

Two calculated Rydberg electron distributions for trilobite molecules. Selected for a Synopsis in *Physics Magazine* and for an Editors' Suggestion. [Markus Exner *et al.*, Phys. Rev. Lett. **134**, 223401 (2025)]

PHYSICAL REVIEW LETTERS

Contents

Articles published 31 May–6 June 2025

VOLUME 134, NUMBER 22

6 June 2025

Quantum Information, Science, and Technology

Decoherence of Histories: Chaotic Versus Integrable Systems	220401
Jiaozi Wang and Philipp Strasberg	
Anomalous Discharging of Quantum Batteries: The Ergotropic Mpemba Effect	220402
Ivan Medina, Oisín Culhane, Felix C. Binder, Gabriel T. Landi, and John Goold	
Non-Markovian Quantum Mpemba Effect	220403
David J. Strachan, Archak Purkayastha, and Stephen R. Clark	
Inhomogeneous Quantum Quenches of Conformal Field Theory with Boundaries	220404
Xinyu Liu, Alexander McDonald, Tokiro Numasawa, Biao Lian, and Shinsei Ryu	
Exploiting Nonlocal Correlations for Dispersion-Resilient Quantum Communications	220801
Hao Yu, Benjamin Crockett, Nicola Montaut, Stefania Sciara, Mario Chemnitz, Sai T. Chu, Brent E. Little, David J. Moss, Zhiming Wang, José Azaña, and Roberto Morandotti	
Testing the Wineland Criterion with Finite Statistics	220802
E. S. Carrera, Y. Zhang, J-D. Bancal, and N. Sangouard	

Cosmology, Astrophysics, and Gravitation

Extended δN Formalism: Nonspatially Flat Separate-Universe Approach	221001
Danilo Artigas, Shi Pi, and Takahiro Tanaka	
Supernovae Time Profiles as a Probe of New Physics at Neutrino Telescopes	221002
Carlos A. Argüelles, Vedran Brdar, Jeffrey Lazar, and Ying-Ying Li	
Partial Rate Matrix for Dark Matter Scattering	221003
Benjamin Lillard	
Black Hole Supercolliders	221401
Andrew Mummery and Joseph Silk	

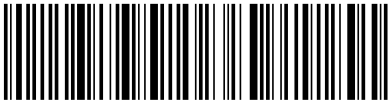
Particles and Fields

Channel Capacity of a Relativistic String	221601
Adam R. Brown	
Establishing CP Violation in b -Baryon Decays	221801
Jia-Jie Han, Ji-Xin Yu, Ya Li, Hsiang-nan Li, Jian-Peng Wang, Zhen-Jun Xiao, and Fu-Sheng Yu	
Precise Extraction of $\alpha_{\text{em}}(m_Z^2)$ at the Tera-Z Stage of a Future Circular Collider	221802
Marc Riembau	
Next-to-Next-to-Leading-Order QCD Prediction for the Pion Form Factor	221901
Yao Ji, Bo-Xuan Shi, Jian Wang, Ye-Fan Wang, Yu-Ming Wang, and Hui-Xin Yu	

(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).



Nuclear Physics

Extracting Neutron-Neutron Interaction Strength and Spatiotemporal Dynamics of Neutron Emission from the Two-Particle Correlation Function	222301
Dawei Si, Sheng Xiao, Zhi Qin, Yuhao Qin, Junhuai Xu, Baiting Tian, Boyuan Zhang, Haojie Zhang, Renjie Zou, Dong Guo, Yijie Wang, Xiaobao Wei, Yibo Hao, Zengxiang Wang, Tianren Zhuo, Chunwang Ma, Yuansheng Yang, Xianglun Wei, Herun Yang, Peng Ma, Limin Duan, Fangfang Duan, Kang Wang, Junbing Ma, Shiwei Xu, Zhen Bai, Guo Yang, Yanyun Yang, and Zhigang Xiao	

Atomic, Molecular, and Optical Physics

 Ionization Energy of Metastable ^3He ($2\ ^3S_1$) and the Alpha- and Helion-Particle Charge-Radius Difference from Precision Spectroscopy of the np Rydberg Series	223001
Gloria Clausen and Frédéric Merkt	
Limits on Anomalous Spin-Spin Interactions Using Noble-Gas Nuclear Magnetic Resonance	223201
Haowen Su, Shiju Hu, Yang Ding, Yuanhong Wang, Min Jiang, and Xinhua Peng	
 High Precision Spectroscopy of Trilobite Rydberg Molecules	223401
Markus Exner, Rohan Srikumar, Richard Blättner, Matthew T. Eiles, Peter Schmelcher, and Herwig Ott	
Observation of Brownian Motion of a Bose-Einstein Condensate	223402
Xiao-Qiong Wang, Rui-Lang Zeng, Zi-Yao Zhang, Chushun Tian, Shizhong Zhang, Andreas Hemmerich, and Zhi-Fang Xu	
Spin and Density Modes in a Binary Fluid of Light	223403
Clara Piekarski, Nicolas Cherroret, Tangui Aladjidi, and Quentin Glorieux	
Torus Bifurcation of a Dissipative Time Crystal	223601
Jayson G. Cosme, Phatthamon Kongkhambut, Anton Bölian, Richelle Jade L. Tuquero, Jim Skulte, Ludwig Mathey, Andreas Hemmerich, and Hans Keßler	
On-Chip Quantum Interference between Independent Lithium Niobate-on-Insulator Photon-Pair Sources	223602
Robert J. Chapman, Tristan Kuttner, Jost Kellner, Alessandra Sabatti, Andreas Maeder, Giovanni Finco, Fabian Kaufmann, and Rachel Grange	
Transient Symmetry Breaking in a Pumped Crystal via the Electric-Field-Dependent Stark Effect	223801
Liang Li, Wei He, Shiqi Liang, Pengfei Lan, and Peixiang Lu	
Dissipative Topological Dynamics in Optical Waveguides: Sensitivity versus Robustness	223802
Zhiyuan Lin, Jian Li, Wange Song, Shanhe Su, Jiacheng Sun, Shengjie Wu, Chunyu Huang, Shining Zhu, and Tao Li	
 Stochastic Dynamics of Incoherent Branched Flows	223803
Josselin Garnier, Antonio Picozzi, and Theo Torres	
Rewritable Binary Recording of the Photon Spin State in Chiral Liquid Crystals	223804
Nicolas Bruni, Charles Loussert, Mushegh Rafayelyan, Tetiana Orlova, Delphine Coursault, and Etienne Brasselet	
Fluctuation Statistics of Nonlinear Optical Microcanonical Systems	223805
Do Hyeok Jeon, Georgios G. Pyrialakos, Mahmoud A. Selim, Abraham M. Berman Bradley, Mercedeh Khajavikhan, and Demetrios N. Christodoulides	
 Chern-Protected Flatband Edge State in Metaphotonics	223806
Jianfeng Chen, Yidong Zheng, Shuihua Yang, Andrea Alù, Zhi-Yuan Li, and Cheng-Wei Qiu	

Physics of Fluids, Earth & Planetary Science, and Climate

Transient Fluted Films behind Falling Water Columns	224001
Abhijit K. Kushwaha, Matthew B. Jones, Jesse Belden, Nathan Speirs, and Tadd T. Truscott	

Condensed Matter and Materials

Anomalous Doppler Effect in Superfluid and Supersolid Atomic Gases	226001
Tomasz Zawiślak, Marija Šindik, Sandro Stringari, and Alessio Recati	
Role of Nematic Fluctuations on Superconductivity in $\text{FeSe}_{0.47}\text{Te}_{0.53}$ Revealed by Nuclear Magnetic Resonance under Pressure	226002
Qing-Ping Ding, Juan Schmidt, Jose A. Moreno, Sergey L. Bud'ko, Paul C. Canfield, and Yuji Furukawa	

(Continued on Preceding Page)

	Postavalanche Relaxation Sheds Light on Twinning Mechanisms	226101
	Haile Gebrehiwet Seyoum, Emil Bronstein, Eilon Faran, and Doron Shilo	
	Non-Markovian Effects in Quantum Rate Calculations of Hydrogen Diffusion with Electronic Friction	226201
	George Trenins and Mariana Rossi	
	Coupled Electron-Phonon Hydrodynamics in Two-Dimensional Semiconductors	226301
	Yujie Quan and Bolin Liao	
	Quantification of Electronic Asymmetry: Chirality and Axiality in Solids	226401
	Tatsuya Miki, Hiroaki Ikeda, Michi-To Suzuki, and Shintaro Hoshino	
	Distinguishing Thermal Fluctuations from Polaron Formation in Halide Perovskites	226402
	Bai-Qing Zhao, Jue-Yi Qi, Xun Xu, Xuan-Yan Chen, Chuan-Nan Li, Jinshan Li, Chris G. Van de Walle, and Xie Zhang	
	Dynamical Freezing in Exactly Solvable Models of Driven Chaotic Quantum Dots	226501
	Haoyu Guo, Rohit Mukherjee, and Debanjan Chowdhury	
	Intrinsic Axion Statistical Topological Insulator	226601
	Xi Chen, Fa-Jie Wang, Zhen Bi, and Zhi-Da Song	
	Exceptional Magic Angles in Non-Hermitian Twisted Bilayer Graphene	226602
	Juan Pablo Esparza and Vladimir Jurić	
	Topological Domain-Wall Pump with $\mathbb{Z}_2$ Spontaneous Symmetry Breaking	226603
	Yoshihito Kuno and Yasuhiro Hatsugai	
	Origin of the Hidden Energy Scale and the f Ratio in Geometrically Frustrated Magnets	226701
	Phillip Popp, Arthur P. Ramirez, and Sergey Syzranov	
	Absence of Altermagnetic Magnon Band Splitting in MnF_2	226702
	V. C. Morano, Z. Maesen, S. E. Nikitin, J. Lass, D. G. Mazzone, and O. Zaharko	
	Multiferroic Collinear Antiferromagnets with Hidden Altermagnetic Spin Splitting	226703
	Jin Matsuda, Hikaru Watanabe, and Ryotaro Arita	
	Tunable Bifurcation of Magnetic Anisotropy and Bi-Oriented Antiferromagnetic Order in Kagome Metal GdTi_3Bi_4	226704
	Jianfeng Guo, Shiyu Zhu, Runnong Zhou, Ruwen Wang, Yunhao Wang, Jianping Sun, Zhen Zhao, Xiaoli Dong, Jinguang Cheng, Haitao Yang, Jiang Xiao, and Hong-Jun Gao	
	Universal Theoretical Elucidation of Electrobending Deformation in Piezoelectrics	226801
	Zhi Tan, Xiang Lv, Laiming Jiang, Xing Huang, Jie Xing, Shaoxiong Xie, Hui Zhang, and Jianguo Zhu	
	Silicon Plasmonics for Enhanced Responsivity of Silicon Photodetectors in Deep-Ultraviolet Region	226901
	Yu-ichiro Tanaka, Atsushi Ono, Wataru Inami, and Yoshimasa Kawata	
	Testing the Tomographic Fermi Liquid Hypothesis with High-Order Cyclotron Resonance	226902
	Ilya Moiseenko, Erwin Mönch, Kirill Kapralov, Denis Bandurin, Sergey Ganichev, and Dmitry Svintsov	
	Theory of the Photonic Joule Effect in Superconducting Circuits	227001
	Samuel Cailleaux, Quentin Ficheux, Nicolas Roch, and Denis M. Basko	
	Statistical Physics; Classical, Nonlinear, and Complex Systems	
	Experimental Realization of an Analog of Entanglement between Two Brownian Particles	227101
	Theerthagiri L. and S. Ciliberto	
	Visitation Dynamics of d -Dimensional Fractional Brownian Motion	227102
	Léo Régnier, Maxim Dolgushev, and Olivier Bénichou	
	Kinetic Energy Diffusivity and Scaling Velocity Correlation Functions	227103
	Jing-Dong Bao and Fabio Marchesoni	
	Polymers, Chemical Physics, Soft Matter, and Biological Physics	
	State-Specific Density Functionals for Excited States via a Density-Driven Correlation Model	228001
	Tim Gould, Stephen G. Dale, Leor Kronik, and Stefano Pittalis	

(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)

Contents (Continued)

	Radiative Stabilization of the Indenyl Cation: Recurrent Fluorescence in a Closed-Shell Polycyclic Aromatic Hydrocarbon	228002
	James N. Bull, Arun Subramani, Chang Liu, Samuel J. P. Marlon, Eleanor K. Ashworth, Henrik Cederquist, Henning Zettergren, and Mark H. Stockett	
	Emergence of Intermediate Range Order in Jammed Packings	228201
	Joseph M. Monti, Ishan Srivastava, Leonardo E. Silbert, A. P. Santos, Joel T. Clemmer, Jeremy B. Lechman, and Gary S. Grest	
	Not-So-Glass-Like Caging and Fluctuations of an Active Matter Model	228301
	Mingyuan Zheng, Dmytro Khomenko, and Patrick Charbonneau	
	Universal Model for Ion Transport: Bridging The Goldman-Hodgkin-Katz Paradigm with Reverse Electrodialysis	228401
	Yoav Green	
	Mechanics of Poking a Cyst	228402
	Shiheng Zhao (赵世恒) and Pierre A. Haas	
 Errata		
	Erratum: Next-to-Next-to-Leading-Order QCD Corrections to Pion Electromagnetic Form Factors [Phys. Rev. Lett. 132 , 201901 (2024)]	229901
	L. B. Chen, W. Chen, F. Feng, and Y. Jia	

 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.