PHYSICAL REVIEW B
covering condensed matter and materials physics
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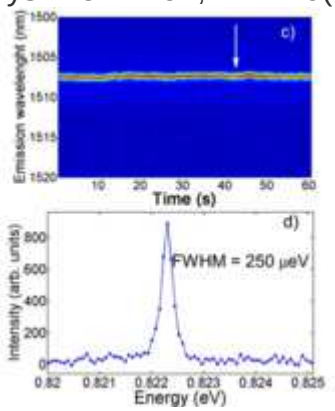
HIGHLIGHTED ARTICLES

Editors' Suggestion **Rapid Communication**

Strong reduction of exciton-phonon coupling in single-wall carbon nanotubes of high crystalline quality: Insight into broadening mechanisms and exciton localization

V. Ardizzone, Y. Chassagneux, F. Vialla, G. Delport, C. Delcamp, N. Belabas, E. Deleporte, Ph. Roussignol, I. Robert-Philip, C. Voisin, and J. S. Lauret

Phys. Rev. B **91**, 121410(R) (2015) – Published 18 March 2015



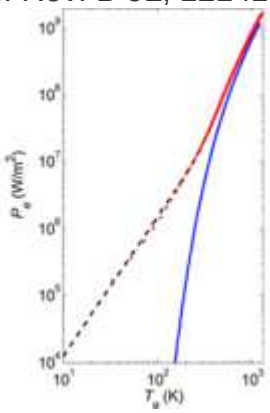
The emission linewidth is a key figure of merit for a quantum emitter. This paper reports on the possibility of reducing the spectral linewidth of single-wall carbon nanotubes. It demonstrates an order of magnitude narrower linewidths compared to the available data due to the enhanced crystalline quality of the carbon nanotubes synthesized by using a laser ablation technique.

Editors' Suggestion **Rapid Communication**

Coupling between electrons and optical phonons in suspended bilayer graphene

Antti Laitinen, Manohar Kumar, Mika Oksanen, Bernard Plaçais, Pauli Virtanen, and Pertti Hakonen

Phys. Rev. B **91**, 121414(R) (2015) – Published 27 March 2015



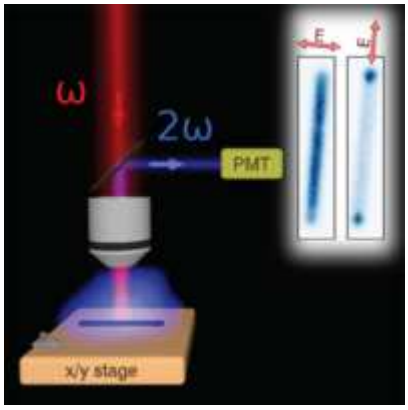
The electron-phonon scattering dominated heat dissipation is difficult to observe in graphene due to the role of impurities in scattering processes. Owing to the suppression of flexural-mode-induced supercollisions in suspended bilayer graphene, the authors of this paper are able to demonstrate that the intrinsic electron-optical phonon coupling governs the heat flow in suspended bilayer graphene samples.

Editors' Suggestion **Rapid Communication**

Enhanced nonlinear optical response from individual silicon nanowires

Peter R. Wiecha, Arnaud Arbouet, Houssem Kallel, Priyanka Periwal, Thierry Baron, and Vincent Paillard

Phys. Rev. B **91**, 121416(R) (2015) – Published 31 March 2015

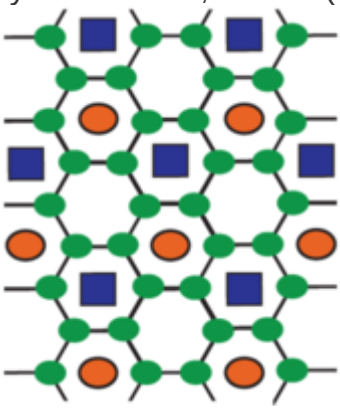


Semiconductor nanostructures, such as arrays of Si nanowires, are promising candidates for photonic and photovoltaic applications where light management and light trapping abilities are essential. A significant aspect for the development of such functionality is understanding the electromagnetic field distribution around the nanostructures. In this Rapid Communication, a collaboration of researchers from Toulouse and Grenoble use nonlinear microscopy on isolated silicon nanowires in order to study the local electromagnetic field morphology. They find that the second harmonic generation yield in Si nanowires can be strongly enhanced compared to bulk silicon.

Editors' Suggestion **Rapid Communication**

Kekulé textures, pseudospin-one Dirac cones, and quadratic band crossings in a graphene-hexagonal indium chalcogenide bilayer

Gianluca Giovannetti, Massimo Capone, Jeroen van den Brink, and Carmine Ortix
Phys. Rev. B **91**, 121417(R) (2015) – Published 31 March 2015

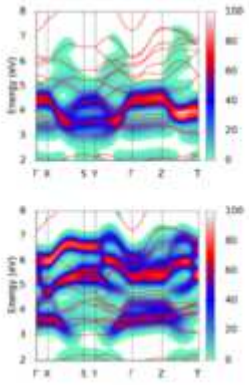


Density functional theory calculations of the electronic properties of graphene-hexagonal indium telluride superlattices predicts two inequivalent geometrical structures that are almost degenerate in energy. These structures give rise to either gapped states in Kekule phase or gapless states in reconstructed graphene Dirac cones. The results of this study will be useful for exploring the possibility of many-body instabilities in two-dimensional systems.

Editors' Suggestion

Quasiparticle self-consistent GW calculations of the electronic band structure of bulk and monolayer V_2O_5

Churna Bhandari, Walter R. L. Lambrecht, and Mark van Schilfgaarde
Phys. Rev. B **91**, 125116 (2015) – Published 10 March 2015



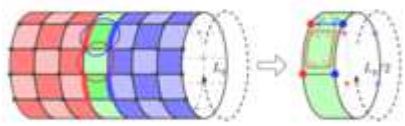
The electronic band structure of monolayer V_2O_5 is examined in detail via quasiparticle self-consistent GW calculations. There is much interest currently for such layered systems, especially compared to the bulk. Sophisticated calculations like the ones done here can provide key information on the reasons why DFT calculations significantly overestimate or underestimate the band gap in such materials, a perennial issue. The lattice polarization is the major missing ingredient responsible for the discrepancy in this system.

Editors' Suggestion

Edge-entanglement spectrum correspondence in a nonchiral topological phase and Kramers-Wannier duality

Wen Wei Ho, Lukasz Cincio, Heidar Moradi, Davide Gaiotto, and Guifre Vidal

Phys. Rev. B **91**, 125119 (2015) – Published 11 March 2015



For chiral topological phases there exist analytical proofs of a one-to-one correspondence between the low lying spectrum of edge states and that of the entanglement spectrum. Whether or not such an edge-entanglement spectrum correspondence could apply to non-chiral phases has been unclear. Here it is shown that in the Wen-plaquette model, a non-chiral Z2 topological phase, such a correspondence is exact in the absence of perturbations. While no such correspondence exists in the case of a general perturbation, the correspondence can be shown to apply for perturbations restricted to be translation invariant along the edge/entanglement cut.

RAPID COMMUNICATIONS

Electronic structure and strongly correlated systems

Rapid Communication

Dirac semimetals A_3Bi (A=Na,K,Rb) as Z2 Weyl semimetals

E. V. Gorbar, V. A. Miransky, I. A. Shovkovy, and P. O. Sukhachov

Phys. Rev. B **91**, 121101(R) (2015) – Published 2 March 2015

Rapid Communication

Spectroscopic evidence for strong quantum spin fluctuations with itinerant character in YFe_2Ge_2

N. Sirica, F. Bondino, S. Nappini, I. Píš, L. Poudel, A. D. Christianson, D. Mandrus, D. J. Singh, and N. Mannella

Phys. Rev. B **91**, 121102(R) (2015) – Published 4 March 2015

Rapid Communication

Numerical detection of symmetry-enriched topological phases with space-group symmetry

Ling Wang, Andrew Essin, Michael Hermele, and Olexei Motrunich

Phys. Rev. B **91**, 121103(R) (2015) – Published 4 March 2015

Rapid Communication

Interplay between tetragonal magnetic order, stripe magnetism, and superconductivity in iron-based materials

Jian Kang, Xiaoyu Wang, Andrey V. Chubukov, and Rafael M. Fernandes

Phys. Rev. B **91**, 121104(R) (2015) – Published 6 March 2015

Rapid Communication

Fermi surface of $IrTe_2$ in the valence-bond state as determined by quantum oscillations

S. F. Blake, M. D. Watson, A. McCollam, S. Kasahara, R. D. Johnson, A. Narayanan, G. L. Pascut, K. Haule, V. Kiryukhin, T. Yamashita, D. Watanabe, T. Shibauchi, Y. Matsuda, and A. I. Coldea

Phys. Rev. B **91**, 121105(R) (2015) – Published 12 March 2015

Rapid Communication

Fate of dynamical many-body localization in the presence of disorder

Analabha Roy and Arnab Das

Phys. Rev. B **91**, 121106(R) (2015) – Published 13 March 2015

Rapid Communication

Separability of dynamical and nonlocal correlations in three dimensions

T. Schäfer, A. Toschi, and Jan M. Tomczak

Phys. Rev. B **91**, 121107(R) (2015) – Published 16 March 2015

Rapid Communication

Matrix product ansatz for Fermi fields in one dimension

Sangwoo S. Chung, Kuei Sun, and C. J. Bolech

Phys. Rev. B **91**, 121108(R) (2015) – Published 16 March 2015

Rapid Communication

Coexistence of Fermi arcs with two-dimensional gapless Dirac states

Adolfo G. Grushin, Jörn W. F. Venderbos, and Jens H. Bardarson

Phys. Rev. B **91**, 121109(R) (2015) – Published 16 March 2015

Rapid Communication

Controlling the evolution of two-dimensional electron gas states at a $metal/Bi_2Se_3$ interface

Han-Jin Noh, Jinwon Jeong, En-Jin Cho, Joonbum Park, Jun Sung Kim, Ilyou Kim, Byeong-Gyu Park, and Hyeong-Do Kim

Phys. Rev. B **91**, 121110(R) (2015) – Published 20 March 2015

Rapid Communication

Systematically improvable multiscale solver for correlated electron systems

Alexei A. Kananenka, Emanuel Gull, and Dominika Zgid

Phys. Rev. B **91**, 121111(R) (2015) – Published 23 March 2015

Rapid Communication

Real-time cumulant approach for charge-transfer satellites in x-ray photoemission spectra

J. J. Kas, F. D. Vila, J. J. Rehr, and S. A. Chambers

Phys. Rev. B **91**, 121112(R) (2015) – Published 25 March 2015

Rapid Communication

Molecular beam epitaxy growth and scanning tunneling microscopy study of $TiSe_2$ ultrathin films

Jun-Ping Peng, Jia-Qi Guan, Hui-Min Zhang, Can-Li Song, Lili Wang, Ke He, Qi-Kun Xue, and Xu-Cun Ma

Phys. Rev. B **91**, 121113(R) (2015) – Published 31 March 2015

Rapid Communication

Hybridization effects and bond disproportionation in the bismuth perovskites

Kateryna Foyevtsova, Arash Khazraie, Ilya Elfimov, and George A. Sawatzky

Phys. Rev. B **91**, 121114(R) (2015) – Published 31 March 2015

Semiconductors I: bulk

Rapid Communication

Spin and photophysics of carbon-antisite vacancy defect in 4H silicon carbide: A potential quantum bit
Krisztián Szász, Viktor Ivády, Igor A. Abrikosov, Erik Janzén, Michel Bockstedte, and Adam Gali
Phys. Rev. B **91**, 121201(R) (2015) – Published 16 March 2015
Rapid Communication
Anomalous pressure dependence of thermal conductivities of large mass ratio compounds
L. Lindsay, D. A. Broido, Jesús Carrete, Natalio Mingo, and T. L. Reinecke
Phys. Rev. B **91**, 121202(R) (2015) – Published 27 March 2015
Semiconductors II: surfaces, interfaces, microstructures, and related topics
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Polarization-coupled polariton pairs in a birefringent microcavity
Yinglei Wang, Tao Hu, Wei Xie, Liaoxin Sun, Long Zhang, Jian Wang, Jie Gu, Lin Wu, Jun Wang, Xuechu Shen, and Zhanghai Chen
Phys. Rev. B **91**, 121301(R) (2015) – Published 30 March 2015
Rapid Communication
Giant exciton oscillator strength and radiatively limited dephasing in two-dimensional platelets
Ali Naeem, Francesco Masia, Sotirios Christodoulou, Iwan Moreels, Paola Borri, and Wolfgang Langbein
Phys. Rev. B **91**, 121302(R) (2015) – Published 30 March 2015
Surface physics, nanoscale physics, low-dimensional systems
Rapid Communication
Highly stable two-dimensional silicon phosphides: Different stoichiometries and exotic electronic properties
Bing Huang, Houlong L. Zhuang, Mina Yoon, Bobby G. Sumpter, and Su-Huai Wei
Phys. Rev. B **91**, 121401(R) (2015) – Published 3 March 2015
Rapid Communication
Cyclotron-resonance-induced negative dc conductivity in a two-dimensional electron system on liquid helium
Yu. P. Monarkha
Phys. Rev. B **91**, 121402(R) (2015) – Published 3 March 2015
Rapid Communication
Unravelling the role of inelastic tunneling into pristine and defected graphene
Mattias L. N. Palsgaard, Nick P. Andersen, and Mads Brandbyge
Phys. Rev. B **91**, 121403(R) (2015) – Published 5 March 2015
Rapid Communication
Observation of vacancy-induced suppression of electronic cooling in defected graphene
Qi Han, Yi Chen, Gerui Liu, Dapeng Yu, and Xiaosong Wu
Phys. Rev. B **91**, 121404(R) (2015) – Published 6 March 2015
Rapid Communication
Nonlocal electromagnetic response of graphene nanostructures
Arya Fallahi, Tony Low, Michele Tamagnone, and Julien Perruisseau-Carrier
Phys. Rev. B **91**, 121405(R) (2015) – Published 9 March 2015
Rapid Communication
Feedback-optimized extraordinary optical transmission of continuous-variable entangled states
Dong Wang, Chuanqing Xia, Qianjin Wang, Yang Wu, Fang Liu, Yong Zhang, and Min Xiao
Phys. Rev. B **91**, 121406(R) (2015) – Published 12 March 2015
Rapid Communication
Nonequilibrium spin transport in Zeeman-split superconductors
Tatiana Krishtop, Manuel Houzet, and Julia S. Meyer
Phys. Rev. B **91**, 121407(R) (2015) – Published 12 March 2015

Rapid Communication

Theory of epsilon-near-zero modes in ultrathin films

Salvatore Campione, Igal Brener, and Francois Marquier

Phys. Rev. B **91**, 121408(R) (2015) – Published 16 March 2015

Rapid Communication

Substrate interactions with suspended and supported monolayer MoS_2: Angle-resolved photoemission spectroscopy

Wencan Jin, Po-Chun Yeh, Nader Zaki, Datong Zhang, Jonathan T. Liou, Jerzy T. Sadowski, Alexey Barinov, Mikhail Yablonskikh, Jerry I. Dadap, Peter Sutter, Irving P. Herman, and Richard M. Osgood, Jr.

Phys. Rev. B **91**, 121409(R) (2015) – Published 17 March 2015

Editors' Suggestion **Rapid Communication**

Strong reduction of exciton-phonon coupling in single-wall carbon nanotubes of high crystalline quality: Insight into broadening mechanisms and exciton localization

V. Ardizzone, Y. Chassagneux, F. Vialla, G. Delport, C. Delcamp, N. Belabas, E. Deleporte, Ph. Roussignol, I. Robert-Philip, C. Voisin, and J. S. Lauret

Phys. Rev. B **91**, 121410(R) (2015) – Published 18 March 2015

Rapid Communication

Giant nonlinear magneto-optical response of magnetoplasmonic crystals

V. L. Krutyanskiy, A. L. Chekhov, V. A. Ketsko, A. I. Stognij, and T. V. Murzina

Phys. Rev. B **91**, 121411(R) (2015) – Published 24 March 2015

Rapid Communication

Valley order and loop currents in graphene on hexagonal boron nitride

Bruno Uchoa, Valeri N. Kotov, and M. Kindermann

Phys. Rev. B **91**, 121412(R) (2015) – Published 24 March 2015

Rapid Communication

Hidden-symmetry decoupling of Majorana bound states in topological superconductors

Eugene Dumitrescu, Tudor D. Stanescu, and Sumanta Tewari

Phys. Rev. B **91**, 121413(R) (2015) – Published 25 March 2015

Editors' Suggestion **Rapid Communication**

Coupling between electrons and optical phonons in suspended bilayer graphene

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Phys. Rev. B **91**, 121414(R) (2015) – Published 27 March 2015

Rapid Communication

Nanoscale transport of surface excitons at the interface between ZnO and a molecular monolayer

Sebastian Friede, Sergei Kuehn, Sergey Sadofev, Sylke Blumstengel, Fritz Henneberger, and Thomas Elsaesser

Phys. Rev. B **91**, 121415(R) (2015) – Published 30 March 2015

Editors' Suggestion **Rapid Communication**

Enhanced nonlinear optical response from individual silicon nanowires

Peter R. Wiecha, Arnaud Arbouet, Houssem Kallel, Priyanka Periwal, Thierry Baron, and Vincent Paillard

Phys. Rev. B **91**, 121416(R) (2015) – Published 31 March 2015

Editors' Suggestion **Rapid Communication**

Kekulé textures, pseudospin-one Dirac cones, and quadratic band crossings in a graphene-hexagonal indium chalcogenide bilayer

Gianluca Giovannetti, Massimo Capone, Jeroen van den Brink, and Carmine Ortix

Phys. Rev. B **91**, 121417(R) (2015) – Published 31 March 2015

ARTICLES

Electronic structure and strongly correlated systems

Optical study of phase transitions in single-crystalline RuP

R. Y. Chen, Y. G. Shi, P. Zheng, L. Wang, T. Dong, and N. L. Wang
Phys. Rev. B **91**, 125101 (2015) – Published 2 March 2015

Effective models for Anderson impurity and Kondo problems from continuous unitary transformations
Jörn Krones and Götz S. Uhrig
Phys. Rev. B **91**, 125102 (2015) – Published 2 March 2015

Dirac semimetal films as spin conductors on topological substrates
Xiaoxiong Wang, Guang Bian, Peng Wang, and T.-C. Chiang
Phys. Rev. B **91**, 125103 (2015) – Published 2 March 2015

Quantum phase near the saturation field in the $S=12$ frustrated spin ladder
H. Yamaguchi, H. Miyagai, Y. Kono, S. Kittaka, T. Sakakibara, K. Iwase, T. Ono, T. Shimokawa, and Y. Hosokoshi
Phys. Rev. B **91**, 125104 (2015) – Published 2 March 2015

Photoinduced pseudospin effects in silicene beyond the off-resonant condition
Alexander López, Andreas Scholz, Benjamin Santos, and John Schliemann
Phys. Rev. B **91**, 125105 (2015) – Published 2 March 2015

Magnetocrystalline anisotropic effect in $GdCo1-xFexAsO(x=0,0.05)$
T. Shang, Y. H. Chen, F. Ronning, N. Cornell, J. D. Thompson, A. Zakhidov, M. B. Salamon, and H. Q. Yuan
Phys. Rev. B **91**, 125106 (2015) – Published 2 March 2015

NMR evidence for field-induced ferromagnetism in $(Li0.8Fe0.2)OHFeSe$ superconductor
Y. P. Wu, D. Zhao, X. R. Lian, X. F. Lu, N. Z. Wang, X. G. Luo, X. H. Chen, and T. Wu
Phys. Rev. B **91**, 125107 (2015) – Published 2 March 2015

Volume-dependent electron localization in ceria
Sergiu Arapan, Sergei I. Simak, and Natalia V. Skorodumova
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Fate of the false Mott-Hubbard transition in two dimensions
T. Schäfer, F. Geles, D. Rost, G. Rohringer, E. Arrigoni, K. Held, N. Blümer, M. Aichhorn, and A. Toschi
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STM observation of charge stripe in metallic phase of $\alpha-(BEDT-TTF)2I3$
K. Katono, T. Taniguchi, K. Ichimura, Y. Kawashima, S. Tanda, and K. Yamamoto
Phys. Rev. B **91**, 125110 (2015) – Published 4 March 2015

Photoinduced complete melting of spin-Peierls phase in Na-tetracyanoquinodimethane revealed by frequency doubling of coherent molecular oscillations
H. Uemura, K. Iwasawa, H. Yamakawa, T. Miyamoto, H. Yada, and H. Okamoto
Phys. Rev. B **91**, 125111 (2015) – Published 5 March 2015

Spin-orbiton and quantum criticality in $FeSc2S4$
L. Mittelstädt, M. Schmidt, Zhe Wang, F. Mayr, V. Tsurkan, P. Lunkenheimer, D. Ish, L. Balents, J. Deisenhofer, and A. Loidl
Phys. Rev. B **91**, 125112 (2015) – Published 5 March 2015

Weak electronic correlations and absence of heavy-fermion state in $KNi2Se2$
Q. Fan, X. P. Shen, M. Y. Li, D. W. Shen, W. Li, X. M. Xie, Q. Q. Ge, Z. R. Ye, S. Y. Tan, X. H. Niu, B. P. Xie, and D. L. Feng
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Monogamy of entanglement and improved mean-field ansatz for spin lattices
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Phys. Rev. B **91**, 125114 (2015) – Published 9 March 2015

Unusual strong spin-fluctuation effects around the critical pressure of the itinerant Ising-type ferromagnet URhAl
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Quasiparticle self-consistent GW calculations of the electronic band structure of bulk and monolayer V_2O_5
Churna Bhandari, Walter R. L. Lambrecht, and Mark van Schilfgaarde
Phys. Rev. B **91**, 125116 (2015) – Published 10 March 2015
Spin Chern pumping from the bulk of two-dimensional topological insulators
M. N. Chen, L. Sheng, R. Shen, D. N. Sheng, and D. Y. Xing
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k dependence of the spin polarization in $Mn_5Ge_3/Ge(111)$ thin films
W. Ndiaye, J.-M. Mariot, P. De Padova, M. C. Richter, W. Wang, O. Heckmann, A. Taleb-Ibrahimi, P. Le Fèvre, F. Bertran, C. Cacho, M. Leandersson, T. Balasubramanian, A. Stroppa, S. Picozzi, and K. Hricovini
Phys. Rev. B **91**, 125118 (2015) – Published 11 March 2015
Editors' Suggestion
Edge-entanglement spectrum correspondence in a nonchiral topological phase and Kramers-Wannier duality
Wen Wei Ho, Lukasz Cincio, Heidar Moradi, Davide Gaiotto, and Guifre Vidal
Phys. Rev. B **91**, 125119 (2015) – Published 11 March 2015
Efficient dielectric matrix calculations using the Lanczos algorithm for fast many-body G_0W_0 implementations
Jonathan Laflamme Janssen, Bruno Rousseau, and Michel Côté
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Bei Zeng and Xiao-Gang Wen
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Toshihiro Sato, Tomonori Shirakawa, and Seiji Yunoki
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Modular matrices from universal wave-function overlaps in Gutzwiller-projected parton wave functions
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Boundary degeneracy of topological order
Juven C. Wang and Xiao-Gang Wen
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V. V. Marinyuk and D. B. Rogozkin
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Xi Luo, Yue Yu, and Long Liang
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J. H. Pixley, Ang Cai, and Qimiao Si
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Theoretical prediction of fragile Mott insulators on plaquette Hubbard lattices
Han-Qing Wu, Rong-Qiang He, Zi Yang Meng, and Zhong-Yi Lu
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Electronic phase transitions of bismuth under strain from relativistic self-consistent GW calculations
Irene Aguilera, Christoph Friedrich, and Stefan Blügel
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Correlation-driven electronic multiferroicity in $TMTTF_2{-}X$ organic crystals
Gianluca Giovannetti, Reza Nourafkan, Gabriel Kotliar, and Massimo Capone
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Spin transitions in graphene butterflies at an integer filling factor
Areg Ghazaryan and Tapash Chakraborty
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Characterization of symmetry-protected topological phases in polymerized models by trajectories of Majorana stars
Chao Yang, Huaiming Guo, Li-Bin Fu, and Shu Chen
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Exchange parameters of strongly correlated materials: Extraction from spin-polarized density functional theory plus dynamical mean-field theory
Y. O. Kvashnin, O. Grånäs, I. Di Marco, M. I. Katsnelson, A. I. Lichtenstein, and O. Eriksson
Phys. Rev. B **91**, 125133 (2015) – Published 20 March 2015
Hyperfine field and electronic structure of magnetite below the Verwey transition
R. Řezníček, V. Chlan, H. Štěpánková, and P. Novák
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Fully self-consistent solution of the Dyson equation using a plane-wave basis set
Lin-Wang Wang
Phys. Rev. B **91**, 125135 (2015) – Published 23 March 2015
Quasilocal strange metal
Shouvik Sur and Sung-Sik Lee
Phys. Rev. B **91**, 125136 (2015) – Published 23 March 2015
Angle-resolved and resonant photoemission spectroscopy study of the Fermi surface reconstruction in the charge density wave systems $CeTe_2$and $PrTe_2$
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Phys. Rev. B **91**, 125137 (2015) – Published 24 March 2015
Fermionic non-Abelian fractional Chern insulators from dipolar interactions
Dong Wang, Zhao Liu, Wu-Ming Liu, Junpeng Cao, and Heng Fan
Phys. Rev. B **91**, 125138 (2015) – Published 24 March 2015
Interaction-induced quantum anomalous Hall phase in (111) bilayer of $LaCoO_3$
Yilin Wang, Zhijun Wang, Zhong Fang, and Xi Dai
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Emergence of quasi-one-dimensional physics in a nearly-isotropic three-dimensional molecular crystal: *Ab initio* modeling of $Mo_3S_7(dmit)_3$
A. C. Jacko, C. Janani, Klaus Koepernik, and B. J. Powell
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Dynamical screening in La_2CuO_4
Philipp Werner, Rei Sakuma, Fredrik Nilsson, and Ferdi Aryasetiawan
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Enhancement of the thermoelectric power by electronic correlations in bad metals: A study of the Kelvin formula
J. Kokalj and Ross H. McKenzie
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Interference of surface plasmons and Smith-Purcell emission probed by angle-resolved cathodoluminescence spectroscopy
Naoki Yamamoto, F. Javier García de Abajo, and Viktor Myroshnychenko
Phys. Rev. B **91**, 125144 (2015) – Published 30 March 2015
Planar immersion lens with metasurfaces
John S. Ho, Brynan Qiu, Yuji Tanabe, Alexander J. Yeh, Shanhui Fan, and Ada S. Y. Poon
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Stable quantum Monte Carlo simulations for entanglement spectra of interacting fermions
Fakher F. Assaad
Phys. Rev. B **91**, 125146 (2015) – Published 31 March 2015
Interacting topological insulator and emergent grand unified theory

Yi-Zhuang You and Cenke Xu
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