

Top view of a perfectly stacked column of dice that was created by repeatedly twisting an initially jumbled dice pile. Selected for a Focus in *Physics* and an Editors' Suggestion. [K. Asencio, M. Acevedo, I. Zuriguel, and D. Maza, Phys. Rev. Lett. **119**, 228002 (2017)]

NEWSPAPER

PHYSICAL REVIEW LETTERS

Contents

Articles published 25 November–1 December 2017

VOLUME 119, NUMBER 22 1 December 2017

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

Dissociation of One-Dimensional Matter-Wave Breathers due to Quantum Many-Body Effects 220401
Vladimir A. Yurovsky, Boris A. Malomed, Randall G. Hulet, and Maxim Olshanii

Communication Games Reveal Preparation Contextuality 220402
Alley Hameedi, Armin Tavakoli, Breno Marques, and Mohamed Bourennane

Experimental Detection of Information Deficit in a Photonic Contextuality Scenario 220403
Xiang Zhan, Paweł Kurzyński, Dagomir Kaszlikowski, Kunkun Wang, Zhihao Bian, Yongsheng Zhang, and Peng Xue

Coherent Control of a Single Trapped Rydberg Ion 220501
Gerard Higgins, Fabian Pokorny, Chi Zhang, Quentin Bodart, and Markus Hennrich

Universal Extensions of Restricted Classes of Quantum Operations 220502
Michał Oszmaniec and Zoltán Zimborás

Optimal Quantum Spatial Search on Random Temporal Networks 220503
Shantanav Chakraborty, Leonardo Novo, Serena Di Giorgio, and Yasser Omar

Generic Local Hamiltonians are Gapless 220504
Ramis Movassagh

Fast Dynamical Decoupling of the Mølmer-Sørensen Entangling Gate 220505
Tom Manovitz, Amit Rotem, Ravid Shaniv, Itsik Cohen, Yotam Shapira, Nitzan Akerman, Alex Retzker, and Roee Ozeri

Private States, Quantum Data Hiding, and the Swapping of Perfect Secrecy 220506
Matthias Christandl and Roberto Ferrara

Arrow of Time for Continuous Quantum Measurement 220507
Justin Dressel, Areeya Chantasri, Andrew N. Jordan, and Alexander N. Korotkov

Universal Scaling and Critical Exponents of the Anisotropic Quantum Rabi Model 220601
Maoxin Liu, Stefano Chesi, Zu-Jian Ying, Xiaosong Chen, Hong-Gang Luo, and Hai-Qing Lin

Variational Approach to Monte Carlo Renormalization Group 220602
Yantao Wu and Roberto Car

Entanglement Entropy of Eigenstates of Quantum Chaotic Hamiltonians 220603
Lev Vidmar and Marcos Rigol

Solvable Hydrodynamics of Quantum Integrable Systems 220604
Vir B. Bulchandani, Romain Vasseur, Christoph Karrasch, and Joel E. Moore

Factorization and Criticality in Finite *XXZ* Systems of Arbitrary Spin 220605
M. Cerezo, R. Rossignoli, N. Canosa, and E. Ríos

(Continued Inside)

Selected for a Viewpoint in *Physics*. Please visit http://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 2017 American Physical Society

0031-9007(20171201)119:22;1-9

Gravitation and Astrophysics

Turbulence of Weak Gravitational Waves in the Early Universe 221101
Sébastien Galtier and Sergey V. Nazarenko

Beyond the Boost: Measuring the Intrinsic Dipole of the Cosmic Microwave Background Using the Spectral Distortions of the Monopole and Quadrupole 221102
Siavash Yasini and Elena Pierpaoli

Recognizing Axionic Dark Matter by Compton and de Broglie Scale Modulation of Pulsar Timing 221103
Ivan De Martino, Tom Broadhurst, S.-H. Henry Tye, Tzihong Chiueh, Hsi-Yu Schive, and Ruth Lazkoz

Maximum Redshift of Gravitational Wave Merger Events 221104
Savvas M. Koushiappas and Abraham Loeb

Elementary Particles and Fields

χ_{c1} and χ_{c2} Resonance Parameters with the Decays $\chi_{c1,c2} \to J/\psi\mu^+\mu^-$ 221801
R. Aaij *et al.* (LHCb Collaboration)

Search for Evidence of the Type-III Seesaw Mechanism in Multilepton Final States in Proton-Proton Collisions at $\sqrt{s} = 13$ TeV 221802
A. M. Sirunyan *et al.* (CMS Collaboration)

Order Parameters and Color-Flavor Center Symmetry in QCD 222001
Aleksey Cherman, Srimoyee Sen, Mithat Ünsal, Michael L. Wagman, and Laurence G. Yaffe

Nuclear Physics

Role of Multichance Fission in the Description of Fission-Fragment Mass Distributions at High Energies 222501
K. Hirose, K. Nishio, S. Tanaka, R. Léguillon, H. Makii, I. Nishinaka, R. Orlandi, K. Tsukada, J. Smallcombe, M. J. Vermeulen, S. Chiba, Y. Aritomo, T. Ohtsuki, K. Nakano, S. Araki, Y. Watanabe, R. Tatsuzawa, N. Takaki, N. Tamura, S. Goto, I. Tsekhanovich, and A. N. Andreyev

Evidence for the Role of Proton Shell Closure in Quasifission Reactions from X-Ray Fluorescence of Mass-Identified Fragments 222502
M. Morjean, D. J. Hinde, C. Simenel, D. Y. Jeung, M. Airiau, K. J. Cook, M. Dasgupta, A. Drouart, D. Jacquet, S. Kalkal, C. S. Palshetkar, E. Prasad, D. Rafferty, E. C. Simpson, L. Tassan-Got, K. Vo-Phuoc, and E. Williams

Neutron Skin Thickness of ^{48}Ca from a Nonlocal Dispersive Optical-Model Analysis 222503
M. H. Mahzoon, M. C. Atkinson, R. J. Charity, and W. H. Dickhoff

Exit-Channel Suppression in Statistical Reaction Theory 222504
G. F. Bertsch and T. Kawano

Ab initio Calculations of the Isotopic Dependence of Nuclear Clustering 222505
Serdar Elhatisari, Evgeny Epelbaum, Hermann Krebs, Timo A. Lähde, Dean Lee, Ning Li, Bing-nan Lu, Ulf-G. Meißner, and Gautam Rupak

Proton Spectra from ^{3}He + T and ^{3}He + ^{3}He Fusion at Low Center-of-Mass Energy, with Potential Implications for Solar Fusion Cross Sections 222701
A. B. Zylstra, J. A. Frenje, M. Gatu Johnson, G. M. Hale, C. R. Brune, A. Bacher, D. T. Casey, C. K. Li, D. McNabb, M. Paris, R. D. Petrasso, T. C. Sangster, D. B. Sayre, and F. H. Séguin

Atomic, Molecular, and Optical Physics

Acid Dissociation in HCl-Water Clusters is Temperature Dependent and Cannot be Detected Based on Dipole Moments 223001
Ricardo Pérez de Tudela and Dominik Marx

Ground-State Properties of Unitary Bosons: From Clusters to Matter 223002
J. Carlson, S. Gandolfi, U. van Kolck, and S. A. Vitiello

(Continued on Preceding Page)

Selected for a Viewpoint in *Physics*. Please visit http://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)

Converging High-Level Coupled-Cluster Energetics by Monte Carlo Sampling and Moment Expansions 223003
J. Emiliano Deustua, Jun Shen, and Piotr Piecuch

Probing Low-Mass Vector Bosons with Parity Nonconservation and Nuclear Anapole Moment Measurements in Atoms and Molecules 223201
V. A. Dzuba, V. V. Flambaum, and Y. V. Stadnik

Steady-State Magneto-Optical Trap with 100-Fold Improved Phase-Space Density 223202
Shayne Bennetts, Chun-Chia Chen (陳俊嘉), Benjamin Pasquiou, and Florian Schreck

Cavity-Enhanced Transport of Charge 223601
David Hagenmüller, Johannes Schachenmayer, Stefan Schütz, Claudiu Genes, and Guido Pupillo

Silicon-Vacancy Spin Qubit in Diamond: A Quantum Memory Exceeding 10 ms with Single-Shot State Readout 223602
D. D. Sukachev, A. Sipahigil, C. T. Nguyen, M. K. Bhaskar, R. E. Evans, F. Jelezko, and M. D. Lukin

Multiphoton Effects Enhanced due to Ultrafast Photon-Number Fluctuations 223603
Kirill Yu. Spasibko, Denis A. Kopylov, Victor L. Krutyanskiy, Tatiana V. Murzina, Gerd Leuchs, and Maria V. Chekhova

Detection Loss Tolerant Supersensitive Phase Measurement with an SU(1,1) Interferometer 223604
Mathieu Manceau, Gerd Leuchs, Farid Khalili, and Maria Chekhova

Nonlinear Dynamics, Fluid Dynamics, Classical Optics, etc.

Phase Memory Preserving Harmonics from Abruptly Autofocusing Beams 223901
Anastasios D. Koulouklidis, Dimitris G. Papazoglou, Vladimir Yu. Fedorov, and Stelios Tzortzakis

Stability Landscape of Shell Buckling 224101
Emmanuel Virot, Tobias Kreilos, Tobias M. Schneider, and Shmuel M. Rubinstein

Buckling Instability Causes Inertial Thrust for Spherical Swimmers at All Scales 224501
Adel Djellouli, Philippe Marmottant, Henda Djeridi, Catherine Quilliet, and Gwennou Coupier

Microscopic Marangoni Flows Cannot Be Predicted on the Basis of Pressure Gradients 224502
Yawei Liu, Raman Ganti, Hugh G. A. Burton, Xianren Zhang, Wenchuan Wang, and Daan Frenkel

Condensed Matter: Structure, etc.

Quantifying Complexity in Quantum Phase Transitions via Mutual Information Complex Networks 225301
Marc Andrew Valdez, Daniel Jaschke, David L. Vargas, and Lincoln D. Carr

Symmetry Protected Dynamical Symmetry in the Generalized Hubbard Models 225302
Jinlong Yu, Ning Sun, and Hui Zhai

Induced-Charge Enhancement of the Diffusion Potential in Membranes with Polarizable Nanopores 226001
I. I. Ryzhkov, D. V. Lebedev, V. S. Solodovnichenko, A. V. Shiverskiy, and M. M. Simunin

Condensed Matter: Electronic Properties, etc.

Interplay of Chiral and Helical States in a Quantum Spin Hall Insulator Lateral Junction 226401
M. R. Calvo, F. de Juan, R. Ilan, E. J. Fox, A. J. Bestwick, M. Mühlbauer, J. Wang, C. Ames, P. Leubner, C. Brüne, S. C. Zhang, H. Buhmann, L. W. Molenkamp, and D. Goldhaber-Gordon

Photoexcited Muon Spin Spectroscopy: A New Method for Measuring Excess Carrier Lifetime in Bulk Silicon 226601
K. Yokoyama, J. S. Lord, J. Miao, P. Murahari, and A. J. Drew

Transport Signatures of the Hall Viscosity 226602
Luca V. Delacrétaz and Andrey Gromov

Two-Dimensional Dirac Fermions Protected by Space-Time Inversion Symmetry in Black Phosphorus 226801
Jimin Kim, Seung Su Baik, Sung Won Jung, Yeongsup Sohn, Sae Hee Ryu, Hyoung Joon Choi, Bohm-Jung Yang, and Keun Su Kim

(Continued on Preceding Page)

Selected for a Viewpoint in *Physics*. Please visit http://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)

Quantum Phase Transition in Few-Layer $NbSe_2$ Probed through Quantized Conductance Fluctuations 226802
Hemanta Kumar Kundu, Sujay Ray, Kapildeb Dolui, Vivas Bagwe, Palash Roy Choudhury, S. B. Krupanidhi, Tanmoy Das, Pratap Raychaudhuri, and Aveek Bid

Switching Magnetism and Superconductivity with Spin-Polarized Current in Iron-Based Superconductor 227001
Seokhwan Choi, Hyoung Joon Choi, Jong Mok Ok, Yeonghoon Lee, Won-Jun Jang, Alex Taekyung Lee, Young Kuk, SungBin Lee, Andreas J. Heinrich, Sang-Wook Cheong, Yunkyu Bang, Steven Johnston, Jun Sung Kim, and Jhinhwan Lee

Intertwining Topological Order and Broken Symmetry in a Theory of Fluctuating Spin-Density Waves 227002
Shubhayu Chatterjee, Subir Sachdev, and Mathias S. Scheurer

Pressure-Induced Ferromagnetism due to an Anisotropic Electronic Topological Transition in $Fe_{1.08}Te$ 227003
K. Mydeen, D. Kasinathan, C. Koz, S. Rößler, U. K. Rößler, M. Hanfland, A. A. Tsirlin, U. Schwarz, S. Wirth, H. Rosner, and M. Nicklas

Antiferromagnetic Resonance and Terahertz Continuum in α-$RuCl_3$ 227201
A. Little, Liang Wu, P. Lampen-Kelley, A. Banerjee, S. Patankar, D. Rees, C. A. Bridges, J.-Q. Yan, D. Mandrus, S. E. Nagler, and J. Orenstein

Magnetic Excitations and Continuum of a Possibly Field-Induced Quantum Spin Liquid in α-$RuCl_3$ 227202
Zhe Wang, S. Reschke, D. Hüvonen, S.-H. Do, K.-Y. Choi, M. Gensch, U. Nagel, T. Rõõm, and A. Loidl

Anomalous Spin Precession under a Geometrical Torque 227203
Christopher Stahl and Michael Potthoff

Quantum Spin Ice under a [111] Magnetic Field: From Pyrochlore to Kagome 227204
Troels Arnfred Bojesen and Shigeki Onoda

Quantitative Disentanglement of the Spin Seebeck, Proximity-Induced, and Ferromagnetic-Induced Anomalous Nernst Effect in Normal-Metal–Ferromagnet Bilayers 227205
Panagiota Bougiatioti, Christoph Klewe, Daniel Meier, Orestis Manos, Olga Kuschel, Joachim Wollschläger, Laurence Bouchenoire, Simon D. Brown, Jan-Michael Schmalhorst, Günter Reiss, and Timo Kuschel

Engineering the Eigenstates of Coupled Spin-1/2 Atoms on a Surface 227206
Kai Yang, Yujeong Bae, William Paul, Fabian D. Natterer, Philip Willke, Jose L. Lado, Alejandro Ferrón, Taeyoung Choi, Joaquín Fernández-Rossier, Andreas J. Heinrich, and Christopher P. Lutz

Coupling between a Charge Density Wave and Magnetism in an Heusler Material 227207
G. Lantz, M. J. Neugebauer, M. Kubli, M. Savoini, E. Abreu, K. Tasca, C. Dornes, V. Esposito, J. Rittmann, Y. W. Windsor, P. Beaud, G. Ingold, and S. L. Johnson

Gapless Spin Excitations in the Field-Induced Quantum Spin Liquid Phase of α-$RuCl_3$ 227208
Jiacheng Zheng, Kejing Ran, Tianrun Li, Jinghui Wang, Pengshuai Wang, Bin Liu, Zheng-Xin Liu, B. Normand, Jinsheng Wen, and Weiqiang Yu

Group Theoretical Route to Deterministic Weyl Points in Chiral Photonic Lattices 227401
Matthias Saba, Joachim M. Hamm, Jeremy J. Baumberg, and Ortwin Hess

Asymmetric Splitting of an Antiferromagnetic Resonance via Quartic Exchange Interactions in Multiferroic Hexagonal $HoMnO_3$ 227601
N. J. Laurita, Yi Luo, Rongwei Hu, Meixia Wu, S. W. Cheong, O. Tchernyshyov, and N. P. Armitage

Negative Spin Exchange in a Multielectron Quantum Dot 227701
Frederico Martins, Filip K. Malinowski, Peter D. Nissen, Saeed Fallahi, Geoffrey C. Gardner, Michael J. Manfra, Charles M. Marcus, and Ferdinand Kuemmeth

Polymer, Soft Matter, Biological, Climate, and Interdisciplinary Physics

Free Surface Relaxations of Star-Shaped Polymer Films 227801
Emmanouil Glynos, Kyle J. Johnson, Bradley Frieberg, Alexandros Chremos, Suresh Narayanan, Georgios Sakellariou, and Peter F. Green

Sequence-Dependent Persistence Length of Long DNA 227802
Hui-Min Chuang, Jeffrey G. Reifenberger, Han Cao, and Kevin D. Dorfman

(Continued on Preceding Page)

Selected for a Viewpoint in *Physics*. Please visit http://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)

Multivalent-Ion-Activated Protein Adsorption Reflecting Bulk Reentrant Behavior 228001
Madeleine R. Fries, Daniel Stopper, Michal K. Braun, Alexander Hinderhofer, Fajun Zhang, Robert M. J. Jacobs, Maximilian W. A. Skoda, Hendrik Hansen-Goos, Roland Roth, and Frank Schreiber

Experimental Study of Ordering of Hard Cubes by Shearing 228002
K. Asencio, M. Acevedo, I. Zuriguel, and D. Maza

Selected for a Viewpoint in *Physics*. Please visit http://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).

Physics
spotlighting exceptional research

The American Physical Society's free online publication, *Physics* (http://physics.aps.org/), provides thought-provoking analysis and spotlights exceptional research.