

# PHYSICAL REVIEW A

Articles Published in APRIL 2003

**ATOMIC, MOLECULAR, AND  
OPTICAL PHYSICS**

*Published by*  
THE AMERICAN PHYSICAL SOCIETY

Volume 67

Third Series

Number 4



# PHYSICAL REVIEW A

For editorial and subscription correspondence,  
please see inside front cover  
(ISSN: 1050-2947)



**PERIODICALS**  
Postmaster send address changes to:  
American Institute of Physics  
Suite 1N01  
2 Huntington Quadrangle  
Melville, NY 11747-4502

THIRD SERIES, VOLUME 67, NUMBER 4

CONTENTS

APRIL 2003

## RAPID COMMUNICATIONS

### Quantum information

- Single-photon two-qubit entangled states: Preparation and measurement (*4 pages*) ..... 040301(R)  
Yoon-Ho Kim
- Relations for classical communication capacity and entanglement capability of two-qubit operations  
(*4 pages*) ..... 040302(R)  
Dominic W. Berry and Barry C. Sanders
- Optimizing the fast Rydberg quantum gate (*4 pages*) ..... 040303(R)  
M. S. Safronova, Carl J. Williams, and Charles W. Clark
- Input states for quantum gates (*4 pages*) ..... 040304(R)  
A. Gilchrist, W. J. Munro, and A. G. White

### Atomic and molecular collisions and interactions

- Cold collisions of spin-polarized metastable hydrogen atoms (*4 pages*) ..... 040701(R)  
R. C. Forrey, S. Jonsell, A. Saenz, P. Froelich, and A. Dalgarno
- Spheroidal close-coupling scheme to describe ionization processes in one-electron diatomic systems  
(*4 pages*) ..... 040702(R)  
B. Pons

### Atomic and molecular processes in external fields

- Interference-induced transparency and coherent control of quantum systems by frequency-chirped pulses  
(*4 pages*) ..... 041401(R)  
A. Nazarkin, R. Netz, and R. Sauerbrey
- Coherent control of matter-wave interference in molecular predissociation (*4 pages*) ..... 041402(R)  
Jérôme Degert, Christoph Meier, Béatrice Chatel, and Bertrand Girard
- Laser cooling of a trapped two-component Fermi gas (*4 pages*) ..... 041403(R)  
Z. Idziaszek, L. Santos, M. Baranov, and M. Lewenstein
- Validity of the two-level approximation in the interaction of few-cycle light pulses with atoms (*4 pages*) ..... 041404(R)  
Jing Cheng and Jianying Zhou

### Matter waves

- Ground-state properties of hard-core bosons in one-dimensional harmonic traps (*4 pages*) ..... 041601(R)  
T. Papenbrock



Macroscopic dynamics of a Bose-Einstein condensate containing a vortex lattice ( <i>4 pages</i> ) .....	041602(R)
Marco Cozzini and Sandro Stringari	
Controlling two-species Mott-insulator phases in an optical lattice to form an array of dipolar molecules ( <i>4 pages</i> ) .....	041603(R)
M. G. Moore and H. R. Sadeghpour	
Quantum reflection engineering: The bichromatic evanescent-wave mirror ( <i>4 pages</i> ) .....	041604(R)
R. Côté and B. Segev	
Dynamics of trapped two-component Fermi gas: Temperature dependence of the transition from collisionless to collisional regime ( <i>4 pages</i> ) .....	041605(R)
F. Toschi, P. Vignolo, S. Succi, and M. P. Tosi	
Interference scheme to measure light-induced nonlinearities in Bose-Einstein condensates ( <i>4 pages</i> ) .....	041606(R)
K. V. Krutitsky, K.-P. Marzlin, and J. Audretsch	

**Quantum optics, physics of lasers, nonlinear optics**

Controlling optical bistability in a three-level atomic system ( <i>4 pages</i> ) .....	041801(R)
Amitabh Joshi, Andy Brown, Hai Wang, and Min Xiao	
Coherence length of photons from a single quantum system ( <i>4 pages</i> ) .....	041802(R)
F. Jelezko, A. Volkmer, I. Popa, K. K. Rebane, and J. Wrachtrup	
Spatial Raman solitons ( <i>4 pages</i> ) .....	041803(R)
D. D. Yavuz, D. R. Walker, and M. Y. Shverdin	
Nonlinear optics in the angstrom regime: Hard-x-ray frequency doubling in perfect crystals ( <i>4 pages</i> ) .....	041804(R)
A. Nazarkin, S. Podorov, I. Uschmann, E. Förster, and R. Sauerbrey	
Quantum diffraction and interference of spatially correlated photon pairs generated by spontaneous parametric down-conversion ( <i>4 pages</i> ) .....	041805(R)
Ryosuke Shimizu, Keiichi Edamatsu, and Tadashi Itoh	

**ARTICLES****Fundamental concepts**

Quantum Zeno and anti-Zeno effects by indirect measurement with finite errors ( <i>4 pages</i> ) .....	042101
Kazuki Koshino and Akira Shimizu	
Spin and statistics in nonrelativistic quantum mechanics: The spin-zero case ( <i>4 pages</i> ) .....	042102
Murray Peshkin	
Continuous quantum measurement and the quantum to classical transition ( <i>12 pages</i> ) .....	042103
Tanmoy Bhattacharya, Salman Habib, and Kurt Jacobs	
Quantum-state engineering assisted by entanglement ( <i>10 pages</i> ) .....	042104
Matteo G. A. Paris, Mary Cola, and Rodolfo Bonifacio	
Universally valid reformulation of the Heisenberg uncertainty principle on noise and disturbance in measurement ( <i>6 pages</i> ) .....	042105
Masanao Ozawa	
Quantum jumps between dressed states: A proposed cavity-QED test using feedback ( <i>13 pages</i> ) .....	042106
J. E. Reiner, H. M. Wiseman, and H. Mabuchi	
How one shutter can close $N$ slits ( <i>3 pages</i> ) .....	042107
Y. Aharonov and L. Vaidman	
Density-matrix operatorial solution of the non-Markovian master equation for quantum Brownian motion ( <i>12 pages</i> ) .....	042108
F. Intravaia, S. Maniscalco, and A. Messina	
Aharonov-Bohm effect in quantum-to-classical correspondence of the Heisenberg principle ( <i>7 pages</i> ) .....	042109
De-Hone Lin, Jee-Gong Chang, and Chi-Chuan Hwang	



Nonpositive evolutions in open system dynamics (7 pages) .....	042110
F. Benatti, R. Floreanini, and M. Piani	
Continuous-variable quantum erasing (5 pages) .....	042111
Radim Filip	
Evolution of entanglement under echo dynamics (4 pages) .....	042112
Tomaž Prosen, Thomas H. Seligman, and Marko Znidarič	
Classicality of spin-coherent states via entanglement and distinguishability (10 pages) .....	042113
D. Markham and V. Vedral	
Bargmann invariants, null phase curves, and a theory of the geometric phase (16 pages) .....	042114
N. Mukunda, Arvind, E. Ercolessi, G. Marmo, G. Morandi, and R. Simon	
Quantum entanglement with acousto-optic modulators: Two-photon beats and Bell experiments with moving beam splitters (13 pages) .....	042115
André Stefanov, Hugo Zbinden, Nicolas Gisin, and Antoine Suarez	
<b>Quantum information</b>	
Effect of unitary noise on Grover's quantum search algorithm (17 pages) .....	042301
Daniel Shapira, Shay Mozes, and Ofer Biham	
Violation of majorization relations in entangled states and its detection by means of generalized entropic forms (6 pages) .....	042302
R. Rossignoli and N. Canosa	
Polynomial invariants of four qubits (5 pages) .....	042303
Jean-Gabriel Luque and Jean-Yves Thibon	
Distinguishing two-qubit states using local measurements and restricted classical communication (9 pages) .....	042304
Mark Hillery and Jihane Mimih	
Quantum quincunx in cavity quantum electrodynamics (4 pages) .....	042305
Barry C. Sanders, Stephen D. Bartlett, Ben Tregenna, and Peter L. Knight	
Optimal phase-covariant cloning for qubits and qutrits (9 pages) .....	042306
Giacomo Mauro D'Ariano and Chiara Macchiavello	
Quantum key distribution with a single photon from a squeezed coherent state (7 pages) .....	042307
Masahiro Matsuoka and Takuya Hirano	
Tackling systematic errors in quantum logic gates with composite rotations (7 pages) .....	042308
Holly K. Cummins, Gavin Llewellyn, and Jonathan A. Jones	
Mixed-quantum-state detection with inconclusive results (14 pages) .....	042309
Yonina C. Eldar	
Local observables for entanglement detection of depolarized states (5 pages) .....	042310
G. Mauro D'Ariano, Chiara Macchiavello, and Matteo G. A. Paris	
Possible realization of entanglement, logical gates, and quantum-information transfer with superconducting-quantum-interference-device qubits in cavity QED (8 pages) .....	042311
Chui-Ping Yang, Shih-I Chu, and Siyuan Han	
Protocols for entanglement transformations of bipartite pure states (7 pages) .....	042312
G. Mauro D'Ariano and Massimiliano F. Sacchi	
Geometric theory of nonlocal two-qubit operations (18 pages) .....	042313
Jun Zhang, Jiri Vala, Shankar Sastry, and K. Birgitta Whaley	
Entanglement generation and Hamiltonian simulation in continuous-variable systems (14 pages) .....	042314
Barbara Kraus, Klemens Hammerer, Géza Giedke, and J. Ignacio Cirac	
Decoherence can be useful in quantum walks (6 pages) .....	042315
Viv Kendon and Ben Tregenna	
Experimental implementation of the quantum random-walk algorithm (5 pages) .....	042316
Jiangfeng Du, Hui Li, Xiaodong Xu, Mingjun Shi, Jihui Wu, Xianyi Zhou, and Rongdian Han	



Nonpositive evolutions in open system dynamics (7 pages) .....	042110
F. Benatti, R. Floreanini, and M. Piani	
Continuous-variable quantum erasing (5 pages) .....	042111
Radim Filip	
Evolution of entanglement under echo dynamics (4 pages) .....	042112
Tomaž Prosen, Thomas H. Seligman, and Marko Znidarič	
Classicality of spin-coherent states via entanglement and distinguishability (10 pages) .....	042113
D. Markham and V. Vedral	
Bargmann invariants, null phase curves, and a theory of the geometric phase (16 pages) .....	042114
N. Mukunda, Arvind, E. Ercolessi, G. Marmo, G. Morandi, and R. Simon	
Quantum entanglement with acousto-optic modulators: Two-photon beats and Bell experiments with moving beam splitters (13 pages) .....	042115
André Stefanov, Hugo Zbinden, Nicolas Gisin, and Antoine Suarez	
<b>Quantum information</b>	
Effect of unitary noise on Grover's quantum search algorithm (17 pages) .....	042301
Daniel Shapira, Shay Mozes, and Ofer Biham	
Violation of majorization relations in entangled states and its detection by means of generalized entropic forms (6 pages) .....	042302
R. Rossignoli and N. Canosa	
Polynomial invariants of four qubits (5 pages) .....	042303
Jean-Gabriel Luque and Jean-Yves Thibon	
Distinguishing two-qubit states using local measurements and restricted classical communication (9 pages) .....	042304
Mark Hillery and Jihane Mimih	
Quantum quincunx in cavity quantum electrodynamics (4 pages) .....	042305
Barry C. Sanders, Stephen D. Bartlett, Ben Tregenna, and Peter L. Knight	
Optimal phase-covariant cloning for qubits and qutrits (9 pages) .....	042306
Giacomo Mauro D'Ariano and Chiara Macchiavello	
Quantum key distribution with a single photon from a squeezed coherent state (7 pages) .....	042307
Masahiro Matsuoka and Takuya Hirano	
Tackling systematic errors in quantum logic gates with composite rotations (7 pages) .....	042308
Holly K. Cummins, Gavin Llewellyn, and Jonathan A. Jones	
Mixed-quantum-state detection with inconclusive results (14 pages) .....	042309
Yonina C. Eldar	
Local observables for entanglement detection of depolarized states (5 pages) .....	042310
G. Mauro D'Ariano, Chiara Macchiavello, and Matteo G. A. Paris	
Possible realization of entanglement, logical gates, and quantum-information transfer with superconducting-quantum-interference-device qubits in cavity QED (8 pages) .....	042311
Chui-Ping Yang, Shih-I Chu, and Siyuan Han	
Protocols for entanglement transformations of bipartite pure states (7 pages) .....	042312
G. Mauro D'Ariano and Massimiliano F. Sacchi	
Geometric theory of nonlocal two-qubit operations (18 pages) .....	042313
Jun Zhang, Jiri Vala, Shankar Sastry, and K. Birgitta Whaley	
Entanglement generation and Hamiltonian simulation in continuous-variable systems (14 pages) .....	042314
Barbara Kraus, Klemens Hammerer, Géza Giedke, and J. Ignacio Cirac	
Decoherence can be useful in quantum walks (6 pages) .....	042315
Viv Kendon and Ben Tregenna	
Experimental implementation of the quantum random-walk algorithm (5 pages) .....	042316
Jiangfeng Du, Hui Li, Xiaodong Xu, Mingjun Shi, Jihui Wu, Xianyi Zhou, and Rongdian Han	



Optimal encryption of quantum bits (6 pages) .....	042317
P. Oscar Boykin and Vwani Roychowdhury	
Teleportation of an atomic momentum state (4 pages) .....	042318
Shahid Qamar, Shi-Yao Zhu, and M. Suhail Zubairy	
Decoherence and gate performance of coupled solid-state qubits (17 pages) .....	042319
Markus J. Storcz and Frank K. Wilhelm	
Performing joint measurements and transformations on several qubits by operating on a single "control" qubit (7 pages) .....	042320
Dominik Janzing, Thomas Decker, and Thomas Beth	
Correlation-assisted quantum communication (7 pages) .....	042321
Mário Ziman and Vladimír Bužek	
Robust method for estimating the Lindblad operators of a dissipative quantum process from measurements of the density operator at multiple time points (12 pages) .....	042322
N. Boulant, T. F. Havel, M. A. Pravia, and D. G. Cory	
Entangling power and operator entanglement in qudit systems (8 pages) .....	042323
Xiaoguang Wang, Barry C. Sanders, and Dominic W. Berry	
<b>Atomic and molecular structure and dynamics</b>	
Relativistic study of vuv radiation properties from Kr-Xe gas mixtures (10 pages) .....	042501
Branislav Jansík, Bernd Schimmelpfennig, and Hans Ågren	
Metastable states of the Condo type in exotic helium atoms (6 pages) .....	042502
Boyan D. Obreshkov, Vladimir I. Korobov, and Dimitr D. Bakalov	
Quasiparticle density-matrix representation of nonlinear time-dependent density-functional response functions (13 pages) .....	042503
Oleg Berman and Shaul Mukamel	
Energies, transition rates, and electron electric-dipole-moment enhancement factors for Ce IV and Pr V (5 pages) .....	042504
I. M. Savukov, W. R. Johnson, U. I. Safronova, and M. S. Safronova	
Lowest open channels, bound states, and narrow resonances of dipositronium (5 pages) .....	042505
C. G. Bao and T. Y. Shi	
<b>Atomic and molecular collisions and interactions</b>	
Time evolution and use of multiple times in the $N$ -body problem (6 pages) .....	042701
J. H. McGuire and A. L. Godunov	
Loss of coherence due to bremsstrahlung (6 pages) .....	042702
Giorgio Calucci	
Observation of dielectronic recombination through two-electron-one-photon correlative stabilization in an electron-beam ion trap (5 pages) .....	042703
Y. Zou, J. R. Crespo López-Urrutia, and J. Ullrich	
Resonant magnetic vortices (6 pages) .....	042704
Yves Décanini and Antoine Folacci	
Radiative charge-transfer lifetime of the excited state of $(\text{NaCa})^+$ (5 pages) .....	042705
Oleg P. Makarov, R. Côté, H. Michels, and W. W. Smith	
Universality in the three-body problem for $^4\text{He}$ atoms (12 pages) .....	042706
Eric Braaten and H.-W. Hammer	
Trends in autoionization of Rydberg states converging to the $4s$ threshold in the $\text{Kr-Rb}^+-\text{Sr}^{2+}$ isoelectronic sequence: Theory and experiment (10 pages) .....	042707
A. Neogi, E. T. Kennedy, J.-P. Mosnier, P. van Kampen, J. T. Costello, G. O'Sullivan, M. W. D. Mansfield, Ph. V. Demekhin, B. M. Lagutin, and V. L. Sukhorukov	



Resonant vibrational excitation of CO <sub>2</sub> by electron impact: Nuclear dynamics on the coupled components of the $^2\Pi_u$ resonance (19 pages) .....	042708
C. W. McCurdy, W. A. Isaacs, H.-D. Meyer, and T. N. Rescigno	
Direct double photoionization of the valence shell of Be (11 pages) .....	042709
F. Citrini, L. Malegat, P. Selles, and A. K. Kazansky	
Elastic scattering of low-energy electrons by XH <sub>3</sub> YH <sub>3</sub> (X, Y=C, Si, Ge, Sn) (6 pages) .....	042710
C. A. S. Maia and M. H. F. Bettega	
Circular dichroism in K-shell ionization from fixed-in-space CO and N <sub>2</sub> (3 pages) .....	042711
B. Zimmermann, K. Wang, and V. McKoy	
Singular inverse square potential, limit cycles, and self-adjoint extensions (5 pages) .....	042712
M. Bawin and S. A. Coon	
Mesic atom deexcitation via an external Auger process (7 pages) .....	042713
A. V. Kravtsov, A. I. Mikhailov, and I. A. Mikhailov	
Electron-impact ionization of O <sup>q+</sup> ions for q=1-4 (7 pages) .....	042714
S. D. Loch, J. Colgan, M. S. Pindzola, M. Westermann, F. Scheuermann, K. Aichele, D. Hathiramani, and E. Salzborn	
Multichannel study of spin-exchange and hyperfine-induced frequency shift and line broadening in cold collisions of hydrogen atoms (16 pages) .....	042715
B. Zygelman, A. Dalgarno, M. J. Jamieson, and P. C. Stancil	
Measurement of the x-ray mass attenuation coefficient and the imaginary part of the form factor of silicon using synchrotron radiation (12 pages) .....	042716
C. Q. Tran, C. T. Chantler, Z. Barnea, D. Paterson, and D. J. Cookson	
Hyperspherical partial-wave theory applied to electron-hydrogen-atom ionization calculation for equal-energy-sharing kinematics (12 pages) .....	042717
J. N. Das, S. Paul, and K. Chakrabarti	
Threshold krypton charge-state distributions coincident with K-shell fluorescence (12 pages) .....	042718
G. B. Armen, E. P. Kanter, B. Krässig, J. C. Levin, S. H. Southworth, and L. Young	
<b>Photon, electron, atom, and molecule interactions with solids and surfaces</b>	
Acceleration and deceleration of convoy electrons in grazing-ion-surface collisions (9 pages) .....	042901
M. S. Gravielle and J. E. Miraglia	
<b>Clusters (including fullerenes)</b>	
Electron-stimulated desorption of positive ions from Na nanoclusters adsorbed on Pt(111) and Ar, H <sub>2</sub> O, and SF <sub>6</sub> spacer layers (6 pages) .....	043201
Ryutaro Souda and Jens Günster	
Angular distribution of emitted electrons in sodium clusters: A semiclassical approach (6 pages) .....	043202
E. Giglio, P.-G. Reinhard, and E. Suraud	
Fragmentation of fullerenes (7 pages) .....	043203
Ryan T. Chancey, Lene Oddershede, Frank E. Harris, and John R. Sabin	
Asymmetric emission of high-energy electrons in the two-dimensional hydrodynamic expansion of large xenon clusters irradiated by intense laser fields (8 pages) .....	043204
V. Kumarappan, M. Krishnamurthy, and D. Mathur	
<b>Atomic and molecular processes in external fields</b>	
Extreme multiphoton coupling in molecular systems (12 pages) .....	043401
George N. Gibson	



Resonances in the double-ionization signal of two-electron model atoms ( <i>10 pages</i> ) .....	043402
R. Panfili and W.-C. Liu	
Feasibility study to create a polychromatic guidestar in atomic sodium ( <i>11 pages</i> ) .....	043403
Jens Biegert and Jean-Claude Diels	
Alignment-dependent ionization probability of molecules in a double-pulse laser field ( <i>5 pages</i> ) .....	043404
Z. X. Zhao, X. M. Tong, and C. D. Lin	
Fragmentation of $H_2^+$ in strong 800-nm laser pulses: Initial-vibrational-state dependence ( <i>8 pages</i> ) .....	043405
Bernold Feuerstein and Uwe Thumm	
Continuous source of translationally cold dipolar molecules ( <i>4 pages</i> ) .....	043406
S. A. Rangwala, T. Junglen, T. Rieger, P. W. H. Pinkse, and G. Rempe	
Two-photon Doppler cooling of alkaline-earth-metal and ytterbium atoms ( <i>7 pages</i> ) .....	043407
Victor C. Magno, Reinaldo L. Cavasso Filho, and Flavio C. Cruz	
Photoassociation spectroscopy of cold calcium atoms ( <i>6 pages</i> ) .....	043408
Carsten Degenhardt, Tomas Binnewies, Guido Wilpers, Uwe Sterr, Fritz Riehle, Christian Lisdat, and Eberhard Tiemann	
Revealing quantum-control mechanisms through Hamiltonian encoding in different representations ( <i>9 pages</i> ) .....	043409
Abhra Mitra, Ignacio R. Solá, and Herschel Rabitz	
Microwave-induced dielectronic recombination above the classical ionization limit in a static field ( <i>8 pages</i> ) .....	043410
C. M. Evans, E. S. Shuman, and T. F. Gallagher	
<b>Matter waves</b>	
Ballistic matter waves with angular momentum: Exact solutions and applications ( <i>20 pages</i> ) .....	043601
Christian Bracher, Tobias Kramer, and Manfred Kleber	
Mechanical response functions of finite-temperature Bose-Einstein condensates ( <i>16 pages</i> ) .....	043602
Stephen Choi, Vladimir Chernyak, and Shaul Mukamel	
Dynamic correlation functions in one-dimensional quasicondensates ( <i>13 pages</i> ) .....	043603
D. L. Luxat and A. Griffin	
First-order coherence in an atomic condensate at finite temperature ( <i>8 pages</i> ) .....	043604
Alberto Montana	
Effective-mass analysis of Bose-Einstein condensates in optical lattices: Stabilization and levitation ( <i>8 pages</i> ) .....	043605
H. Pu, L. O. Baksmaty, W. Zhang, N. P. Bigelow, and P. Meystre	
Quantum coherence of double-well Bose-Einstein condensates: An $SU(2)$ coherent-state path-integral approach ( <i>5 pages</i> ) .....	043606
Yi Zhou, Hui Zhai, Rong Lü, Zhan Xu, and Lee Chang	
Finite one-dimensional impenetrable Bose systems: Occupation numbers ( <i>17 pages</i> ) .....	043607
P. J. Forrester, N. E. Frankel, T. M. Garoni, and N. S. Witte	
Fluctuation corrections to the mean-field interaction for a trapped Fermi gas ( <i>6 pages</i> ) .....	043608
Jin Woo Jun	
Nondestructive dynamic detectors for Bose-Einstein condensates ( <i>13 pages</i> ) .....	043609
J. E. Lye, J. J. Hope, and J. D. Close	
Algorithm for preparation of multilayer systems with high critical angle of total reflection ( <i>8 pages</i> ) .....	043610
I. Carron and V. Ignatovich	



Formation of a molecular Bose-Einstein condensate and an entangled atomic gas by Feshbach resonance (8 pages) .....	043611
V. A. Yurovsky and A. Ben-Reuven	
Effect of atom loss on collapse and revivals of phase coherence in small atomic samples (4 pages) .....	043612
Michael W. Jack	
<b>Quantum optics, physics of lasers, nonlinear optics</b>	
Enhanced generation of twin single-photon states via quantum interference in parametric down-conversion: Application to two-photon quantum photolithography (4 pages) .....	043801
Christopher C. Gerry	
Nonclassical statistics of intracavity coupled $\chi^{(2)}$ waveguides: The quantum optical dimer (15 pages) .....	043802
M. Bache, Yu. B. Gaididei, and P. L. Christiansen	
Subthreshold optical parametric oscillator with nonorthogonal polarization eigenmodes (15 pages) .....	043803
A. Aiello, G. Nienhuis, and J. P. Woerdman	
Generation of a pulsed polarization entangled-photon pair via a two-crystal geometry (4 pages) .....	043804
Bao-Sen Shi and Akihisa Tomita	
Nonlinear magneto-optical rotation of elliptically polarized light (18 pages) .....	043805
A. B. Matsko, I. Novikova, M. S. Zubairy, and G. R. Welch	
Possibility of single-atom detection on a chip (9 pages) .....	043806
Peter Horak, Bruce G. Klappauf, Albrecht Haase, Ron Folman, Jörg Schmiedmayer, Peter Domokos, and E. A. Hinds	
Single-atom and two-atom Ramsey interferometry with quantized fields (9 pages) .....	043807
G. S. Agarwal, P. K. Pathak, and M. O. Scully	
Splitting of the peak of electromagnetically induced transparency by the higher-order spatial harmonics of the atomic coherence (5 pages) .....	043808
S. A. Babin, D. V. Churkin, E. V. Podivilov, V. V. Potapov, and D. A. Shapiro	
Generation of photon pairs using polarization-dependent two-photon absorption (4 pages) .....	043809
T. Nakanishi, K. Sugiyama, and M. Kitano	
Inhibition of electromagnetically induced absorption due to excited-state decoherence in Rb vapor (7 pages) .....	043810
H. Failache, P. Valente, G. Ban, V. Lorent, and A. Lezama	
Casimir force and the quantum theory of lossy optical cavities (18 pages) .....	043811
Cyriaque Genet, Astrid Lambrecht, and Serge Reynaud	
Local-field effects in pattern formation in large-aspect-ratio lasers (9 pages) .....	043812
Oscar G. Calderón, Eduardo Cabrera, M. Antón, and J. M. Guerra	
Trapping atoms in the vacuum field of a cavity (8 pages) .....	043813
C. Schön and J. I. Cirac	
Observation of transverse patterns in an isotropic microchip laser (6 pages) .....	043814
Y. F. Chen and Y. P. Lan	
Reconstruction of a multimode entangled state using a two-photon phase-sensitive linear amplifier (8 pages) .....	043815
Mashhood Ahmad, Shahid Qamar, and M. Suhail Zubairy	
Modeling of saturation and refraction in x-ray lasers (5 pages) .....	043816
D. Benredjem, J. Kuba, C. Möller, and O. Z. Zabaydullin	
Interference between the halves of a double-well trap containing a Bose-Einstein condensate (4 pages) .....	043817
Zhao-xian Yu and Zhi-yong Jiao	
Deterministic optical Fock-state generation (16 pages) .....	043818
K. R. Brown, K. M. Dani, D. M. Stamper-Kurn, and K. B. Whaley	



Optical field measurements using cold atoms with direct optical readout (12 pages) .....	043819
A. B. Matsko, N. Yu, and L. Maleki	
Quantum correlations across a metallic screen (10 pages) .....	043820
M. Al-Amri and M. Babiker	
Influence of damping on the vanishing of the linear electro-optic effect in chiral isotropic media (4 pages) .....	043821
G. S. Agarwal and Robert W. Boyd	

**BRIEF REPORTS**

**Fundamental concepts**

Dark soliton phase for the Jaynes-Cummings model modified by a sudden perturbation of the two-level system (4 pages) .....	044101
Istok Mendaš	

**Quantum information**

Generation of an entangled state of two three-level atoms in cavity QED (3 pages) .....	044301
XuBo Zou, K. Pahlke, and W. Mathis	
Quantum secret sharing based on reusable Greenberger-Horne-Zeilinger states as secure carriers (4 pages) .....	044302
Saber Bagherinezhad and Vahid Karimipour	
Modified Wigner inequality for secure quantum-key distribution (4 pages) .....	044303
S. Castelletto, I. P. Degiovanni, and M. L. Rastello	

**Atomic and molecular collisions and interactions**

Theory of Čerenkov pair production (3 pages) .....	044701
Yugo Nagata and Hideo Nitta	
Asymmetries in spatially resolved processes of ionization of heavy atoms by relativistic electrons (4 pages) .....	044702
Marco Kampp, N. C. Pyper, Colm T. Whelan, and H. R. J. Walters	

**Clusters (including fullerenes)**

Fragmentation statistics of large H <sub>2</sub> O and NH <sub>3</sub> clusters from molecular-dynamics simulations (4 pages) .....	045201
T. A. Beu	

**Atomic and molecular processes in external fields**

Design of a biased Stark trap of molecules that move adiabatically in an electric field (4 pages) .....	045401
N. E. Shafer-Ray, K. A. Milton, B. R. Furneaux, E. R. I. Abraham, and G. R. Kalbfleisch	

**Light waves**

Expansion of a dipolar condensate (4 pages) .....	045601
S. Yi and L. You	
Environment effects over quantum statistics and atom-photon correlations in the collective atomic-recoil (4 pages) .....	045602
G. A. Prativiera	



Formation of a two-component Bose condensate during the chemical-potential curve crossing (4 pages) . . . . .	045603
M. A. Kayali and N. A. Sinitsyn	

**Quantum optics, physics of lasers, nonlinear optics**

Atomic spin squeezing in a $\Lambda$ system (4 pages) . . . . .	045801
A. Dantan, M. Pinar, V. Josse, N. Nayak, and P. R. Berman	

**ERRATA**

Erratum: Conceptual inadequacy of the Shannon information in quantum measurements [Phys. Rev. A <b>63</b> , 022113 (2001)] (1 page) . . . . .	049901(E)
Časlav Brukner and Anton Zeilinger	

<b>Selected Abstracts from Other Physical Review Journals</b> . . . . .	i
---	---

<b>Cumulative Author Index</b> . . . . .	ii
--	----