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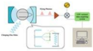
HIGHLIGHTED ARTICLES

EDITORS' SUGGESTION

On-demand shaped-photon emission based on a parametrically modulated qubit

Xiang Li, Sheng-Yong Li, Si-Lu Zhao, Zheng-Yang Mei, Yang He, Cheng-Lin Deng, Yu Liu, Yan-Jun Liu, Gui-Han Liang, Jin-Zhe Wang, Xiao-Hui Song, Kai Xu, Heng Fan, Yu-Xiang Zhang, Zhong-Cheng Xiang, and Dong-Ning Zheng

Phys. Rev. Applied **23**, 024019 (2025) - Published 7 February, 2025



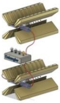
Deterministic emission of shaped microwave photons is important for high-efficiency transmission of quantum information, and thus is crucial for building long-range quantum networks. Current approaches are hindered by the need for complex flux-tunable elements, as well as a small linear range of tunable coupling. This study demonstrates a simple and scalable photon generator that modulates qubit-resonator coupling without extra elements, achieving high-fidelity photon emission with minimal spurious frequency shifts, making it a promising solution for future quantum networks using both single-rail and time-bin encoding.

EDITORS' SUGGESTION

How to integrate a miniature optical cavity in a linear ion trap: Shielding dielectrics and trap symmetry

Ezra Kassa, Shaobo Gao, Soon Teh, Dyon van Dinter, and Hiroki Takahashi

Phys. Rev. Applied **23**, 024038 (2025) - Published 18 February, 2025



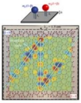
Scaling up qubit numbers remains a major challenge across all quantum computing platforms, including trapped-ion systems. A modular approach seems promising, but hinges on efficient interfaces like miniature optical cavities. Despite decades of effort, a lack of understanding of the relevant challenges has precluded integration. This study identifies key obstacles posed by dielectric optical cavities, and uncovers a critical component that alleviates their negative effects. The findings provide a clear roadmap for improving ion-trap interfacing and suggest that three-dimensional traps are more suitable than planar ones.

EDITORS' SUGGESTION

Interface states in two-dimensional quasicrystals with broken inversion symmetry

Danilo Beli, Matheus I.N. Rosa, Luca Lomazzi, Carlos De Marqui, Jr., and Massimo Ruzzene

Phys. Rev. Applied **23**, 024039 (2025) - Published 18 February, 2025



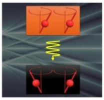
Topological metamaterials exhibit remarkable functionality in robust energy localization and waveguiding. Passive systems mostly use periodic structures with nontrivial topological features in their band structures. While quasicrystals could significantly expand this design space by introducing other symmetry orders, their lack of periodicity adds challenges. This work demonstrates the existence of interface states induced by broken inversion symmetries in two-dimensional quasicrystals: Mass dimerization breaks inversion symmetry in a tenfold-symmetric quasicrystal lattice, producing two fivefold sublattices to create domain-wall interfaces for diffractionless waveguiding.

EDITORS' SUGGESTION

On-demand magnon resonance isolation in cavity magnonics

Amin Pishehvar, Zhaoyou Wang, Yujie Zhu, Yu Jiang, Zixin Yan, Fangxin Li, Josep M. Jornet, Jia-Mian Hu, Liang Jiang, and Xufeng Zhang

Phys. Rev. Applied **23**, 024053 (2025) - Published 20 February, 2025



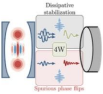
Cavity magnonics is crucial for advancing next-generation signal processing (both classical and quantum), but its uptake has been limited by the challenge of achieving on-demand isolation and control of magnons, due to quasistatic magnon-photon interactions. This study employs Floquet engineering, using time-periodic drives in a multimode hybrid magnonic system to dynamically darken magnon modes, effectively decoupling them from the electromagnetic environment. By tuning the relative phase and amplitudes of the drives, precise control over magnon dynamics is achieved. This approach is also scalable, opening the door to large-scale, programmable hybrid magnonic circuits.

EDITORS' SUGGESTION

Flux-pump-induced degradation of T_1 for dissipative cat qubits

Léon Carde, Pierre Rouchon, Joachim Cohen, and Alexandru Petrescu

Phys. Rev. Applied **23**, 024073 (2025) - Published 28 February, 2025



Engineering nonlinear dissipation through parametric interactions is a key ingredient in autonomous quantum error correction. In "cat" qubits bit-flip errors may be exponentially suppressed using two-photon driven dissipation, but spurious dissipative channels appear, in a process that is poorly understood. The authors turn to high-order perturbation theory and exact numerical diagonalization to classify the possible decay mechanisms that reduce the coherence of such a qubit, bridging the gap between the microscopic parameters of the circuit and the lifetimes of the modes. Furthermore, engineering constraints on the surrounding apparatus are identified, to reduce decoherence.

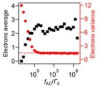
LETTERS

LETTER

Sensing an alternating-current signal beyond the cutoff frequency using a single-electron dynamic random-access memory

Chloe Salhani, Kensaku Chida, Takase Shimizu, Toshiaki Hayashi, and Katsuhiko Nishiguchi

Phys. Rev. Applied **23**, L021001 (2025) - Published 5 February, 2025



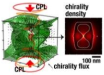
Single-electron devices are critical for quantum computing and precision sensing, but are limited by high resistance and slow operation. This study applies a nonequilibrium-thermodynamics approach to a nanoscale dynamic random-access memory (DRAM) device monitoring a small number of electrons, enabling it to detect high-frequency signals up to six orders of magnitude higher than the DRAM's cutoff frequency. These insights could advance high-sensitivity sensors and electronic systems, as well as offer avenues for designing low-consumption, high-frequency sensors.

LETTER

Nanoscale chirality enhancement using topology-designed three-dimensional dielectric nanogap antennas

Atsushi Taguchi, Yamato Fukui, and Keiji Sasaki

Phys. Rev. Applied **23**, L021002 (2025) - Published 11 February, 2025



Optical chirality enhancement and confinement at the nanoscale are crucial for amplifying chiral light-matter interactions with nanostructures, but challenges remain in designing efficient chiral nanophotonic structures, and in understanding their complex near-field behavior. This work leverages *topology optimization*, a high-degree-of-freedom design technique, to create a dielectric chiral gap antenna with an enhanced chiroptical effect. Here the chirality flux injected by circularly polarized light is squeezed and confined within a subwavelength mode volume through the designed nanogap structure. This approach could promote nanoscale chiral molecular sensing and spectroscopy.

LETTER

Free-space optical-frequency comparison over rapidly moving links

Shawn M.P. McSorley, Benjamin P. Dix-Matthews, Alex M. Frost, Ayden S. McCann, Skevos F.E. Karpathakis, David R. Gozzard, Shane M. Walsh, and Sascha W. Schediwy

Phys. Rev. Applied **23**, L021003 (2025) - Published 18 February, 2025

The comparison of optical clocks from ground to space will provide unprecedented tests of fundamental physics. Such comparison is limited, though, by the relative motion between the clocks. The experiment in this Letter demonstrates a method to compensate for Doppler shifts over a rapidly moving free-space optical drone link, using an electro-optic modulator. The authors demonstrate Doppler-shift compensation up to 18 MHz, providing a path toward ground-to-space optical comparison.

ARTICLES

High-impedance resonators for strong coupling to an electron on helium

G. Koolstra, E.O. Glen, N.R. Beysengulov, H. Byeon, K.E. Castoria, M. Sammon, B. Dizdar, C.S. Wang, D.I. Schuster, S.A. Lyon, J. Pollanen, and D.G. Rees

Phys. Rev. Applied **23**, 024001 (2025) - Published 3 February, 2025

All-optical inference engine based on a shape-optimized multimode optical fiber

Daniel Marima, Barak Hadad, Oded Katz, Avishay Eyal, and Alon Bahabad

Phys. Rev. Applied **23**, 024002 (2025) - Published 3 February, 2025

Broadband magnomechanics enabled by magnon–spoof plasmon hybridization

Yu Jiang, Jing Xu, Zixin Yan, Amin Pishehvar, and Xufeng Zhang

Phys. Rev. Applied **23**, 024003 (2025) - Published 3 February, 2025

Laser discharge in a high-pressure jet of heavy noble gas: Expansion of emitting volume promises an efficient source of EUV light for lithography

I.S. Abramov, S.V. Golubev, E.D. Gospodchikov, A.G. Shalashov, A.A. Perekalov, A.N. Nechay, and N.I. Chkhalo

Phys. Rev. Applied **23**, 024004 (2025) - Published 3 February, 2025

Electronic band structure of GaN diluted and overdiluted with group-V elements

Jakub Ziembicki, Rafał Bartoszewicz, Miłosz Grodzicki, Paweł Scharoch, Robert Kudrawiec, Wojciech Olszewski, Damian Pucicki, Detlef Hommel, and Maciej P. Polak

Phys. Rev. Applied **23**, 024005 (2025) - Published 3 February, 2025

Optically pumped vector magnetometer using a strong bias magnetic field

Thomas Schönau, Theo Scholtes, Florian Wittkämper, Alexander Sekels, Stefan Hiebel, Gregor Oelsner, and Ronny Stolz

Phys. Rev. Applied **23**, 024006 (2025) - Published 4 February, 2025

Finite-key security analysis against the Trojan-horse attack on practical reference-frame-independent measurement-device-

independent quantum key distribution

Yang Zhou, Hua-Jian Ding, Jing-Yang Liu, Chun-Hui Zhang, Xing-Yu Zhou, and Qin Wang

Phys. Rev. Applied **23**, 024007 (2025) - Published 4 February, 2025

Harmonic engineering of antennas with time-periodic substrate permittivity

Dongha Yang, Arkaprovo Das, Sawyer D. Campbell, and Douglas H. Werner

Phys. Rev. Applied **23**, 024008 (2025) - Published 4 February, 2025

Structured solvent on a split electron tail: A semiclassical theory of electrified metal-solution interfaces

Mengke Zhang, Yanxia Chen, Michael Eikerling, and Jun Huang

Phys. Rev. Applied **23**, 024009 (2025) - Published 4 February, 2025

Superoptimal charging of quantum batteries via reservoir engineering: Arbitrary energy transfer unlocked

Borhan Ahmadi, Paweł Mazurek, Shabir Barzanjeh, and Paweł Horodecki

Phys. Rev. Applied **23**, 024010 (2025) - Published 4 February, 2025

Cavity-excited impedance surfaces for full-space beam steering via combination of integral equations and baffles

Minseok Kim

Phys. Rev. Applied **23**, 024011 (2025) - Published 5 February, 2025

Balanced coupling in electromagnetic circuits

Daniel Sank, Mostafa Khezri, Sergei Isakov, and Juan Atalaya

Phys. Rev. Applied **23**, 024012 (2025) - Published 5 February, 2025

Sensitivity and control of a six-axis fused-silica seismometer

Jiri Smetana, Amit Singh Ubhi, Emilia Chick, Leonid Prokhorov, John Bryant, Artemiy Dmitriev, Alex Gill, Lari Koponen, Denis Martynov, Haixing Miao, Alan V. Cumming, Giles Hammond, Valery Frolov, Richard Mittleman, and Peter Fritchel

Phys. Rev. Applied **23**, 024013 (2025) - Published 5 February, 2025

Effect of femtosecond-pulse-injection silicon photonic modulators on the security of quantum key distribution

Xiang Kang, Peng Ye, Shuang Wang, Guo-Wei Zhang, Ze-Hao Wang, Jia-Lin Chen, Zhen-Qiang Yin, De-Yong He, Wei Chen, Guan-Jie Fan-Yuan, Guang-Can Guo, and Zheng-Fu Han

Phys. Rev. Applied **23**, 024014 (2025) - Published 6 February, 2025

Experimental acceleration of the spin transition in a nitrogen-vacancy center

Si-Qi Chen and He Lu

Phys. Rev. Applied **23**, 024015 (2025) - Published 6 February, 2025

Utilizing focused field as a probe for shape determination of subwavelength structures via coherent Fourier scatterometry

Anubhav Paul, Robin Wever, Sarika Soman, and Silvania F. Pereira

Phys. Rev. Applied **23**, 024016 (2025) - Published 6 February, 2025

Why superconducting Ta qubits have fewer tunneling two-level systems at the vacuum-oxide interface than Nb qubits

Zhe Wang, Clare C. Yu, and Ruqian Wu

Phys. Rev. Applied **23**, 024017 (2025) - Published 6 February, 2025

Quantitative noncontact measurement of thermal Hall angle and transverse thermal conductivity by lock-in thermography

Takumi Imamura, Takamasa Hirai, Koichi Oyanagi, Ryo Iguchi, Kenta Takamori, Satoru Kobayashi, and Ken-ichi Uchida

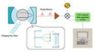
Phys. Rev. Applied **23**, 024018 (2025) - Published 6 February, 2025

EDITORS' SUGGESTION

On-demand shaped-photon emission based on a parametrically modulated qubit

Xiang Li, Sheng-Yong Li, Si-Lu Zhao, Zheng-Yang Mei, Yang He, Cheng-Lin Deng, Yu Liu, Yan-Jun Liu, Gui-Han Liang, Jin-Zhe Wang, Xiao-Hui Song, Kai Xu, Heng Fan, Yu-Xiang Zhang, Zhong-Cheng Xiang, and Dong-Ning Zheng

Phys. Rev. Applied **23**, 024019 (2025) - Published 7 February, 2025



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Flashing-ratchet effect on directional photocurrent in organic devices

Han Li, Teng Gao, and Shijie Xie

Phys. Rev. Applied **23**, 024020 (2025) - Published 10 February, 2025

Strong-interaction dynamics of nanosecond-laser-induced millimeter-size cavitation bubbles in water

Zhi Yang, Hengzhu Bao, Lou Gao, Kaining Ying, Hailong Zhang, Qiuyu Li, Hongchao Zhang, and Jian Lu

Phys. Rev. Applied **23**, 024021 (2025) - Published 10 February, 2025

Generation of acoustic vortices in arbitrary space via asymmetric orbital-angular-momentum transition

Xiao Li, Daxing Dong, Kun Zhang, Changdong Chen, Youwen Liu, Yadong Xu, and Yangyang Fu

Phys. Rev. Applied **23**, 024022 (2025) - Published 10 February, 2025

Flat band structure in chiral magnonic crystals with tunable indirect band gaps

Fei Wei, Yang Zhou, Wenjun Zhang, Zhixiang Ren, Gengtao Chen, Hui Li, Guangbing Han, Shishen Yan, and Shishou Kang

Phys. Rev. Applied **23**, 024023 (2025) - Published 10 February, 2025

Multiple corner states and particle trapping in higher-order topological waterborne acoustic crystals

Jialuo Liang, Han Liu, Riyi Zheng, Junpeng Wu, Jiuyang Lu, Weiyin Deng, Manzhu Ke, Xueqin Huang, and Zhengyou Liu

Phys. Rev. Applied **23**, 024024 (2025) - Published 10 February, 2025

Conducting metallic metameshes with perfect electromagnetic transparency for arbitrary polarization and angle of incidence

Hao Luo, Jie Luo, HongChen Chu, WenJie Ji, and Yun Lai

Phys. Rev. Applied **23**, 024025 (2025) - Published 10 February, 2025

Quantum simulation in hybrid transmission lines

Alessandro Ferreri and Frank K. Wilhelm

Phys. Rev. Applied **23**, 024026 (2025) - Published 10 February, 2025

Critical behavior and large magnetocaloric properties in a van der Waals ferromagnet $\mathrm{Cr}\,\mathrm{Br}_3$

Zhongchong Lin, Liqiang Zeng, Shaohua Fan, Luozhao Zhang, Yue Chen, Jinbo Yang, and Zhigao Huang

Phys. Rev. Applied **23**, 024027 (2025) - Published 11 February, 2025

Topological adiabatic metatapering and beam shaping in solid-state phononic metamaterials

Hua-Yang Chen, Jiang-Po Zheng, Bo-Yu Li, Zhen-Hui Qin, Sheng-Nan Liang, Jian-Lan Xie, Xue-Jun Yan, Si-Yuan Yu, Cheng He, Ming-Hui Lu, and Yan-Feng Chen

Phys. Rev. Applied **23**, 024028 (2025) - Published 11 February, 2025

Optically and remotely controlling localization of exciton-polariton condensates in a potential lattice

Qiang Ai, Jan Wingenbach, Xinmiao Yang, Jing Wei, Zaharias Hatzopoulos, Pavlos G. Savvidis, Stefan Schumacher, Xuekai Ma, and Tingge Gao

Phys. Rev. Applied **23**, 024029 (2025) - Published 12 February, 2025

Hyperentangled-state generation in nanophotonic periodically poled lithium niobate waveguides

Yanghe Chen, Bo Ji, Tengfei Wu, and Guangqiang He

Phys. Rev. Applied **23**, 024030 (2025) - Published 12 February, 2025

High-energy-density acoustofluidic device using a double-parabolic ultrasonic transducer

Enrico Corato, Ola Jakobsson, Wei Qiu, Takeshi Morita, and Per Augustsson

Phys. Rev. Applied **23**, 024031 (2025) - Published 12 February, 2025

Z_3-classified topological phases in plasmonic nanoparticle arrays

Huizhou Wu, Guochao Wei, Zhenzhen Liu, and Jun-Jun Xiao

Phys. Rev. Applied **23**, 024032 (2025) - Published 13 February, 2025

Error-mitigated geometric quantum control over an oscillator

Ming-Jie Liang, Tao Chen, and Zheng-Yuan Xue

Phys. Rev. Applied **23**, 024033 (2025) - Published 13 February, 2025

Chiral chaos–enhanced sensing

Yun-Qiu Ge, Zhe Wang, Qian-Chuan Zhao, Jing Zhang, and Yu-xi Liu

Phys. Rev. Applied **23**, 024034 (2025) - Published 13 February, 2025

Quantum sensing in the fractional Fourier domain

Swastik Hegde, David J. Durden, Lakshmy Priya Ajayakumar, Rishi Sivakumar, and Mikael P. Backlund

Phys. Rev. Applied **23**, 024035 (2025) - Published 14 February, 2025

Parametrization and optimizability of pulse-level variational quantum eigensolvers

Kyle M. Sherbert, Hisham Amer, Sophia E. Economou, Edwin Barnes, and Nicholas J. Mayhall

Phys. Rev. Applied **23**, 024036 (2025) - Published 14 February, 2025

Optical constants and critical-point transitions in biaxially tensile-strained epitaxial thin films of germanium

Rutwik Joshi, Nina Hong, Neha Singh, Muntasir Mahdi, and Mantu K. Hudait

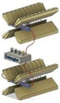
Phys. Rev. Applied **23**, 024037 (2025) - Published 14 February, 2025

EDITORS' SUGGESTION

How to integrate a miniature optical cavity in a linear ion trap: Shielding dielectrics and trap symmetry

Ezra Kassa, Shaobo Gao, Soon Teh, Dyon van Dinter, and Hiroki Takahashi

Phys. Rev. Applied **23**, 024038 (2025) - Published 18 February, 2025



Scaling up qubit numbers remains a major challenge across all quantum computing platforms, including trapped-ion systems. A modular approach seems promising, but hinges on efficient interfaces like miniature optical cavities. Despite decades of effort, a lack of understanding of the relevant challenges has precluded integration. This study identifies key obstacles posed by dielectric optical cavities, and uncovers a critical component that alleviates their negative effects. The findings provide a clear roadmap for improving ion-trap interfacing and suggest that three-dimensional traps are more suitable than planar ones.

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Interface states in two-dimensional quasicrystals with broken inversion symmetry

Danilo Beli, Matheus I.N. Rosa, Luca Lomazzi, Carlos De Marqui, Jr., and Massimo Ruzzene

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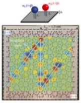

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Laser emission induced by time-modulated impedance surfaces

Liangshu He, Yabin Jin, Yongdong Pan, Yanxun Xiang, Fu-zhen Xuan, and Dani Torrent

Phys. Rev. Applied **23**, 024040 (2025) - Published 18 February, 2025

Ferroelectric control of spin-channel polarity in two-dimensional $\mathrm{Sc_2CO_2/VSi_2P_4}$ van der Waals multiferroic heterostructures and application to nonvolatile logic-in-memory devices

Zhi Yang, Xin-Yu Fu, Shen-Ao Qin, Bing-Xin Liu, Chuan-Kui Wang, Zong-Liang Li, and Shuai Qiu

Phys. Rev. Applied **23**, 024041 (2025) - Published 18 February, 2025

Magnetoresistive reading of perpendicular magnetization in ferrimagnetic insulators enhanced through proximity coupling

Weronika Janus, Weibin Li, Manuel Valvidares, and Can Onur Avci

Phys. Rev. Applied **23**, 024042 (2025) - Published 18 February, 2025

Configurable thermoacoustic streaming by laser-induced temperature gradients

Franziska Martens, Wei Qiu, Ola Jakobsson, Christian Cierpka, Andreas Ehn, and Per Augustsson

Phys. Rev. Applied **23**, 024043 (2025) - Published 18 February, 2025

Transformer-based inverse-design model for optimal multilayer microperforated panels

Jiaji Chen, Huiling Duan, and Guoliang Huang

Phys. Rev. Applied **23**, 024044 (2025) - Published 19 February, 2025

Stand-alone mobile quantum memory system

Martin Jutisz, Alexander Erl, Janik Wolters, Mustafa Gündoğan, and Markus Krutzik

Phys. Rev. Applied **23**, 024045 (2025) - Published 19 February, 2025

Backscattering-immune Floquet conversion in ring modulators

Awanish Pandey and Alex Krasnok

Phys. Rev. Applied **23**, 024046 (2025) - Published 19 February, 2025

Generation of 100-TW half-cycle zeptosecond x-ray pulses in the cascaded regime

Chengkai Li, Yunliang Wang, Ze Chen, Youyou Kang, Meiqi Sun, Lipan Qin, Bengt Eliasson, and Xueqing Yan

Phys. Rev. Applied **23**, 024047 (2025) - Published 19 February, 2025

Ultrafast switchable spin-orbit coupling for silicon spin qubits via spin valves

Ranran Cai, Fang-Ge Li, Bao-Chuan Wang, Hai-Ou Li, Gang Cao, and Guo-Ping Guo

Phys. Rev. Applied **23**, 024048 (2025) - Published 20 February, 2025

Quantum frequency conversion of photons with microsecond duration from the visible to the telecommunication C band

Sören Wengerowsky, Stefano Duranti, Lukas Heller, and Hugues de Riedmatten

Phys. Rev. Applied **23**, 024049 (2025) - Published 20 February, 2025

High-spatiotemporal-resolution chip analysis using a fiber-coupled quantum sensor based on diamond $\mathrm{N}\text{-}V$ centers

Youwei Liu, Fazhan Zhao, Jing Li, Zhenfeng Li, Lei Wang, and Bo Li

Phys. Rev. Applied **23**, 024050 (2025) - Published 20 February, 2025

Synaptic and neuronal functionalities on a single oxide film via interface engineering

Carl Willem Rischau, Pau Torruella, Chih-Ying Hsu, Stefano Gariglio, Duncan T. L. Alexander, Jean-Marc Triscone, and Javier del Valle

Phys. Rev. Applied **23**, 024051 (2025) - Published 20 February, 2025

Perforation of thin-membrane-covered soft matter induced by cavitation-initiated extreme mechanics

Yuzhe Fan and Claus-Dieter Ohl

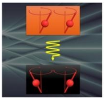
Phys. Rev. Applied **23**, 024052 (2025) - Published 20 February, 2025

EDITORS' SUGGESTION

On-demand magnon resonance isolation in cavity magnonics

Amin Pishehvar, Zhaoyou Wang, Yujie Zhu, Yu Jiang, Zixin Yan, Fangxin Li, Josep M. Jornet, Jia-Mian Hu, Liang Jiang, and Xufeng Zhang

Phys. Rev. Applied **23**, 024053 (2025) - Published 20 February, 2025



Cavity magnonics is crucial for advancing next-generation signal processing (both classical and quantum), but its uptake has been limited by the challenge of achieving on-demand isolation and control of magnons, due to quasistatic magnon-photon interactions. This study employs Floquet engineering, using time-periodic drives in a multimode hybrid magnonic system to dynamically darken magnon modes, effectively decoupling them from the electromagnetic environment. By tuning the relative phase and amplitudes of the drives, precise control over magnon dynamics is achieved. This approach is also scalable, opening the door to large-scale, programmable hybrid magnonic circuits.

Low-phase-noise surface-acoustic-wave oscillator using an edge mode of a phononic band gap

Zichen Xi, Joseph G. Thomas, Jun Ji, Dongyao Wang, Zengyu Cen, Ivan I. Kravchenko, Bernadeta R. Srijanto, Yu Yao, Yizheng Zhu, and Linbo Shao

Phys. Rev. Applied **23**, 024054 (2025) - Published 20 February, 2025

System characterization of dispersive readout in superconducting qubits

Daniel Sank, Alex Opremcak, Andreas Bengtsson, Mostafa Khezri, Jimmy Chen, Ofer Naaman, and Alexander Korotkov

Phys. Rev. Applied **23**, 024055 (2025) - Published 21 February, 2025

Sorting light’s radial momentum and orbital angular momentum with a parabolalike lens

Yuan Li, Ye Xing, Wuhong Zhang, and Lixiang Chen

Phys. Rev. Applied **23**, 024056 (2025) - Published 21 February, 2025

Strain engineering in $\mathrm{Ge}/\mathrm{Ge-Si}$ spin-qubit heterostructures

Lorenzo Mauro, Esteban A. Rodríguez-Mena, Biel Martinez, and Yann-Michel Niquet

Phys. Rev. Applied **23**, 024057 (2025) - Published 21 February, 2025

Sharp electromagnetically induced absorption via balanced interferometric excitation in a microwave resonator

Michael T. Hatzon, Graeme R. Flower, Maxim Goryachev, Jeremy F. Bourhill, and Michael E. Tobar

Phys. Rev. Applied **23**, 024058 (2025) - Published 21 February, 2025

High-precision pulse calibration of tunable couplers for high-fidelity two-qubit gates in superconducting quantum processors

Tian-Ming Li *et al.*

Phys. Rev. Applied **23**, 024059 (2025) - Published 21 February, 2025

Multivalley optical switching in germanium

Junjun Jia, Hossam A. Almossalami, Hui Ye, Naoomi Yamada, and Takashi Yagi

Phys. Rev. Applied **23**, 024060 (2025) - Published 24 February, 2025

Backscattering-immune optomechanical entanglement in a whispering-gallery-mode resonator

Bo Zhao, Mei-Rong Wei, and Qi Guo

Phys. Rev. Applied **23**, 024061 (2025) - Published 24 February, 2025

Nonreciprocity of supercurrent along an applied magnetic field

Filippo Gaggioli, Yasen Hou, Jagadeesh S. Moodera, and Akashdeep Kamra

Phys. Rev. Applied **23**, 024062 (2025) - Published 24 February, 2025

Near-quantum-limited subgigahertz TiN kinetic inductance traveling-wave parametric amplifier operating in a frequency-translating mode

Farzad Faramarzi, Sasha Sypkens, Ryan Stephenson, Byeong H. Eom, Henry LeDuc, Saptarshi Chaudhuri, and Peter Day

Phys. Rev. Applied **23**, 024063 (2025) - Published 25 February, 2025

Two-dimensional Planck spectroscopy for microwave photon calibration

S. Gandorfer, M. Renger, W.K. Yam, F. Fesquet, A. Marx, R. Gross, and K.G. Fedorov

Phys. Rev. Applied **23**, 024064 (2025) - Published 25 February, 2025

Diverse set of two-qubit gates for spin qubits in semiconductor quantum dots

Ming Ni, Rong-Long Ma, Zhen-Zhen Kong, Ning Chu, Sheng-Kai Zhu, Chu Wang, Ao-Ran Li, Wei-Zhu Liao, Gang Cao, Gui-Lei Wang, Guang-Can Guo, Xuedong Hu, Hai-Ou Li, and Guo-Ping Guo

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Breaking Rayleigh’s curse for two unbalanced single-photon emitters: Beam modulation and examination of shot statistics

Konstantin Katamadze, Boris Bantysh, Andrey Chernyavskiy, Yurii Bogdanov, and Sergei Kulik

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Cross-resonance control of an oscillator with an auxiliary fluxonium qubit

Guo Zheng, Simon Lieu, Emma L. Rosenfeld, Kyungjoo Noh, and Connor T. Hann

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Interferometric Purcell suppression of spontaneous emission in a superconducting qubit

Alec Yen, Yufeng Ye, Kaidong Peng, Jennifer Wang, Gregory Cunningham, Michael Gingras, Bethany M. Niedzielski, Hannah Stickler, Kyle Serniak, Mollie E. Schwartz, and Kevin P. O’Brien

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Achieving quantum-limited optical resolution with degenerate spatial modes

Xiao-Jie Tan

Phys. Rev. Applied **23**, 024069 (2025) - Published 27 February, 2025

Slepian eigenvalues for near-field communication

Stephen C. Creagh and Gabriele Gradoni

Phys. Rev. Applied **23**, 024070 (2025) - Published 27 February, 2025

Colloidal quantum-dot vertical-cavity surface-emitting laser based on gain-integrated distributed Bragg reflector

Yangzhi Tan, Luwei Zhou, Zhongqi Wang, Guohong Xiang, Dan Wu, Hoi Wai Choi, and Kai Wang

Phys. Rev. Applied **23**, 024071 (2025) - Published 28 February, 2025

Individual-atom control in an array through phase modulation

Guoqing Wang (王国庆), Wenchao Xu, Changhao Li, Vladan Vuletić, and Paola Cappellaro

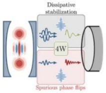
Phys. Rev. Applied **23**, 024072 (2025) - Published 28 February, 2025

EDITORS' SUGGESTION

Flux-pump-induced degradation of T_1 for dissipative cat qubits

Léon Carde, Pierre Rouchon, Joachim Cohen, and Alexandru Petrescu

Phys. Rev. Applied **23**, 024073 (2025) - Published 28 February, 2025



Engineering nonlinear dissipation through parametric interactions is a key ingredient in autonomous quantum error correction. In “cat” qubits bit-flip errors may be exponentially suppressed using two-photon driven dissipation, but spurious dissipative channels appear, in a process that is poorly understood. The authors turn to high-order perturbation theory and exact numerical diagonalization to classify the possible decay mechanisms that reduce the coherence of such a qubit, bridging the gap between the microscopic parameters of the circuit and the lifetimes of the modes. Furthermore, engineering constraints on the surrounding apparatus are identified, to reduce decoherence.

Transversal cnot gate with multicycle error correction

Younghun Kim, Martin Sevior, and Muhammad Usman

Phys. Rev. Applied **23**, 024074 (2025) - Published 28 February, 2025

Superresolution ultrasonic focusing through a modified Fresnel-spiral lens

Jia-Jia Feng, Bu-Chen Ping, Jie Yao, Xin-Rui Li, Xing-Feng Zhu, and Da-Jian Wu

Phys. Rev. Applied **23**, 024075 (2025) - Published 28 February, 2025

Role of surfactants in droplet formation in piezoacoustic inkjet printing across microsecond-to-second timescales

Maaike Rump, Christian Diddens, Uddalok Sen, Michel Versluis, Detlef Lohse, and Tim Segers

Phys. Rev. Applied **23**, 024076 (2025) - Published 28 February, 2025

ERRATA

Erratum: Entanglement source and quantum memory analysis for zero-added-loss multiplexing [Phys. Rev. Applied **22**, 044014 (2024)]

Jeffrey H. Shapiro, Michael G. Raymer, Clark Embleton, Franco N. C. Wong, and Brian J. Smith

Phys. Rev. Applied **23**, 029901 (2025) - Published 27 February, 2025

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