-Tolra, and M. Robert-de-Saint-Vincent	
Numerical linked cluster expansions for inhomogeneous systems (<i>9 pages</i>)	013318
Johann Gan and Kaden R. A. Hazzard	
Efficient production of a narrow-line erbium magneto-optical trap with two-stage slowing (<i>5 pages</i>)	013319
Bojeong Seo, Peng Chen, Ziting Chen, Weijun Yuan, Mingchen Huang, Shengwang Du, and Gyu-Boong Jo	
Supersolid phase of the extended Bose-Hubbard model with an artificial gauge field (<i>11 pages</i>)	013320
K. Suthar, Hrushikesh Sable, Rukmani Bai, Soumik Bandyopadhyay, Sukla Pal, and D. Angom	
Probing thermalization in quenched integrable and nonintegrable Fermi-Hubbard models (<i>14 pages</i>)	013321
Philip Bleicker, Joachim Stolze, and Götz S. Uhrig	
Berry phase for a Bose gas on a one-dimensional ring (<i>7 pages</i>)	013322
Marija Todorčić, Bruno Klajn, Dario Jukić, and Hrvoje Buljan	
Rotational properties of superfluid Fermi-Bose mixtures in a tight toroidal trap (<i>10 pages</i>)	013323
M. Ögren and G. M. Kavoulakis	
Dimensional crossovers and Casimir forces for the Bose gas in anisotropic optical lattices (<i>14 pages</i>)	013324
Maciej Łebek and Paweł Jakubczyk	
Josephson effect with superfluid fermions in the two-dimensional BCS-BEC crossover (<i>7 pages</i>)	013325
F. Pascucci and L. Salasnich	
☞ Rotation sensing with improved stability using point-source atom interferometry (<i>8 pages</i>)	013326
Chen Avinadav, Dmitry Yankelev, Moshe Shuker, Ofer Firstenberg, and Nir Davidson	
Anomalies in isothermal compressibility and exponent of pressure in spin-orbit-coupled degenerate Fermi gases (<i>6 pages</i>)	013327
Chenggong Liang, Yuexin Huang, Feihong Liu, Yunbo Zhang, Guangcan Guo, and Ming Gong	

(Continued)

CONTENTS - *Continued*

PHYSICAL REVIEW A

THIRD SERIES, VOLUME 102, NUMBER 1

JULY 2020

Trapping ^{171}Yb atoms into a one-dimensional optical lattice with a small waist (8 pages)	013114
Akio Kawasaki, Boris Braverman, Edwin Pedrozo-Peñafiel, Chi Shu, Simone Colombo, Zeyang Li, and Vladan Vuletić	
Optimal control of coupled quantum systems based on the first-order Magnus expansion: Application to multiple dipole-dipole-coupled molecular rotors (9 pages)	013115
Andrew Ma, Alicia B. Magann, Tak-San Ho, and Herschel Rabitz	
Ellipticity dependence of excitation and ionization of argon atoms by short-pulse infrared radiation (6 pages)	013116
Thomas Pauly, Aaron Bondy, Kathryn R. Hamilton, Nicolas Douguet, Xiao-Min Tong, Dashavir Chetty, and Klaus Bartschat	
Photoelectron ionization time of aligned molecules clocked by attosecond angular streaking (7 pages)	013117
Jiaqing Yan, Wenhai Xie, Min Li, Kun Liu, Siqiang Luo, Chuanpeng Cao, Keyu Guo, Wei Cao, Pengfei Lan, Qingbin Zhang, Yueming Zhou, and Peixiang Lu	
Ultracold systems and matter waves	
Symmetry-protected topological phase for spin-tensor-momentum-coupled ultracold atoms (7 pages)	013301
Zhoutao Lei, Yuangang Deng, and Chaohong Lee	
Many-body effects on second-order phase transitions in spinor Bose-Einstein condensates and breathing dynamics (15 pages)	013302
K. M. Mittal, S. I. Mistakidis, P. G. Kevrekidis, and P. Schmelcher	
Quantum boomerang effect for interacting particles (10 pages)	013303
Jakub Janarek, Dominique Delande, Nicolas Cherroret, and Jakub Zakrzewski	
Unidirectional spin transport of a spin-orbit-coupled atomic matter wave using a moving Dirac δ -potential well (9 pages)	013304
Jieli Qin and Lu Zhou	
Spin excitations in dipolar spin-1 condensates (10 pages)	013305
Sheng-Xiong Deng, Tao Shi, and Su Yi	
Coherent optical nanotweezers for ultracold atoms (6 pages)	013306
P. Bienias, S. Subhankar, Y. Wang, T-C. Tsui, F. Jendrzejewski, T. Tiecke, G. Juzeliūnas, L. Jiang, S. L. Rolston, J. V. Porto, and A. V. Gorshkov	
Ground-state properties of dilute spinless fermions in fractional dimensions (5 pages)	013307
V. Pastukhov	
Generating a nonequilibrium stationary state from a ground-state condensate through an almost adiabatic cycle (8 pages)	013308
Atushi Tanaka, Takaaki Nakamura, and Taksu Cheon	
Experimental realization of spin-tensor momentum coupling in ultracold Fermi gases (6 pages)	013309
Donghao Li, Lianghui Huang, Peng Peng, Guoqi Bian, Pengjun Wang, Zengming Meng, Liangchao Chen, and Jing Zhang	
Quantum-state-dependent chemistry of ultracold $^6\text{Li}_2$ dimers (8 pages)	013310
Gene Polovy, Erik Frieling, Denis Uhland, Julian Schmidt, and Kirk W. Madison	
Anisotropic long-range interaction investigated with cold atoms (10 pages)	013311
Vincent Mancois, Julien Barré, Chang Chi Kwong, Alain Olivetti, Pascal Viot, and David Wilkowski	

(Continued)

CONTENTS - *Continued*

PHYSICAL REVIEW A

THIRD SERIES, VOLUME 102, NUMBER 1

JULY 2020

Relativistic coupled-cluster-theory study for low-energy electron scattering with argon (<i>12 pages</i>)	012824
Yongjun Cheng, Shi Liu, Song Bin Zhang, and Yong-Bo Tang	
Doubly excited states of the positronium molecule (<i>7 pages</i>)	012825
Yi Zhang, Meng-Shan Wu, Ying Qian, Kálmán Varga, Hui-Li Han, and Jun-Yi Zhang	

PART B

Light-induced processes in atomic-scale systems

Rydberg-positronium velocity and self-ionization studies in a 1T magnetic field and cryogenic environment (<i>10 pages</i>)	013101
M. Antonello <i>et al.</i> (AEgIS Collaboration)	
Self-induced splitting of x-ray emission lines (<i>14 pages</i>)	013102
Š. Krušič, A. Mihelič, K. Bučar, and M. Žitnik	
Origin of the multiphoton-regime harmonic-generation plateau structure (<i>9 pages</i>)	013103
J. M. Ngoko Djiokap and Anthony F. Starace	
☞ Atomic photoionization dynamics in ultrashort cycloidal laser fields (<i>12 pages</i>)	013104
T. Bayer, Ch. Philipp, K. Eickhoff, and M. Wollenhaupt	
Narrowband and passband composite pulses for variable rotations (<i>6 pages</i>)	013105
Boyan T. Torosov, Svetoslav S. Ivanov, and Nikolay V. Vitanov	
☞ Exploiting transport properties for the detection of optical pumping in heavy ions (<i>10 pages</i>)	013106
Mustapha Laatiaoui, Alexei A. Buchachenko, and Larry A. Viehland	
Choice of the electronic basis for field-induced surface hopping (<i>10 pages</i>)	013107
Murali Krishna Ganesa Subramanian, Robin Santra, and Ralph Welsch	
Robust control of the minima of high-order harmonics by fine-tuning the alignment of CO ₂ molecules for shaping attosecond pulses and probing molecular alignment (<i>11 pages</i>)	013108
Cheng Jin, Su-Ju Wang, Song-Feng Zhao, Anh-Thu Le, and C. D. Lin	
Holographic detection of parity in atomic and molecular orbitals (<i>7 pages</i>)	013109
HuiPeng Kang, Andrew S. Maxwell, Daniel Trabert, XuanYang Lai, Sebastian Eckart, Maksim Kunitski, Markus Schöffler, Till Jahnke, XueBin Bian, Reinhard Dörner, and Carla Figueira de Morisson Faria	
Delayed ionization and excitation dynamics in a filament wake channel in a dense-gas medium (<i>10 pages</i>)	013110
Dmitri A. Romanov and Robert J. Levis	
N ₂ ⁺ lasing: Gain and absorption in the presence of rotational coherence (<i>12 pages</i>)	013111
Marianna Lytova, Maria Richter, Felipe Morales, Olga Smirnova, Misha Ivanov, and Michael Spanner	
Static-field ionization model of He-like ions for diagnostics of light-field intensity (<i>13 pages</i>)	013112
Erik Lötstedt, Marcelo F. Ciappina, and Kaoru Yamanouchi	
Quantum control of the dissociation of LiH molecules with two intense laser pulses (<i>7 pages</i>)	013113
Rong Wang and Ying-Yu Niu	

(Continued)

CONTENTS - Continued

PHYSICAL REVIEW A

THIRD SERIES, VOLUME 102, NUMBER 1

JULY 2020

Calculation of higher-order corrections to the light shift of the $5s^2\ ^1S_0 - 5s5p\ ^3P_0^o$ clock transition in Cd (5 pages)	012811
S. G. Porsev and M. S. Safronova	
Generalized excitation of atomic multipole transitions by twisted light modes (10 pages)	012812
S. A.-L. Schulz, A. A. Peshkov, R. A. Müller, R. Lange, N. Huntemann, Chr. Tamm, E. Peik, and A. Surzhykov	
Atomic shell structure from an orbital-free-related density-functional-theory Pauli potential (10 pages)	012813
Russell B. Thompson	
Hyperfine structure in the HD molecule (9 pages)	012814
Jacek Komasa, Mariusz Puchalski, and Krzysztof Pachucki	
Validity of the static-exchange approximation for inner-shell photoionization of polyatomic molecules (13 pages)	012815
Carlos A. Marante, Loren Greenman, Cynthia S. Trevisan, Thomas N. Rescigno, C. William McCurdy, and Robert R. Lucchese	
Three-body boundary-corrected continuum-intermediate-state method for single charge exchange with the general transition amplitude ($1s \rightarrow nlm$) applied to the p -H(1s), α -H(1s), and p -He(1s ²) collisions with $n \leq 4$ (24 pages)	012816
Nenad Milojević, Ivan Mančev, Danilo Delibašić, and Dževad Belkić	
Experimental x-ray-production cross sections for the M_3 , M_4 , and M_5 subshells of Pt and Au by electron impact (9 pages)	012817
Alejo Carreras, Gustavo Castellano, Silvina Segui, and Jorge Trincavelli	
Influence of nuclear motion on resonant two-center photoionization (10 pages)	012818
F. Grüll, A. B. Voitkiv, and C. Müller	
Ionization of atoms and molecules using 200-keV protons and 5.5-MeV/u bare C ions: Energy-dependent collision dynamics (9 pages)	012819
Madhusree Roy Chowdhury, A. Mandal, A. Bhogale, H. Bansal, C. Bagdia, S. Bhattacharjee, J. M. Monti, R. D. Rivarola, and Lokesh C. Tribedi	
Direct measurement of recurrent fluorescence emission from naphthalene ions (6 pages)	012820
M. Saito, H. Kubota, K. Yamasa, K. Suzuki, T. Majima, and H. Tsuchida	
Subpercent agreement between <i>ab initio</i> and experimental collision-induced line shapes of carbon monoxide perturbed by argon (15 pages)	012821
Grzegorz Kowzan, Hubert Cybulski, Piotr Wcisło, Michał Słowiński, Alexandra Viel, Piotr Masłowski, and Franck Thibault	
 Quantum dynamics of collective spin states in a thermal gas (11 pages)	012822
Roy Shaham, Or Katz, and Ofer Firstenberg	
Cryogenic merged-ion-beam experiments in DESIREE: Final-state-resolved mutual neutralization of Li ⁺ and D ⁻ (9 pages)	012823
Gustav Eklund, Jon Grumer, Stefan Rosén, MingChao Ji, Najeeb Punnakayathil, Anders Källberg, Ansgar Simonsson, Richard D. Thomas, Mark H. Stockett, Peter Reinhed, Patrik Löfgren, Mikael Björkhage, Mikael Blom, Paul S. Barklem, Henrik Cederquist, Henning Zettergren, and Henning T. Schmidt	

(Continued)

CONTENTS - *Continued*

PHYSICAL REVIEW A	THIRD SERIES, VOLUME 102, NUMBER 1	JULY 2020
Optimizing adiabatic quantum pathways via a learning algorithm (7 pages)		012614
Xiaodong Yang, Ran Liu, Jun Li, and Xinhua Peng		
Limitations for private randomness repeaters (13 pages)		012615
Karol Horodecki, Ryszard P. Kostecki, Roberto Salazar, and Michał Studziński		
Optimal characterization of Gaussian channels using photon-number-resolving detectors (10 pages)		012616
Chandan Kumar, Ritabrata Sengupta, and Arvind		
Quantifying nonlocality as a resource for device-independent quantum key distribution (10 pages)		012617
S. Camalet		
Scalable quantum computation with fast gates in two-dimensional microtrap arrays of trapped ions (11 pages) . . .		012618
Zain Mehdi, Alexander K. Ratcliffe, and Joseph J. Hope		
Systematically localizable operators for quantum simulations of quantum field theories (20 pages)		012619
Natalie Klco and Martin J. Savage		
Atomic and molecular structure and dynamics; high-precision experiments		
Many-body calculations and hyperfine-interaction effect on dynamic polarizabilities at the low-lying energy levels of Y^{2+} (13 pages)		012801
Arghya Das, Anal Bhowmik, Narendra Nath Dutta, and Sonjoy Majumder		
Optical clocks based on the Cf^{15+} and Cf^{17+} ions (9 pages)		012802
S. G. Porsev, U. I. Safronova, M. S. Safronova, P. O. Schmidt, A. I. Bondarev, M. G. Kozlov, I. I. Tupitsyn, and C. Cheung		
Electronic stopping power under channeling conditions for slow ions in Ge using first principles (9 pages)		012803
Yan-Long Fu, Chang-Kai Li, Hai-Bo Sang, Wei Cheng, and Feng-Shou Zhang		
Absolute frequency measurement of rubidium $5S-6P$ transitions (8 pages)		012804
Conny Glaser, Florian Karlewski, Julien Kluge, Jens Grimmel, Manuel Kaiser, Andreas Günther, Helge Hattermann, Markus Krutzik, and József Fortágh		
Nuclear versus electronic energy loss in slow Ar ion scattering on a Cu (100) surface: Experiment and simulations (10 pages)		012805
Jijin Wang, Bin Ding, Xiaoxun Song, Yuanqing Shi, Xinyue Guo, Xuan Liu, Lei Wang, Mingxuan Wei, Pinyang Liu, Yuefeng Liu, Bitao Hu, Jorge E. Valdés, Vladimir A. Esaulov, Lin Chen, Yanling Guo, and Ximeng Chen		
Theoretical study of the $T + D_2$ and $D + T_2$ collisions in low-temperature hydrogen plasmas (5 pages)		012806
François Lique		
QED calculation of ionization energies of $1snd$ states in helium (5 pages)		012807
Vladimir A. Yerokhin, Vojtěch Patkóš, Mariusz Puchalski, and Krzysztof Pachucki		
Multicharged-ion–water-molecule collisions in a classical-trajectory time-dependent mean-field theory (10 pages)		012808
Alba Jorge, Marko Horbatsch, and Tom Kirchner		
Vibrational overtone spectroscopy of cold trapped hydroxyl anions (6 pages)		012809
Olga Lakhmanskaya, Malcolm Simpson, and Roland Wester		
Quantum dynamics of ^{17}O in collision with ortho- and para- $^{17}O^{17}O$ (7 pages)		012810
Grégoire Guillon, Maxence Lepers, and Pascal Honvault		

(Continued)

CONTENTS - *Continued*

PHYSICAL REVIEW A

THIRD SERIES, VOLUME 102, NUMBER 1

JULY 2020

Planar maximally entangled states (8 pages)	012427
Mehregan Doroudiani and Vahid Karimipour	
Rating the performance of noisy teleportation using fluctuations in fidelity (9 pages)	012428
Saptarshi Roy and Arkaprabha Ghosal	
Relating relative Rényi entropies and Wigner-Yanase-Dyson skew information to generalized multiple quantum coherences (17 pages)	012429
Diego Paiva Pires, Augusto Smerzi, and Tommaso Macrì	
Quantum technologies	
Machine-learning-based three-qubit gate design for the Toffoli gate and parity check in transmon systems (13 pages)	012601
S. Daraeizadeh, S. P. Premaratne, N. Khammassi, X. Song, M. Perkowski, and A. Y. Matsuura	
Experimentally undoing an unknown single-qubit unitary (5 pages)	012602
Qin Feng, Tianfeng Feng, Yuling Tian, Maolin Luo, and Xiaoqi Zhou	
Scheme for the generation of hybrid entanglement between time-bin and wavelike encodings (12 pages)	012603
Élie Gouzien, Floriane Brunel, Sébastien Tanzilli, and Virginia D'Auria	
Improved heralded schemes to generate entangled states from single photons (8 pages)	012604
F. V. Gubarev, I. V. Dyakonov, M. Yu. Saygin, G. I. Struchalin, S. S. Straupe, and S. P. Kulik	
Experimental demonstration of quantum-to-quantum Bernoulli factory (5 pages)	012605
Xiang Zhan, Kunkun Wang, Lei Xiao, Zhihao Bian, and Peng Xue	
Defect-induced controllable quantum state transfer via a topologically protected channel in a flux qubit chain (9 pages)	012606
Li-Na Zheng, Lu Qi, Liu-Yong Cheng, Hong-Fu Wang, and Shou Zhang	
Generation of a time-frequency grid state with integrated biphoton frequency combs (15 pages)	012607
N. Fabre, G. Maltese, F. Appas, S. Felicetti, A. Ketterer, A. Keller, T. Coudreau, F. Baboux, M. I. Amanti, S. Ducci, and P. Milman	
Continuous-variable quantum key distribution with non-Gaussian operations (15 pages)	012608
Liyun Hu, M. Al-amri, Zeyang Liao, and M. S. Zubairy	
Robust and high-fidelity nondestructive Rydberg parity meter (10 pages)	012609
Ri-Hua Zheng, Yi-Hao Kang, S.-L. Su, Jie Song, and Yan Xia	
Experimental simulation of the four-dimensional Yang-Baxter equation on a spin quantum simulator (7 pages)	012610
Hengyan Wang, Shijie Wei, Chao Zheng, Xiangyu Kong, Jingwei Wen, Xinfang Nie, Jun Li, Dawei Lu, and Tao Xin	
Security of finite-key-length measurement-device-independent quantum key distribution using an arbitrary number of decoys (12 pages)	012611
H. F. Chau	
Minimally entangled state preparation of localized wave functions on quantum computers (30 pages)	012612
Natalie Klco and Martin J. Savage	
Time-optimal bang-bang control for the driven spin-boson system (8 pages)	012613
H. Jirari	

(Continued)

CONTENTS - *Continued*

PHYSICAL REVIEW A	THIRD SERIES, VOLUME 102, NUMBER 1	JULY 2020
Hilbert-Schmidt distance and entanglement witnessing (<i>6 pages</i>)		012409
Palash Pandya, Omer Sakarya, and Marcin Wieśniak		
Piggybacking on quantum streams (<i>6 pages</i>)		012410
Marco Chiani, Andrea Conti, and Moe Z. Win		
Coherence measures with respect to general quantum measurements (<i>10 pages</i>)		012411
Jianwei Xu, Lian-He Shao, and Shao-Ming Fei		
Relating spin squeezing to multipartite entanglement criteria for particles and modes (<i>14 pages</i>)		012412
Matteo Fadel and Manuel Gessner		
Characterizing scalable measures of quantum resources (<i>9 pages</i>)		012413
Fernando Parisio		
Generalization of port-based teleportation and controlled teleportation capability (<i>6 pages</i>)		012414
Kabgyun Jeong, Jaewan Kim, and Soojoon Lee		
Machine learning phase transitions with a quantum processor (<i>7 pages</i>)		012415
A. V. Uvarov, A. S. Kardashin, and J. D. Biamonte		
Optimal exploitation of the resource in remote state preparation (<i>10 pages</i>)		012416
Morteza Nikaeen, Mehdi Ramezani, and Alireza Bahrampour		
Training Gaussian boson sampling distributions (<i>14 pages</i>)		012417
Leonardo Banchi, Nicolás Quesada, and Juan Miguel Arrazola		
Simultaneous multiple-user quantum communication across a spin-chain channel (<i>11 pages</i>)		012418
Rozhin Yousefjani and Abolfazl Bayat		
Fault-tolerant weighted union-find decoding on the toric code (<i>6 pages</i>)		012419
Shilin Huang, Michael Newman, and Kenneth R. Brown		
Certifying the purity of quantum states with temporal correlations (<i>9 pages</i>)		012420
Cornelia Spee		
Computable genuine multimode entanglement measure: Gaussian versus non-Gaussian (<i>13 pages</i>)		012421
Saptarshi Roy, Tamoghna Das, and Aditi Sen(De)		
Practical security analysis of a continuous-variable quantum random-number generator with a noisy local oscillator (<i>9 pages</i>)		012422
Weinan Huang, Yichen Zhang, Ziyong Zheng, Yang Li, Bingjie Xu, and Song Yu		
Approach for the construction of non-Calderbank-Steane-Shor low-density-generator-matrix-based quantum codes (<i>15 pages</i>)		012423
Patricio Fuentes, Josu Etxezarreta Martinez, Pedro M. Crespo, and Javier Garcia-Frias		
Teleportation of a multiphoton qubit using hybrid entanglement with a loss-tolerant carrier qubit (<i>9 pages</i>)		012424
Seongjeon Choi, Seok-Hyung Lee, and Hyunseok Jeong		
Quantum blackjack: Advantages offered by quantum strategies in communication-limited games (<i>14 pages</i>)		012425
Joseph X. Lin, Joseph A. Formaggio, Aram W. Harrow, and Anand V. Natarajan		
Zero-noise extrapolation for quantum-gate error mitigation with identity insertions (<i>12 pages</i>)		012426
Andre He, Benjamin Nachman, Wibe A. de Jong, and Christian W. Bauer		

(Continued)

CONTENTS - *Continued*

PHYSICAL REVIEW A	THIRD SERIES, VOLUME 102, NUMBER 1	JULY 2020
Bounds for nonadiabatic transitions (6 pages)		012216
Takuya Hatomura and Go Kato		
Employing non-Markovian effects to improve the performance of a quantum Otto refrigerator (13 pages)		012217
Patrice A. Camati, Jonas F. G. Santos, and Roberto M. Serra		
Non-Hermitian and Zeno limit of quantum systems under rapid measurements (20 pages)		012218
Felix Thiel and David A. Kessler		
Nonequilibrium magnetic phases in spin lattices with gain and loss (13 pages)		012219
Julian Huber, Peter Kirton, and Peter Rabl		
Lazy open quantum walks (14 pages)		012220
Garreth Kemp, Ilya Sinayskiy, and Francesco Petruccione		
Coherent control of dissipative dynamics in a periodically driven lattice array (12 pages)		012221
Zhao-Yun Zeng, Lei Li, Baiyuan Yang, Jinpeng Xiao, and Xiaobing Luo		
Phase-space quantum mechanics as a Landau-level problem (6 pages)		012222
Kun Yang		
Quantum parameter estimation of the frequency and damping of a harmonic oscillator (13 pages)		012223
Patrick Binder and Daniel Braun		
Retrieval of cavity-generated atomic spin squeezing after free-space release (7 pages)		012224
Yunfan Wu, Rajiv Krishnakumar, Julián Martínez-Rincón, Benjamin K. Malia, Onur Hosten, and Mark A. Kasevich		
Quantum information science		
Information-theoretic aspects of the generalized amplitude-damping channel (31 pages)		012401
Sumeet Khatri, Kunal Sharma, and Mark M. Wilde		
Separability discrimination and decomposition of m -partite quantum mixed states (8 pages)		012402
Ying Li and Guyan Ni		
Fragility of quantum correlations and coherence in a multipartite photonic system (13 pages)		012403
Huan Cao, Chandrashekar Radhakrishnan, Ming Su, Md. Manirul Ali, Chao Zhang, Yun-Feng Huang, Tim Byrnes, Chuan-Feng Li, and Guang-Can Guo		
Experimental conversion of position correlation into polarization entanglement (4 pages)		012404
Chithrabhanu Perumangatt, Alexander Lohrmann, and Alexander Ling		
Wishart and random density matrices: Analytical results for the mean-square Hilbert-Schmidt distance (11 pages)		012405
Santosh Kumar		
Magnetization revivals and dynamics of quantum correlations in a Kitaev spin chain (14 pages)		012406
Vimallesh Kumar Vimal and V. Subrahmanyam		
Continuous-variable entanglement distillation by cascaded photon replacement (9 pages)		012407
Yasamin Mardani, Ali Shafiei, Milad Ghadimi, and Mehdi Abdi		
Noise-adaptive test of quantum correlations with quasiprobability functions (8 pages)		012408
Seung-Woo Lee, Jaewan Kim, and Wonmin Son		

(Continued)

Mechanical oscillations frozen on discrete levels by two optical driving fields (<i>6 pages</i>)	011503(R)
Bing He, Qing Lin, Miguel Orszag, and Min Xiao	

ARTICLES

Fundamental concepts

Quantum-classical dynamical distance and quantumness of quantum walks (<i>6 pages</i>)	012201
Valentina Gualtieri, Claudia Benedetti, and Matteo G. A. Paris	
Diagnosing steerability of a bipartite state with the nonsteering threshold (<i>10 pages</i>)	012202
Xiaohua Wu and Tao Zhou	
Second-order topological insulator in a coinless discrete-time quantum walk (<i>10 pages</i>)	012203
Ya Meng, Gang Chen, and Suotang Jia	
Quantum precision thermometry with weak measurements (<i>9 pages</i>)	012204
Arun Kumar Pati, Chiranjib Mukhopadhyay, Sagnik Chakraborty, and Sibasish Ghosh	
Nonlinear Schrödinger equations and generalized Heisenberg uncertainty principle from estimation schemes violating the principle of estimation independence (<i>16 pages</i>)	012205
Agung Budiyo and Hermawan K. Dipojono	
Improved tripartite uncertainty relation with quantum memory (<i>7 pages</i>)	012206
Fei Ming, Dong Wang, Xiao-Gang Fan, Wei-Nan Shi, Liu Ye, and Jing-Ling Chen	
Complete classification of trapping coins for quantum walks on the two-dimensional square lattice (<i>14 pages</i>)	012207
B. Kollár, A. Gilyén, I. Tkáčová, T. Kiss, I. Jex, and M. Štefaňák	
Achieving higher precision in quantum parameter estimation with feedback controls (<i>7 pages</i>)	012208
Liqiang Liu and Haidong Yuan	
☞ Conditions for macrorealism for systems described by many-valued variables (<i>15 pages</i>)	012209
J. J. Halliwell and C. Mawby	
Experimental test of Leggett's inequalities with solid-state spins (<i>10 pages</i>)	012210
Xianzhi Huang, Xiaolong Ouyang, Wenqian Lian, Wengang Zhang, Xin Wang, Huili Zhang, Yefei Yu, Li He, Yanqing Liu, Xiuying Chang, Dong-Ling Deng, and Luming Duan	
Equilibrium stationary coherence in the multilevel spin-boson model (<i>13 pages</i>)	012211
Mike Reppert, Deborah Reppert, Leonardo A. Pachon, and Paul Brumer	
Non-Hermitian scattering on a tight-binding lattice (<i>12 pages</i>)	012212
Phillip C. Burke, Jan Wiersig, and Masudul Haque	
Quantum measurements of sums (<i>11 pages</i>)	012213
Juzar Thingna and Peter Talkner	
Witnessing non-Markovian dynamics through correlations (<i>35 pages</i>)	012214
Dario De Santis, Markus Johansson, Bogna Bylicka, Nadja K. Bernardes, and Antonio Acín	
Topological transition of a non-Markovian dissipative quantum walk (<i>10 pages</i>)	012215
A. Ricottone, M. S. Rudner, and W. A. Coish	

(Continued)

The Table of Contents is a total listing of Parts A and B.
Part A consists of pages 010001–012825, and Part B pages 013101–019904(E).

PART A

EDITORIALS AND ANNOUNCEMENTS

Announcement: Changes to the sections of *Physical Review A* (1 page) 010001

RAPID COMMUNICATIONS

Quantum information science

Signaling and scrambling with strongly long-range interactions (6 pages) 010401(R)
Andrew Y. Guo, Minh C. Tran, Andrew M. Childs, Alexey V. Gorshkov, and Zhe-Xuan Gong

Quantum technologies

High-fidelity Trotter formulas for digital quantum simulation (5 pages) 010601(R)
Yi-Xiang Liu (刘仪襄), Jordan Hines, Zhi Li (李智), Ashok Ajoy, and Paola Cappellaro

Ultracold systems and matter waves

Many-body echo (5 pages) 011301(R)
Yang-Yang Chen, Pengfei Zhang, Wei Zheng, Zhigang Wu, and Hui Zhai

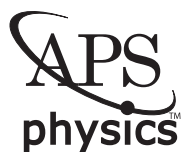
Machine learning for achieving Bose-Einstein condensation of thulium atoms (6 pages) 011302(R)
E. T. Davletov, V. V. Tsyganok, V. A. Khlebnikov, D. A. Pershin, D. V. Shaykin, and A. V. Akimov

Vortex patterns of atomic Bose-Einstein condensates in a density-dependent gauge potential (7 pages) 011303(R)
Matthew Edmonds and Muneto Nitta

Photonics, nonlinear optics, and optomechanics

Photon-correlation measurements of stochastic limit cycles emerging from high- Q nonlinear silicon photonic crystal microcavities (5 pages) 011501(R)
N. Takemura, M. Takiguchi, H. Sumikura, E. Kuramochi, A. Shinya, and M. Notomi

Nonreciprocal ground-state cooling of multiple mechanical resonators (6 pages) 011502(R)
Deng-Gao Lai, Jin-Feng Huang, Xian-Li Yin, Bang-Pin Hou, Wenlin Li, David Vitali, Franco Nori, and Jie-Qiao Liao



Copyright 2020 by American Physical Society



2469-9926(202007)102:1:B;1-2

(Continued)