



Michelson-Sagnac optomechanical interferometer, cryogenically cooled and improved by broadband squeezed-light injection. [L. Kleybolte *et al.*, Phys. Rev. Lett. **125**, 213601 (2020)]

NEWSPAPER

PHYSICAL REVIEW LETTERS

Contents

Articles published 14 November–20 November 2020

VOLUME 125, NUMBER 21

20 November 2020

EDITORIALS, ESSAYS, and ANNOUNCEMENTS

Editorial: Promoting Inclusive and Respectful Communications	210001
Michael Thoennessen	

General Physics: Statistical and Quantum Mechanics, Quantum Information, etc.

Minimizing Backaction through Entangled Measurements	210401
Kang-Da Wu, Elisa Bäumer, Jun-Feng Tang, Karen V. Hovhannisyanyan, Martí Perarnau-Llobet, Guo-Yong Xiang, Chuan-Feng Li, and Guang-Can Guo	
 Type-Independent Characterization of Spacelike Separated Resources	210402
Denis Rosset, David Schmid, and Francesco Buscemi	
 Optimal Universal Programming of Unitary Gates	210501
Yuxiang Yang, Renato Renner, and Giulio Chiribella	
Cloning of Quantum Entanglement	210502
Li-Chao Peng, Dian Wu, Han-Sen Zhong, Yi-Han Luo, Yuan Li, Yi Hu, Xiao Jiang, Ming-Cheng Chen, Li Li, Nai-Le Liu, Kae Nemoto, William J. Munro, Barry C. Sanders, Chao-Yang Lu, and Jian-Wei Pan	
Heisenberg-Limited Noisy Atomic Clock Using a Hybrid Coherent and Squeezed State Protocol	210503
Luca Pezzè and Augusto Smerzi	
Projected Entangled Pair States: Fundamental Analytical and Numerical Limitations	210504
G. Scarpa, A. Molnár, Y. Ge, J. J. García-Ripoll, N. Schuch, D. Pérez-García, and S. Iblisdir	
Multimode Storage of Quantum Microwave Fields in Electron Spins over 100 ms	210505
V. Ranjan, J. O'Sullivan, E. Albertinale, B. Albanese, T. Chanelière, T. Schenkel, D. Vion, D. Esteve, E. Flurin, J. J. L. Morton, and P. Bertet	
Experimental Test of the $1/\tau$ -Scaling Entropy Generation in Finite-Time Thermodynamics	210601
Yu-Han Ma, Ruo-Xun Zhai, Jinfu Chen, C. P. Sun, and Hui Dong	
Universality of Entanglement Transitions from Stroboscopic to Continuous Measurements	210602
M. Szyniszewski, A. Romito, and H. Schomerus	

Gravitation and Astrophysics

What Is the Price of Abandoning Dark Matter? Cosmological Constraints on Alternative Gravity Theories	211101
Kris Pardo and David N. Spergel	
Virtual Hawking Radiation	211301
Walter Goldberger and Ira Z. Rothstein	
Gravitational Wave Bursts as Harbingers of Cosmic Strings Diluted by Inflation	211302
Yanou Cui, Marek Lewicki, and David E. Morrissey	

(Continued Inside)



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

By suggesting a few manuscripts each week, we hope to promote reading across fields. Please see our Announcement Phys. Rev. Lett. 98, 010001 (2007).

Copyright 2020 American Physical Society



0031-9007(20201120)125:21;1-8

Elementary Particles and Fields

String Theory and Non-Riemannian Geometry	211601
Jeong-Hyuck Park (朴廷懋) and Shigeki Sugimoto (杉本茂樹)	
String Universality and Non-Simply-Connected Gauge Groups in 8D	211602
Mirjam Cvetič, Markus Dierigl, Ling Lin, and Hao Y. Zhang	
Observation of Enhanced Double Parton Scattering in Proton-Lead Collisions at $\sqrt{s_{NN}} = 8.16$ TeV	212001
R. Aaij <i>et al.</i> (LHCb Collaboration)	

Nuclear Physics

Shadowing in Inelastic Nucleon-Nucleon Cross Section?	212301
Kari J. Eskola, Ilkka Helenius, Mikko Kuha, and Hannu Paukkunen	
Gamow-Teller Strength in ^{48}Ca and ^{78}Ni with the Charge-Exchange Subtracted Second Random-Phase Approximation	212501
D. Gambacurta, M. Grasso, and J. Engel	

Atomic, Molecular, and Optical Physics

Nonadiabatic, Relativistic, and Leading-Order QED Corrections for Rovibrational Intervals of $^4\text{He}_2^+$ ($X^2\Sigma_u^+$)	213001
Dávid Ferenc, Vladimir I. Korobov, and Edit Mátyus	
Tailoring Multiloop Atom Interferometers with Adjustable Momentum Transfer	213201
L. A. Sidorenkov, R. Gautier, M. Altorio, R. Geiger, and A. Landragin	
Nonexponential Tunneling due to Mean-Field-Induced Swallowtails	213401
Q. Guan, M. K. H. Ome, T. M. Bersano, S. Mossman, P. Engels, and D. Blume	
Squeezed-Light Interferometry on a Cryogenically Cooled Micromechanical Membrane	213601
L. Kleybolte, P. Gewecke, A. Sawadsky, M. Korobko, and R. Schnabel	
Geometric Control of Collective Spontaneous Emission	213602
Yizun He, Lingjing Ji, Yuzhuo Wang, Liyang Qiu, Jian Zhao, Yudi Ma, Xing Huang, Saijun Wu, and Darrick E. Chang	
Interferometric Unruh Detectors for Bose-Einstein Condensates	213603
Cisco Gooding, Steffen Biermann, Sebastian Erne, Jorma Louko, William G. Unruh, Joerg Schmiedmayer, and Silke Weinfurter	
Local Versus Global Two-Photon Interference in Quantum Networks	213604
Thomas Nitsche, Syamsundar De, Sonja Barkhofen, Evan Meyer-Scott, Johannes Tiedau, Jan Sperling, Aurél Gábris, Igor Jex, and Christine Silberhorn	

Nonlinear Dynamics, Fluid Dynamics, Classical Optics, etc.

 Observation of a Higher-Order Topological Bound State in the Continuum	213901
Alexander Cerjan, Marius Jürgensen, Wladimir A. Benalcazar, Seabrata Mukherjee, and Mikael C. Rechtsman	
 Topology-Controlled Photonic Cavity Based on the Near-Conservation of the Valley Degree of Freedom	213902
Yandong Li, Yang Yu, Fengyu Liu, Baile Zhang, and Gennady Shvets	
Flat Bands in Magic-Angle Vibrating Plates	214301
María Rosendo López, Fernando Peñaranda, Johan Christensen, and Pablo San-Jose	
Competition between Ekman Plumes and Vortex Condensates in Rapidly Rotating Thermal Convection	214501
Andrés J. Aguirre Guzmán, Matteo Madonia, Jonathan S. Cheng, Rodolfo Ostilla-Mónico, Herman J. H. Clercx, and Rudie P. J. Kunnen	

Plasma and Beam Physics

Energy Flow in Thin Shell Implosions and Explosions	215001
J. J. Ruby, J. R. Rygg, D. A. Chin, J. A. Gaffney, P. J. Adrian, C. J. Forrest, V. Yu. Glebov, N. V. Kabadi, P. M. Nilson, Y. Ping, C. Stoeckl, and G. W. Collins	

Condensed Matter: Structure, etc.

Vortices in Nonequilibrium Photon Condensates	215301
Vladimir N. Gladilin and Michiel Wouters	

(Continued on Preceding Page)



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

By suggesting a few manuscripts each week, we hope to promote reading across fields. Please see our Announcement Phys. Rev. Lett. 98, 010001 (2007)

Additional Transition Line in Jammed Asymmetric Bidisperse Granular Packings	215501
Juan C. Petit, Nishant Kumar, Stefan Luding, and Matthias Sperl	
Length Scale Effect in Frictional Aging of Silica Contacts	215502
Shen Li, Shuai Zhang, Zhe Chen, Xi-Qiao Feng, and Qunyang Li	
Statistical Mechanics of Low Angle Grain Boundaries in Two Dimensions	215503
Grace H. Zhang and David R. Nelson	
Finite-Temperature Topological Invariant for Interacting Systems	215701
Razmik Unanyan, Maximilian Kiefer-Emmanouilidis, and Michael Fleischhauer	
Crystal Structure and Melting of Fe Shock Compressed to 273 GPa: <i>In Situ</i> X-Ray Diffraction	215702
Stefan J. Turneure, Surinder M. Sharma, and Y. M. Gupta	
Multidimensional Hydrogen Tunneling in Supported Molecular Switches: The Role of Surface Interactions	216001
Yair Litman and Mariana Rossi	
Condensed Matter: Electronic Properties, etc.	
 Mott Metal-Insulator Transition from Steady-State Density Functional Theory	216401
David Jacob, Gianluca Stefanucci, and Stefan Kurth	
Radial Spin Texture of the Weyl Fermions in Chiral Tellurium	216402
G. Gatti, D. Gosálbez-Martínez, S. S. Tsirkin, M. Fanciulli, M. Puppini, S. Polishchuk, S. Moser, L. Testa, E. Martino, S. Roth, Ph. Bugnon, L. Moreschini, A. Bostwick, C. Jozwiak, E. Rotenberg, G. Di Santo, L. Petaccia, I. Vobornik, J. Fujii, J. Wong, D. Jariwala, H. A. Atwater, H. M. Rønnow, M. Chergui, O. V. Yazyev, M. Grioni, and A. Crepaldi	
Visualizing Half-Metallic Bulk Band Structure with Multiple Weyl Cones of the Heusler Ferromagnet	216403
Takashi Kono, Masaaki Kakoki, Tomoki Yoshikawa, Xiaoxiao Wang, Kazuki Goto, Takayuki Muro, Rie Y. Umetsu, and Akio Kimura	
 Revealing Hidden Orbital Pseudospin Texture with Time-Reversal Dichroism in Photoelectron Angular Distributions	216404
S. Beaulieu, J. Schusser, S. Dong, M. Schüler, T. Pincelli, M. Dendzik, J. Maklar, A. Neef, H. Ebert, K. Hricovini, M. Wolf, J. Braun, L. Rettig, J. Minár, and R. Ernstorfer	
Purely Cubic Spin Splittings with Persistent Spin Textures	216405
Hong Jian Zhao, Hiro Nakamura, Rémi Arras, Charles Paillard, Peng Chen, Julien Gosteau, Xu Li, Yurong Yang, and Laurent Bellaiche	
Kibble-Zurek Behavior in Disordered Chern Insulators	216601
Lara Ulčakar, Jernej Mravlje, and Tomaž Rejec	
Fermi Liquid Theory for Nonlinear Transport through a Multilevel Anderson Impurity	216801
Yoshimichi Teratani, Rui Sakano, and Akira Oguri	
 Hydrogen Pentagraphenelike Structure Stabilized by Hafnium: A High-Temperature Conventional Superconductor	217001
Hui Xie, Yansun Yao, Xiaolei Feng, Defang Duan, Hao Song, Zihan Zhang, Shuqing Jiang, Simon A. T. Redfern, Vladimir Z. Kresin, Chris J. Pickard, and Tian Cui	
Raman Study of Cooper Pairing Instabilities in $(\text{Li}_{1-x}\text{Fe}_x)\text{OHFeSe}$	217002
G. He, D. Li, D. Jost, A. Baum, P. P. Shen, X. L. Dong, Z. X. Zhao, and R. Hackl	
Multiband Material with a Quasi-1D Band as a Robust High-Temperature Superconductor	217003
T. T. Saraiva, P. J. F. Cavalcanti, A. Vagov, A. S. Vasenko, A. Perali, L. Dell'Anna, and A. A. Shanenko	
Reduction of the Spin Susceptibility in the Superconducting State of Sr_2RuO_4 Observed by Polarized Neutron Scattering	217004
A. N. Petsch, M. Zhu, Mechthild Enderle, Z. Q. Mao, Y. Maeno, I. I. Mazin, and S. M. Hayden	
Proposed Model of the Giant Thermal Hall Effect in Two-Dimensional Superconductors: An Extension to the Superconducting Fluctuation Regime	217005
A. V. Kavokin, Y. M. Galperin, and A. A. Varlamov	
Observation of Magnon Polarons in a Uniaxial Antiferromagnetic Insulator	217201
Junxue Li, Haakon T. Simensen, Derek Reitz, Qiyang Sun, Wei Yuan, Chen Li, Yaroslav Tserkovnyak, Arne Brataas, and Jing Shi	

(Continued on Preceding Page)



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

By suggesting a few manuscripts each week, we hope to promote reading across fields. Please see our Announcement Phys. Rev. Lett. 98, 010001 (2007)

	Bosonic Bott Index and Disorder-Induced Topological Transitions of Magnons X. S. Wang, Arne Brataas, and Roberto E. Troncoso	217202
	Nonreciprocal Dzyaloshinskii–Moriya Magnetoacoustic Waves M. Küß, M. Heigl, L. Flacke, A. Hörner, M. Weiler, M. Albrecht, and A. Wixforth	217203
	Subterahertz Momentum Drag and Violation of Matthiessen’s Rule in an Ultraclean Ferromagnetic SrRuO ₃ Metallic Thin Film Youcheng Wang, G. Bossé, H. P. Nair, N. J. Schreiber, J. P. Ruf, B. Cheng, C. Adamo, D. E. Shai, Y. Lubashevsky, D. G. Schlom, K. M. Shen, and N. P. Armitage	217401
	Manipulating Intertwined Orders in Solids with Quantum Light Jiajun Li and Martin Eckstein	217402
	Quasiparticle Mass Enhancement as a Measure of Entanglement in the Kondo Problem Nayra A. Álvarez Pari, D. J. García, and Pablo S. Cornaglia	217601
	Using High Multipolar Orders to Reconstruct the Sound Velocity in Piezoelectrics from Lattice Dynamics Miquel Royo, Konstanze R. Hahn, and Massimiliano Stengel	217602
	Anomalous Cyclotron Motion in Graphene Superlattice Cavities Rainer Kraft, Ming-Hao Liu (劉明豪), Pranauv Balaji Selvasundaram, Szu-Chao Chen (陳思超), Ralph Krupke, Klaus Richter, and Romain Danneau	217701
	Polymer, Soft Matter, Biological, Climate, and Interdisciplinary Physics	
	Multiple Types of Aging in Active Glasses Rituparno Mandal and Peter Sollich	218001
	Dynamical Crystallites of Active Chiral Particles Zhi-Feng Huang, Andreas M. Menzel, and Hartmut Löwen	218002
	Designing the Morphology of Separated Phases in Multicomponent Liquid Mixtures Sheng Mao, Milena S. Chakraverti-Wuerthwein, Hunter Gaudio, and Andrej Košmrlj	218003
	Role of Friction in Multidefect Ordering Kristian Thijssen, Mehrana R. Nejad, and Julia M. Yeomans	218004
	Circuit Reduction of Heterogeneous Nonequilibrium Systems Milo M. Lin	218101
	Topological Determinants of Perturbation Spreading in Networks Xiaozhu Zhang (张潇竹), Dirk Witthaut, and Marc Timme	218301
	Heterogeneity Improves Speed and Accuracy in Social Networks Bhargav Karamched, Megan Stickler, William Ott, Benjamin Lindner, Zachary P. Kilpatrick, and Krešimir Josić	218302
	Errata	
	Publisher’s Note: Large Deviation Function for the Number of Eigenvalues of Sparse Random Graphs inside an Interval [Phys. Rev. Lett. 117 , 104101 (2016)] Fernando L. Metz and Isaac Pérez Castillo	219901
	Erratum: Superfluid and Supersolid Phases of ⁴ He on the Second Layer of Graphite [Phys. Rev. Lett. 124 , 205301 (2020)] M. C. Gordillo and J. Boronat	219902

 This paper was highlighted in the APS publication *Physics* (physics.aps.org).
By suggesting a few manuscripts each week, we hope to promote reading across fields. Please see our Announcement Phys. Rev. Lett. 98, 010001 (2007).