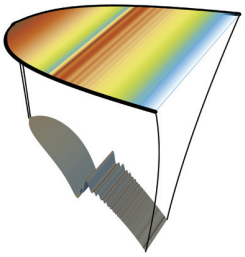

Depiction of the thermal evolution of the early universe from a holographic model during periods of inflation, reheating, and thermalization. [C. Ecker, E. Kiritsis, and W. van der Schee, Phys. Rev. Lett. **130**, 251001 (2023)]

NEWSPAPER

PHYSICAL REVIEW LETTERS

Contents

Articles published 17 June–23 June 2023

VOLUME 130, NUMBER 25 23 June 2023

Quantum Information, Science, and Technology

Hierarchy of Multipartite Nonlocality and Device-Independent Effect Witnesses 250201
Peter Bierhorst and Jitendra Prakash

Dynamical Transition of Operator Size Growth in Quantum Systems Embedded in an Environment 250401
Pengfei Zhang and Zhenhua Yu

Genuine Many-Body Quantum Scars along Unstable Modes in Bose-Hubbard Systems 250402
Quirin Hummel, Klaus Richter, and Peter Schlagheck

Channeling Quantum Criticality 250403
Yijian Zou, Shengqi Sang, and Timothy H. Hsieh

Experimentally Realizable $\mathcal{PT}$ Phase Transitions in Reflectionless Quantum Scattering 250404
Micheline B. Soley, Carl M. Bender, and A. Douglas Stone

Many-Body Resonances in the Avalanche Instability of Many-Body Localization 250405
Hyunsoo Ha, Alan Morningstar, and David A. Huse

Noise-Resilient Phase Estimation with Randomized Compiling 250601
Yanwu Gu, Yunheng Ma, Nicolò Forcellini, and Dong E. Liu

All-Microwave Leakage Reduction Units for Quantum Error Correction with Superconducting Transmon Qubits 250602
J. F. Marques, H. Ali, B. M. Varbanov, M. Finkel, H. M. Veen, S. L. M. van der Meer, S. Valles-Sanclemente, N. Muthusubramanian, M. Beekman, N. Haider, B. M. Terhal, and L. DiCarlo

Experimental Quantum Communication Overcomes the Rate-Loss Limit without Global Phase Tracking 250801
Lai Zhou, Jinping Lin, Yuan-Mei Xie, Yu-Shuo Lu, Yumang Jing, Hua-Lei Yin, and Zhiliang Yuan

Twin-Field Quantum Key Distribution without Phase Locking 250802
Wei Li, Likang Zhang, Yichen Lu, Zheng-Ping Li, Cong Jiang, Yang Liu, Jia Huang, Hao Li, Zhen Wang, Xiang-Bin Wang, Qiang Zhang, Lixing You, Feihu Xu, and Jian-Wei Pan

Cosmology, Astrophysics, and Gravitation

Dynamical Inflaton Coupled to Strongly Interacting Matter 251001
Christian Ecker, Elias Kiritsis, and Wilke van der Schee

Search for Ultralight Dark Matter with Spectroscopy of Radio-Frequency Atomic Transitions 251002
Xue Zhang, Abhishek Banerjee, Mahapan Leyser, Gilad Perez, Stephan Schiller, Dmitry Budker, and Dionysios Antypas

Particles and Fields

Nucleation at Finite Temperature: A Gauge-Invariant Perturbative Framework 251801
Johan Löfgren, Michael J. Ramsey-Musolf, Philipp Schicho, and Tuomas V. I. Tenkanen

(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 2023 American Physical Society

0031-9007(20230623)130:25;1-N

Measurement of Direct-Photon Cross Section and Double-Helicity Asymmetry at $\sqrt{s} = 510$ GeV in $\vec{p}+\vec{p}$ Collisions 251901
N. J. Abdulameer *et al.* (PHENIX Collaboration)
First Study of Reaction $\Xi^0 n \to \Xi^- p$ Using Ξ^0-Nucleus Scattering at an Electron-Positron Collider 251902
M. Ablikim *et al.* (BESIII Collaboration)

Atomic, Molecular, and Optical Physics

Improved Limits on the Coupling of Ultralight Bosonic Dark Matter to Photons from Optical Atomic Clock Comparisons 253001
M. Filzinger, S. Dörscher, R. Lange, J. Klose, M. Steinel, E. Benkler, E. Peik, C. Lisdat, and N. Huntemann
Strong-Field Ionization of Hydrogen Atoms with Quantum Light 253201
Yiqi Fang, Feng-Xiao Sun, Qiongyi He, and Yunquan Liu
Observation of Nuclear Wave-Packet Interference in Ultrafast Interatomic Energy Transfer 253202
Meng Han, Jacqueline Fedyk, Jia-Bao Ji, Victor Despré, Alexander I. Kuleff, and Hans Jakob Wörner
Universality of Internal Correlations of Strongly Interacting p-Wave Fermions in One-Dimensional Geometry 253401
Przemysław Kościk and Tomasz Sowiński
Ultrafast Temporal SU(1,1) Interferometer 253601
Sara Meir, Yuval Tamir, Hamootal Duadi, Eliahu Cohen, and Moti Fridman
Stochastic Approach to the Quantum Noise of a Single-Emitter Nanolaser 253801
Matias Bundgaard-Nielsen, Emil Vosmar Denning, Marco Saldutti, and Jesper Mørk

Physics of Fluids, Earth & Planetary Science, and Climate

Kinematic Effects on Probability Density Functions of Energy Dissipation Rate and Enstrophy in Turbulence 254001
Toshiyuki Gotoh, Takeshi Watanabe, and Izumi Saito

Plasma and Solar Physics, Accelerators and Beams

Seeding the Electrothermal Instability through a Three-Dimensional, Nonlinear Perturbation 255101
E. P. Yu, T. J. Awe, K. R. Cochrane, K. J. Peterson, K. C. Yates, T. M. Hutchinson, M. W. Hatch, B. S. Bauer, K. Tomlinson, and D. B. Sinars

Condensed Matter and Materials

Hyperbolic Fringe Signal for Twin Impurity Quasiparticle Interference 256001
Peize Ding, Tilman Schwemmer, Ching Hua Lee, Xianxin Wu, and Ronny Thomale
Record High 36 K Transition Temperature to the Superconducting State of Elemental Scandium at a Pressure of 260 GPa 256002
Jianjun Ying, Shiqiu Liu, Qing Lu, Xikai Wen, Zhigang Gui, Yuqing Zhang, Xiaomeng Wang, Jian Sun, and Xianhui Chen
Current Noise of Hydrodynamic Electrons 256301
Aaron Hui and Brian Skinner
Multiversality and Unnecessary Criticality in One Dimension 256401
Abhishodh Prakash, Michele Fava, and S. A. Parameswaran
General Theory of Momentum-Space Nonsymmorphic Symmetry 256601
Chen Zhang, Z. Y. Chen, Zheng Zhang, and Y. X. Zhao
Acoustic Waves Induced by Einstein–de Haas Effect in the Ultrafast Core Reversal of Magnetic Vortex 256701
Jiajun Sun, Shengbin Shi, and Jie Wang
Confinement of Fractional Excitations in a Triangular Lattice Antiferromagnet 256702
L. Facheris, S. D. Nabi, A. Glezer Moshe, U. Nagel, T. Rõõm, K. Yu. Povarov, J. R. Stewart, Z. Yan, and A. Zheludev
Spin-Derived Electric Polarization and Chirality Density Inherent in Localized Electron Orbitals 256801
Shintaro Hoshino, Michi-To Suzuki, and Hiroaki Ikeda

(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)

Probing Enhanced Electron-Phonon Coupling in Graphene by Infrared Resonance Raman Spectroscopy 256901
Tommaso Venanzi, Lorenzo Graziotto, Francesco Macheda, Simone Sotgiu, Taoufiq Ouaj, Elena Stellino, Claudia Fasolato, Paolo Postorino, Vaidotas Mišeikis, Marvin Metzelaars, Paul Kögerler, Bernd Beschoten, Camilla Coletti, Stefano Roddaro, Matteo Calandra, Michele Ortolani, Christoph Stampfer, Francesco Mauri, and Leonetta Baldassarre

Giant Bulk Electrophotovoltaic Effect in Heteronodal-Line Systems 256902
Xiao Jiang, Lei Kang, Jianfeng Wang, and Bing Huang

Temperature-Dependent Spin-Lattice Relaxation of the Nitrogen-Vacancy Spin Triplet in Diamond 256903
M. C. Cambria, A. Norambuena, H. T. Dinani, G. Thiering, A. Gardill, I. Kemeny, Y. Li, V. Lordi, Á. Gali, J. R. Maze, and S. Kolkowitz

Statistical Physics; Classical, Nonlinear, and Complex Systems

Time-Resolved Statistics of Snippets as General Framework for Model-Free Entropy Estimators 257101
Jann van der Meer, Julius Degünther, and Udo Seifert

Generalized Lotka-Volterra Equations with Random, Nonreciprocal Interactions: The Typical Number of Equilibria 257401
Valentina Ros, Felix Roy, Giulio Biroli, Guy Bunin, and Ari M. Turner

Polymers, Chemical Physics, Soft Matter, and Biological Physics

Crackling Noise during Slow Relaxations in Crumpled Sheets 258201
Yoav Lahini, Shmuel M. Rubinstein, and Ariel Amir

Two-Dimensional Melting of Two- and Three-Component Mixtures 258202
Yan-Wei Li, Yugui Yao, and Massimo Pica Ciamarra

Crowding-Regulated Binding of Divalent Biomolecules 258401
Tomasz Skóra, Mathijs Janssen, Andreas Carlson, and Svyatoslav Kondrat

Schrödinger Dynamics and Berry Phase of Undulatory Locomotion 258402
Alexander E. Cohen, Alasdair D. Hastewell, Sreeparna Pradhan, Steven W. Flavell, and Jörn Dunkel

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).

Physics
spotlighting exceptional research

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