

HIGHLIGHTED ARTICLES

Editors' Suggestion

Enhanced performance of joint cooling and energy production

O. Entin-Wohlman, Y. Imry, and A. Aharony

Phys. Rev. B **91**, 054302 (2015) – Published 3 February 2015

A three-terminal thermoelectric junction is studied theoretically and a counterintuitive result is obtained. The cooling efficiency is increased for configurations when not only one terminal is cooled but also electric power is generated.

Editors' Suggestion

Very large magnetoresistance in $\text{Fe}_{0.28}\text{TaS}_2$ single crystals

Will J. Hardy, Chih-Wei Chen, A. Marcinkova, Heng Ji, Jairo Sinova, D. Natelson, and E. Morosan

Phys. Rev. B **91**, 054426 (2015) – Published 26 February 2015

There is great interest in understanding the physics of magnetic ordering and electronic transport in materials of reduced dimensionality with strong spin-orbit coupling. This paper presents magnetotransport measurements of $\text{Fe}_{0.28}\text{TaS}_2$ single crystals, which are found to exhibit very large magnetoresistance (MR) for magnetic fields along the easy axis. The authors believe that such a large MR arises from spin disorder scattering and propose to use this mechanism as a design principle for materials with large MR. Further tests are needed to fully rule out contributions from a more conventional anisotropic MR mechanism.

ARTICLES

Structure, structural phase transitions, mechanical properties, defects

Dynamic and structural stability of cubic vanadium nitride

A. B. Mei, O. Hellman, N. Wireklint, C. M. Schlepütz, D. G. Sangiovanni, B. Alling, A. Rockett, L. Hultman, I. Petrov, and J. E. Greene

Phys. Rev. B **91**, 054101 (2015) – Published 2 February 2015

Identification and mechanical control of ferroelastic domain structure in rhombohedral $\text{CaMn}_7\text{O}_{12}$

Renliang Yuan, Lian Duan, Xinyu Du, and Yuan Li

Phys. Rev. B **91**, 054102 (2015) – Published 3 February 2015

Low-energy behavior of strongly interacting bosons on a flat-band lattice above the critical filling factor

L. G. Phillips, G. De Chiara, P. Öhberg, and M. Valiente

Phys. Rev. B **91**, 054103 (2015) – Published 3 February 2015

Velocity of domain-wall motion during polarization reversal in ferroelectric thin films: Beyond Merz's Law

Qingping Meng, Myung-Geun Han, Jing Tao, Guangyong Xu, David O. Welch, and Yimei Zhu

Phys. Rev. B **91**, 054104 (2015) – Published 9 February 2015

Predicting low-thermal-conductivity Si-Ge nanowires with a modified cluster expansion method

Jesper Kristensen and Nicholas J. Zabarar

Phys. Rev. B **91**, 054105 (2015) – Published 12 February 2015

Plastic strain is a mixture of avalanches and quasireversible deformations: Study of various sizes

Péter Szabó, Péter Dusán Ispánovity, and István Groma

Phys. Rev. B **91**, 054106 (2015) – Published 13 February 2015

Phase stability and transition of BaSi₂-type disilicides and digermanides

Jian-Tao Wang, Changfeng Chen, and Yoshiyuki Kawazoe

Phys. Rev. B **91**, 054107 (2015) – Published 17 February 2015

Slow relaxation of cascade-induced defects in Fe

Laurent Karim Béland, Yuri N. Osetsky, Roger E. Stoller, and Haixuan Xu

Phys. Rev. B **91**, 054108 (2015) – Published 17 February 2015

Reduced tight-binding models for elemental Si and N, and ordered binary Si-N systems

J. Gehrmann, D. G. Pettifor, A. N. Kolmogorov, M. Reese, M. Mrovec, C. Elsässer, and R. Drautz

Phys. Rev. B **91**, 054109 (2015) – Published 19 February 2015

Anomalous temperature-induced volume contraction in GeTe

Tapan Chatterji, C. M. N. Kumar, and Urszula D. Wdowik

Phys. Rev. B **91**, 054110 (2015) – Published 25 February 2015

Measurement of the acoustic-to-optical phonon coupling in multicomponent systems

Antonio Caretta, Michiel C. Donker, Diederik W. Perdok, Davood Abbaszadeh, Alexey O. Polyakov, Remco W. A. Havenith, Thomas T. M. Palstra, and Paul H. M. van Loosdrecht

Phys. Rev. B **91**, 054111 (2015) – Published 25 February 2015

Structural and electronic properties of sodium clusters under confinement

Balasaheb J. Nagare, Dilip G. Kanhere, and Sajeev Chacko

Phys. Rev. B **91**, 054112 (2015) – Published 26 February 2015

Thermal and nonthermal melting of silicon under femtosecond x-ray irradiation

Nikita Medvedev, Zheng Li, and Beata Ziaja

Phys. Rev. B **91**, 054113 (2015) – Published 26 February 2015

Inhomogeneous, disordered, and partially ordered systems

Nonlinear XY and p-clock models on sparse random graphs: Mode-locking transition of localized waves

Alessia Marruzzo and Luca Leuzzi

Phys. Rev. B **91**, 054201 (2015) – Published 17 February 2015

Dynamics, dynamical systems, lattice effects

Nitrogen vacancy, self-interstitial diffusion, and Frenkel-pair formation/dissociation in B1 TiN studied by *ab initio* and classical molecular dynamics with optimized potentials

D. G. Sangiovanni, B. Alling, P. Steneteg, L. Hultman, and I. A. Abrikosov

Phys. Rev. B **91**, 054301 (2015) – Published 2 February 2015

Editors' Suggestion

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A three-terminal thermoelectric junction is studied theoretically and a counterintuitive result is obtained. The cooling efficiency is increased for configurations when not only one terminal is cooled but also electric power is generated.

Chimeras in SQUID metamaterials

N. Lazarides, G. Neofotistos, and G. P. Tsironis

Phys. Rev. B **91**, 054303 (2015) – Published 3 February 2015

First-principles calculations of phonon frequencies, lifetimes, and spectral functions from weak to strong anharmonicity: The example of palladium hydrides

Lorenzo Paulatto, Ion Errea, Matteo Calandra, and Francesco Mauri

Phys. Rev. B **91**, 054304 (2015) – Published 19 February 2015

Model for thermal conductivity in nanoporous silicon from atomistic simulations

Riccardo Dettori, Claudio Melis, Xavier Cartoixà, Riccardo Rurali, and Luciano Colombo

Phys. Rev. B **91**, 054305 (2015) – Published 23 February 2015

Dynamic trapping near a quantum critical point

Michael Kolodrubetz, Emanuel Katz, and Anatoli Polkovnikov

Phys. Rev. B **91**, 054306 (2015) – Published 26 February 2015

Magnetism

Density-matrix renormalization group study of the extended Kitaev-Heisenberg model

Kazuya Shinjo, Shigetoshi Sota, and Takami Tohyama

Phys. Rev. B **91**, 054401 (2015) – Published 4 February 2015

Nonmagnetic ions enhance magnetic order in the ludwigite $\text{Co}_5\text{Sn}(\text{O}_2\text{BO}_3)_2$

Cynthia P. Contreras Medrano, D. C. Freitas, D. R. Sanchez, C. B. Pinheiro, G. G. Eslava, L. Ghivelder, and M. A. Continentino

Phys. Rev. B **91**, 054402 (2015) – Published 4 February 2015

Phonon–spin scattering and magnetic heat transport in the quasi-one-dimensional spin-1 antiferromagnetic chain compound CuSb_2O_6

N. Prasai, A. Rebello, A. B. Christian, J. J. Neumeier, and J. L. Cohn

Phys. Rev. B **91**, 054403 (2015) – Published 11 February 2015

Third-order effect in magnetic small-angle neutron scattering by a spatially inhomogeneous medium

Konstantin L. Metlov and Andreas Michels

Phys. Rev. B **91**, 054404 (2015) – Published 11 February 2015

Spin dynamics of the anisotropic spin-1 antiferromagnetic chain at finite magnetic fields

Yousef Rahnavard and Wolfram Brenig

Phys. Rev. B **91**, 054405 (2015) – Published 12 February 2015

Bosonic short-range entangled states beyond group cohomology classification

Cenke Xu and Yi-Zhuang You

Phys. Rev. B **91**, 054406 (2015) – Published 12 February 2015

Head-to-head domain wall structures in wide permalloy strips

Virginia Estévez and Lasse Laurson

Phys. Rev. B **91**, 054407 (2015) – Published 12 February 2015

Random dilution effects in the frustrated spin chain β -CaCr_{2-x}Sc_xO₄

M. Songvilay, S. Petit, V. Hardy, J. P. Castellan, G. André, C. Martin, and F. Damay

Phys. Rev. B **91**, 054408 (2015) – Published 17 February 2015

Quasi-two-dimensional S=12 magnetism of Cu[C₆H₂(COO)₄][C₂H₅NH₃]₂

R. Nath, M. Padmanabhan, S. Baby, A. Thirumurugan, D. Ehlers, M. Hemmida, H.-A. Krug von Nidda, and A. A. Tsirlin

Phys. Rev. B **91**, 054409 (2015) – Published 17 February 2015

Capturing of a magnetic skyrmion with a hole

Jan Müller and Achim Rosch

Phys. Rev. B **91**, 054410 (2015) – Published 17 February 2015

Variation of skyrmion forms and their stability in MnSi thin plates

Xiuzhen Yu, Akiko Kikkawa, Daisuke Morikawa, Kiyou Shibata, Yusuke Tokunaga, Yasujiro Taguchi, and Yoshinori Tokura

Phys. Rev. B **91**, 054411 (2015) – Published 17 February 2015

Novel magnetic state in d₄ Mott insulators

O. Nganba Meetei, William S. Cole, Mohit Randeria, and Nandini Trivedi

Phys. Rev. B **91**, 054412 (2015) – Published 19 February 2015

Marshall-positive SU(N) quantum spin systems and classical loop models: A practical strategy to design sign-problem-free spin Hamiltonians

Ribhu K. Kaul

Phys. Rev. B **91**, 054413 (2015) – Published 19 February 2015

Magnetic field induced switching of the antiferromagnetic order parameter in thin films of magnetoelectric chromia

Lorenzo Fallarino, Andreas Berger, and Christian Binek

Phys. Rev. B **91**, 054414 (2015) – Published 19 February 2015

Diffuse magnetic neutron scattering in the highly frustrated double perovskite Ba₂YRuO₆

Gøran. J. Nilsen, Corey M. Thompson, Georg Ehlers, Casey A. Marjerrison, and John E. Greedan

Phys. Rev. B **91**, 054415 (2015) – Published 23 February 2015

Irreversible transformation of ferromagnetic ordered stripe domains in single-shot infrared-pump/resonant-x-ray-scattering-probe experiments

Nicolas Bergeard, Stefan Schaffert, Víctor López-Flores, Nicolas Jaouen, Jan Geilhufe, Christian M. Günther, Michael Schneider, Catherine Graves, Tianhan Wang, Benny Wu, Andreas Scherz, Cédric Baumier, Renaud Delaunay, Franck Fortuna, Marina Tortarolo, Bharati Tudu, Oleg Krupin, Michael P. Minitti, Joe Robinson, William F. Schlotter, Joshua J. Turner, Jan Lüning, Stefan Eisebitt, and Christine Boeglin

Phys. Rev. B **91**, 054416 (2015) – Published 23 February 2015

Large magnetochromism in multiferroic MnWO₄

S. Toyoda, N. Abe, T. Arima, and S. Kimura

Phys. Rev. B **91**, 054417 (2015) – Published 23 February 2015

Enhanced ferrimagnetism in auxetic NiFe₂O₄ in the crossover to the ultrathin-film limit

Michael Hoppe, Sven Döring, Mihaela Gorgoi, Stefan Cramm, and Martina Müller

Phys. Rev. B **91**, 054418 (2015) – Published 24 February 2015

Simultaneous enhancements of polarization and magnetization in epitaxial Pb(Zr_{0.52}Ti_{0.48})O₃/La_{0.7}Sr_{0.3}MnO₃ multiferroic heterostructures enabled by ultrathin CoFe₂O₄sandwich layers

Devajyoti Mukherjee, Mahesh Hordagoda, Paula Lampen, Manh-Huong Phan, Hariharan Srikanth, Sarath Witanachchi, and Pritish Mukherjee

Phys. Rev. B **91**, 054419 (2015) – Published 24 February 2015

Constrained density functional for noncollinear magnetism

Pui-Wai Ma and S. L. Dudarev

Phys. Rev. B **91**, 054420 (2015) – Published 24 February 2015

Synthesis and magnetic properties of double-perovskite oxide La₂MnFeO₆ thin films

K. Yoshimatsu, K. Nogami, K. Watarai, K. Horiba, H. Kumigashira, O. Sakata, T. Oshima, and A. Ohtomo

Phys. Rev. B **91**, 054421 (2015) – Published 25 February 2015

Axial current driven by magnetization dynamics in Dirac semimetals

Katsuhisa Taguchi and Yukio Tanaka

Phys. Rev. B **91**, 054422 (2015) – Published 25 February 2015

Spin freezing in the spin-liquid compound FeAl_2O_4

Harikrishnan S. Nair, Ramesh Kumar K., and André M. Strydom

Phys. Rev. B **91**, 054423 (2015) – Published 26 February 2015

Disorder from order among anisotropic next-nearest-neighbor Ising spin chains in SrHo_2O_4

J.-J. Wen, W. Tian, V. O. Garlea, S. M. Koohpayeh, T. M. McQueen, H.-F. Li, J.-Q. Yan, J. A. Rodriguez-Rivera, D. Vaknin, and C. L. Broholm

Phys. Rev. B **91**, 054424 (2015) – Published 26 February 2015

Energy dissipation in single-domain ferromagnetic nanoparticles: Dynamical approach

T. V. Lyutyy, S. I. Denisov, A. Yu. Peletskyi, and C. Binns

Phys. Rev. B **91**, 054425 (2015) – Published 26 February 2015

Editors' Suggestion

Very large magnetoresistance in $\text{Fe}_{0.28}\text{TaS}_2$ single crystals

Will J. Hardy, Chih-Wei Chen, A. Marcinkova, Heng Ji, Jairo Sinova, D. Natelson, and E. Morosan

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There is great interest in understanding the physics of magnetic ordering and electronic transport in materials of reduced dimensionality with strong spin-orbit coupling. This paper presents magnetotransport measurements of $\text{Fe}_{0.28}\text{TaS}_2$ single crystals, which are found to exhibit very large magnetoresistance (MR) for magnetic fields along the easy axis. The authors believe that such a large MR arises from spin disorder scattering and propose to use this mechanism as a design principle for materials with large MR. Further tests are needed to fully rule out contributions from a more conventional anisotropic MR mechanism.

Superfluidity and superconductivity

Pair breaking due to orbital magnetism in iron-based superconductors

M. Hoyer, M. S. Scheurer, S. V. Syzranov, and J. Schmalian

Phys. Rev. B **91**, 054501 (2015) – Published 2 February 2015

Emergent loop current order from pair density wave superconductivity

D. F. Agterberg, Drew S. Melchert, and M. K. Kashyap

Phys. Rev. B **91**, 054502 (2015) – Published 2 February 2015

Superfluidity of strongly correlated bosons in two- and three-dimensional traps

T. Dornheim, A. Filinov, and M. Bonitz

Phys. Rev. B **91**, 054503 (2015) – Published 3 February 2015

Chiral superconductivity in nematic states

Shuhei Takamatsu and Youichi Yanase

Phys. Rev. B **91**, 054504 (2015) – Published 5 February 2015

Measurement of the penetration depth and coherence length of MgB₂ in all directions using transmission electron microscopy

J. C. Loudon, S. Yazdi, T. Kasama, N. D. Zhigadlo, and J. Karpinski

Phys. Rev. B **91**, 054505 (2015) – Published 5 February 2015

Disordered graphene Josephson junctions

W. A. Muñoz, L. Covaci, and F. M. Peeters

Surface Majorana fermions and bulk collective modes in superfluid He₃-B

YeJe Park, Suk Bum Chung, and Joseph Maciejko

Phys. Rev. B **91**, 054507 (2015) – Published 6 February 2015

Superconductivity in intercalated group-IV honeycomb structures

José A. Flores-Livas and Antonio Sanna

Phys. Rev. B **91**, 054508 (2015) – Published 9 February 2015

Pairing effects in the normal phase of a two-dimensional Fermi gas

F. Marsiglio, P. Pieri, A. Perali, F. Palestini, and G. C. Strinati

Phys. Rev. B **91**, 054509 (2015) – Published 9 February 2015

Exceptional suppression of flux-flow resistivity in FeSe_{0.4}Te_{0.6} by back-flow from excess Fe atoms and Se/Te substitutions

Tatsunori Okada, Fuyuki Nabeshima, Hideyuki Takahashi, Yoshinori Imai, and Atsutaka Maeda

Phys. Rev. B **91**, 054510 (2015) – Published 11 February 2015

Universal V-shaped temperature-pressure phase diagram in the iron-based superconductors KFe_2As_2 , RbFe_2As_2 , and CsFe_2As_2

F. F. Tafti, A. Ouellet, A. Juneau-Fecteau, S. Faucher, M. Lapointe-Major, N. Doiron-Leyraud, A. F. Wang, X.-G. Luo, X. H. Chen, and Louis Taillefer

Phys. Rev. B **91**, 054511 (2015) – Published 17 February 2015

Magnetotransport of proton-irradiated BaFe_2As_2 and $\text{BaFe}_{1.985}\text{Co}_{0.015}\text{As}_2$ single crystals

D. A. Moseley, K. A. Yates, N. Peng, D. Mandrus, A. S. Sefat, W. R. Branford, and L. F. Cohen

Phys. Rev. B **91**, 054512 (2015) – Published 17 February 2015

Symmetry classification of bond order parameters in cuprates

Roland Zeyher

Phys. Rev. B **91**, 054513 (2015) – Published 20 February 2015

Slowing down of vortex motion at the Berezinskii-Kosterlitz-Thouless transition in ultrathin NbN films

Rini Ganguly, Dipanjan Chaudhuri, Pratap Raychaudhuri, and Lara Benfatto

Phys. Rev. B **91**, 054514 (2015) – Published 20 February 2015

Sitewise manipulations and Mott insulator-superfluid transition of interacting photons using superconducting circuit simulators

Xiuhao Deng, Chunjing Jia, and Chih-Chun Chien

Phys. Rev. B **91**, 054515 (2015) – Published 23 February 2015

Valence bond supersolid in a bilayer extended Bose-Hubbard model

Kwai-Kong Ng

Phys. Rev. B **91**, 054516 (2015) – Published 23 February 2015

Photoinduced superconductivity in semiconductors

Garry Goldstein, Camille Aron, and Claudio Chamon

Phys. Rev. B **91**, 054517 (2015) – Published 24 February 2015

Odd-frequency pairing in topological superconductivity in a one-dimensional magnetic chain

Hiromi Ebisu, Keiji Yada, Hideaki Kasai, and Yukio Tanaka

Phys. Rev. B **91**, 054518 (2015) – Published 24 February 2015

Admittance of a long diffusive SNS junction

K. S. Tikhonov and M. V. Feigel'man

Phys. Rev. B **91**, 054519 (2015) – Published 25 February 2015

Chiral Mott insulators, Meissner effect, and Laughlin states in quantum ladders

Alexandru Petrescu and Karyn Le Hur

Phys. Rev. B **91**, 054520 (2015) – Published 26 February 2015

Reconciliation of local and long-range tilt correlations in underdoped $\text{La}_{2-x}\text{Ba}_x\text{CuO}_4$ ($0 \leq x \leq 0.155$)

Emil S. Bozin, Ruidan Zhong, Kevin R. Knox, Genda Gu, John P. Hill, John M. Tranquada, and Simon J. L. Billinge

Phys. Rev. B **91**, 054521 (2015) – Published 26 February 2015

Low-energy phonons and superconductivity in $\text{Sn}_{0.8}\text{In}_{0.2}\text{Te}$

Zhijun Xu, J. A. Schneeloch, R. D. Zhong, J. A. Rodriguez-Rivera, L. W. Harriger, R. J. Birgeneau, G. D. Gu, J. M. Tranquada, and Guangyong Xu

Phys. Rev. B **91**, 054522 (2015) – Published 26 February 2015

Multiphoton dressing of an anharmonic superconducting many-level quantum circuit

Jochen Braumüller, Joel Cramer, Steffen Schlör, Hannes Rotzinger, Lucas Radtke, Alexander Lukashenko, Ping Yang, Sebastian T. Skacel, Sebastian Probst, Michael Marthaler, Lingzhen Guo, Alexey V. Ustinov, and Martin Weides

Phys. Rev. B **91**, 054523 (2015) – Published 26 February 2015

ERRATA

Publisher's Note: Two distinct kinetic regimes for the relaxation of light-induced superconductivity in $\text{La}_{1.675}\text{Eu}_{0.2}\text{Sr}_{0.125}\text{CuO}_4$ [Phys. Rev. B **91**, 020505(R) (2015)]

C. R. Hunt, D. Nicoletti, S. Kaiser, T. Takayama, H. Takagi, and A. Cavalleri

Phys. Rev. B **91**, 059901 (2015) – Published 10 February 2015

Erratum: Density functional theory study of $\text{La}_2\text{Ce}_2\text{O}_7$: Disordered fluorite versus pyrochlore structure [Phys. Rev. B **84**, 054110 (2011)]

D. E. P. Vanpoucke, P. Bultinck, S. Cottenier, V. Van Speybroeck, and I. Van Driessche

Phys. Rev. B **91**, 059902 (2015) – Published 19 February 2015

Publisher's Note: Anomalously thick domain walls in ferroelectrics [Phys. Rev. B **91**, 060102(R) (2015)]

P. V. Yudin, M. Y. Gureev, T. Sluka, A. K. Tagantsev, and N. Setter

Phys. Rev. B **91**, 059903 (2015) – Published 27 February 2015