

ARTICLES

Electronic structure and strongly correlated systems

- ☞ Interorbital singlet pairing in Sr_2RuO_4 : A Hund's superconductor (18 pages) 155101
Stefan Käser, Hugo U. R. Strand, Nils Wentzell, Antoine Georges, Olivier Parcollet, and Philipp Hansmann
- Symmetry-protected Dirac nodal lines and large spin Hall effect in a V_6Sb_4 kagome bilayer (6 pages) 155102
Y. Yang, R. Wang, M.-Z. Shi, Z. Wang, Z. Xiang, and X.-H. Chen
- ☞ Observation of broken inversion and chiral symmetries in the pseudogap phase in single- and double-layer bismuth-based cuprates (9 pages) 155103
Sejoon Lim, Chandra M. Varma, Hiroshi Eisaki, and Aharon Kapitulnik
- Coexistence of non-Abelian chiral spin liquid and magnetic order in a spin-1 antiferromagnet (10 pages) 155104
Yixuan Huang, W. Zhu, Shou-Shu Gong, Hong-Chen Jiang, and D. N. Sheng
- Bosonization of Majorana modes and edge states (13 pages) 155105
Arkadiusz Bochniak, Błażej Ruba, and Jacek Wosiek
- ☞ Charge density wave order in the kagome metal AV_3Sb_5 ($A = \text{Cs, Rb, K}$) (20 pages) 155106
Shangfei Wu, Brenden R. Ortiz, Hengxin Tan, Stephen D. Wilson, Binghai Yan, Turan Birol, and Girsh Blumberg
- Spontaneous breaking of multipole symmetries (10 pages) 155107
Charles Stahl, Ethan Lake, and Rahul Nandkishore
- Robust kagome electronic structure in the topological quantum magnets XMn_6Sn_6 ($X = \text{Dy, Tb, Gd, Y}$) (6 pages) 155108
X. Gu, C. Chen, W. S. Wei, L. L. Gao, J. Y. Liu, X. Du, D. Pei, J. S. Zhou, R. Z. Xu, Z. X. Yin, W. X. Zhao, Y. D. Li, C. Jozwiak, A. Bostwick, E. Rotenberg, D. Backes, L. S. I. Veiga, S. Dhessi, T. Hesjedal, G. van der Laan, H. F. Du, W. J. Jiang, Y. P. Qi, G. Li, W. J. Shi, Z. K. Liu, Y. L. Chen, and L. X. Yang
- Emergent flat-band physics in $d^{9-\delta}$ multilayer nickelates (9 pages) 155109
Frank Lechermann
- Estimation of the energy barrier responsible for hysteresis and multilevel nonvolatile resistance states in VO_2 thin films (7 pages) 155110
Yongchang Ma, Rui Chen, Yajun Li, Cuimin Lu, and Chenguang Zhang
- Superuniversality of dimerized $\text{SU}(N + M)$ spin chains (9 pages) 155111
A. M. M. Pruiskien, Bimla Danu, and R. Shankar



Topological Green function of interacting systems (8 pages)	155112
Minh-Tien Tran, Duong-Bo Nguyen, Hong-Son Nguyen, and Thanh-Mai Thi Tran	
Evolution of magnetic and transport properties in the Cu-doped pyrochlore iridate $\text{Eu}_2(\text{Ir}_{1-x}\text{Cu}_x)_2\text{O}_7$ (8 pages)	155113
Sampad Mondal, M. Modak, B. Maji, Swapan K. Mandal, B. Ghosh, Surajit Saha, M. Sardar, and S. Banerjee	
Role of intercalated cobalt in the electronic structure of $\text{Co}_{1/3}\text{NbS}_2$ (15 pages)	155114
Petar Popčević, Yuki Utsumi, Izabela Biało, Wojciech Tabis, Mateusz A. Gala, Marcin Rosmus, Jacek J. Kolodziej, Natalia Tomaszewska, Mariusz Garb, Helmuth Berger, Ivo Batistić, Neven Barišić, László Forró, and Eduard Tutiš	
Evolution of ultraflat band in the van der Waals kagome semiconductor $\text{Pd}_3\text{P}_2(\text{S}_{1-x}\text{Se}_x)_8$ (6 pages)	155115
Shaohua Yan (闫少华), Ben-Chao Gong (龚本超), Lin Wang (王林), Jinzhi Wu (武晋治), Qiangwei Yin (殷蔷薇), Xinyu Cao (曹新宇), Xiao Zhang (张晓), Xiaofeng Liu (刘小峰), Zhong-Yi Lu (卢仲毅), Kai Liu (刘凯), and Hechang Lei (雷和畅)	
Physical and one-dimensional properties of single-crystalline La_5AgPb_3 (9 pages)	155116
Jannis Maiwald and M. C. Aronson	
Transmission of a single electron through a Berry ring (10 pages)	155117
Maseim Bassis Kenmoe and Yosuke Kayanuma	
Path-integral derivation of the equations of the anomalous Hall effect (13 pages)	155118
Kazuo Fujikawa and Koichiro Umetsu	
Gutzwiller wave function on a quantum computer using a discrete Hubbard-Stratonovich transformation (17 pages)	155119
Kazuhiro Seki, Yuichi Otsuka, and Seiji Yunoki	
Modification of transition radiation by three-dimensional topological insulators (19 pages)	155120
O. J. Franca and Stefan Yoshi Buhmann	
Topological reflection matrix (14 pages)	155121
S. Franca, F. Hassler, and I. C. Fulga	
High Chern number quantum anomalous Hall effect tunable by stacking order in van der Waals topological insulators (6 pages)	155122
Wenxuan Zhu, Cheng Song, Hua Bai, Liyang Liao, and Feng Pan	
Semiclassical transport with Berry curvature: Chambers formula and applications to systems with Fermi surface topological transitions (16 pages)	155123
Emmanouil K. Kokkinis, Garry Goldstein, Dmitri V. Efremov, and Joseph J. Betouras	
Inner workings of fractional quantum Hall parent Hamiltonians: A matrix product state point of view (9 pages)	155124
Matheus Schossler, Sumanta Bandyopadhyay, and Alexander Seidel	
Fermi surface of a system with strong valence fluctuations: Evidence for a noninteger count of valence electrons in EuIr_2Si_2 (8 pages)	155125
K. Götze, B. Bergk, O. Ignatchik, A. Polyakov, I. Kraft, V. Lorenz, H. Rosner, T. Förster, S. Seiro, I. Sheikin, J. Wosnitza, and C. Geibel	

(Continued)

Anomaly cascade in $(2 + 1)$ -dimensional fermionic topological phases (35 pages)	155126
Daniel Bulmash and Maissam Barkeshli	
☞ Extreme many-body scarring in a quantum spin chain via weak dynamical constraints (9 pages)	155127
Shane Dooley and Graham Kells	
Deep learning for disordered topological insulators through their entanglement spectrum (6 pages)	155128
Alejandro José Uría-Álvarez, Daniel Molpeceres-Mingo, and Juan José Palacios	
Pressure-induced changes of valence fluctuation in β -YbAlB ₄ probed by x-ray absorption spectroscopy (8 pages)	155129
Yui Sakaguchi, Shugo Ikeda, Naomi Kawamura, Masaichiro Mizumaki, Kentaro Kuga, Shintaro Suzuki, Keita Sone, Satoru Nakatsuji, and Hisao Kobayashi	
Solvable lattice Hamiltonians with fractional Hall conductivity (20 pages)	155130
Zhaoyu Han and Jing-Yuan Chen	
Temperature dependence of correlated electronic states in the archetypal kagome metal CoSn (8 pages)	155131
Sicong Wan, Haiyan Lu, and Li Huang	
Comparison of the canonical transformation and energy functional formalisms for <i>ab initio</i> calculations of self-localized polarons (13 pages)	155132
Yao Luo, Benjamin K. Chang, and Marco Bernardi	
☞ Topological pumping and Tamm states in photonic systems (11 pages)	155133
Solange V. Silva, David E. Fernandes, Tiago A. Morgado, and Mário G. Silveirinha	
Emergence of electronic modes by doping Kondo insulators in the Kondo lattice and periodic Anderson models (14 pages)	155134
Masanori Kohno	
Trions in twisted bilayer graphene (23 pages)	155135
Frank Schindler, Oskar Vafek, and B. Andrei Bernevig	
GW space-time method: Energy band gap of solid hydrogen (10 pages)	155136
Sam Azadi, Arkadiy Davydov, and Evgeny Kozik	
☞ Ungappable edge theories with finite-dimensional Hilbert spaces (20 pages)	155137
Sriram Ganeshan and Michael Levin	
Ultrafast optical excitation of magnetic dynamics in van der Waals magnets: Coherent magnons and BKT dynamics in NiPS ₃ (17 pages)	155138
Urban F. P. Seifert, Mengxing Ye, and Leon Balents	
Evolution of electronic and magnetic properties in the topological semimetal SmSb _x Te _{2-x} (9 pages)	155139
Krishna Pandey, Rabindra Basnet, Jian Wang, Bo Da, and Jin Hu	
High-harmonic spectroscopy of light-driven nonlinear anisotropic anomalous Hall effect in a Weyl semimetal (5 pages)	155140
Amar Bharti, M. S. Mrudul, and Gopal Dixit	
Efficient and temperature-independent terahertz emission from CoFeB/NiCu heterostructures (8 pages)	155141
Hao Cheng, Yangkai Wang, Hongchuan He, Qiuping Huang, and Yalin Lu	

(Continued)

 Three-dimensional electronic structure of LiFeAs (8 pages)	155142
R. P. Day, M. X. Na, M. Zingl, B. Zwartsenberg, M. Michiardi, G. Levy, M. Schneider, D. Wong, P. Dosanjh, T. M. Pedersen, S. Gorovikov, S. Chi, R. Liang, W. N. Hardy, D. A. Bonn, S. Zhdanovich, I. S. Elfimov, and A. Damascelli	
Many-body quadrupolar sum rule for higher-order topological insulators (15 pages)	155143
Wonjun Lee, Gil Young Cho, and Byungmin Kang	
Electronic structure and resonant inelastic x-ray scattering in osmates. I. Perovskite NaOsO ₃ (9 pages)	155144
V. N. Antonov, D. A. Kukusta, and L. V. Bekenov	
Electronic structure and resonant inelastic x-ray scattering in osmates. II. Pyrochlore Cd ₂ Os ₂ O ₇ (7 pages)	155145
V. N. Antonov, D. A. Kukusta, and L. V. Bekenov	
Relaxation mechanisms in a disordered system with Poisson-level statistics (8 pages)	155146
Janez Bonča and Marcin Mierzejewski	
Melting of magnetic order in NaOsO ₃ by femtosecond laser pulses (9 pages)	155147
Flavio Giorgianni, Max Burian, Namrata Gurung, Martin Kubli, Vincent Esposito, Urs Staub, Paul Beaud, Steven L. Johnson, Yoav William Windsor, Laurenz Rettig, Dmitry Ozerov, Henrik Lemke, Susmita Saha, Federico Pressacco, Stephen Patrick Collins, Tadashi Togashi, Tetsuo Katayama, Shigeki Owada, Makina Yabashi, Kazunari Yamaura, Yoshikazu Tanaka, and V. Scagnoli	
Nonperturbative <i>ab initio</i> approach for calculating the electrical conductivity of a liquid metal (8 pages)	155148
Xiao-Wei Zhang, Haoran Chen, En-Ge Wang, Junren Shi, and Xin-Zheng Li	
Rashba and Dresselhaus effects in two-dimensional Pb-I-based perovskites (8 pages)	155149
Benedikt Maurer, Christian Vorwerk, and Claudia Draxl	
Multicritical point and unified description of broken-symmetry phases in spin- $\frac{1}{2}$ antiferromagnets on a square lattice (10 pages)	155150
Oğuz Türker and Kun Yang	
Spin dynamics of itinerant electrons: Local magnetic moment formation and Berry phase (21 pages)	155151
E. A. Stepanov, S. Brener, V. Harkov, M. I. Katsnelson, and A. I. Lichtenstein	
Slowly decaying real-time oscillations in instanton crystals (15 pages)	155152
Grigory A. Starkov and Konstantin B. Efetov	
Low-temperature specific-heat studies on two square-kagome antiferromagnets (5 pages)	155153
Bo Liu, Zhenyuan Zeng, Aini Xu, Yili Sun, Olga Yakubovich, Larisa Shvanskaya, Shiliang Li, and Alexander Vasiliev	
Enhancement of <i>d</i> -wave pairing in the striped phase with nearest neighbor attraction (6 pages)	155154
Lufeng Zhang, Ting Guo, Yingping Mou, Qiaoni Chen, and Tianxing Ma	
Efficient simulation of quantum many-body thermodynamics by tailoring a zero-temperature tensor network (6 pages)	155155
Ding-Zu Wang, Guo-Feng Zhang, Maciej Lewenstein, and Shi-Ju Ran	
Complete classification of band nodal structures and massless excitations (7 pages)	155156
Feng Tang and Xiangang Wan	

(Continued)

Analysis of model-parameter dependences on the second-order nonlinear conductivity in $\mathcal{PT}$ -symmetric collinear antiferromagnetic metals with magnetic toroidal moment on zigzag chains (10 pages)	155157
Megumi Yatsushiro, Rikuto Oiwa, Hiroaki Kusunose, and Satoru Hayami	
Shallow dopant pairs in silicon: An atomistic full configuration interaction study (9 pages)	155158
Archana Tankasala, Benoit Voisin, Zachary Kembrey, Joseph Salfi, Yu-Ling Hsueh, Edyta N. Osika, Sven Rogge, and Rajib Rahman	
Phase diagram of Rydberg-dressed atoms on two-leg square ladders: Coupling supersymmetric conformal field theories on the lattice (15 pages)	155159
Mikheil Tsitsishvili, Titas Chanda, Matteo Votto, Pierre Fromholz, Marcello Dalmonte, and Alexander Nersesyan	
Semiconductors I: bulk	
Role of carbon and hydrogen in limiting n -type doping of monoclinic $(\text{Al}_x\text{Ga}_{1-x})_2\text{O}_3$ (15 pages)	155201
Sai Mu, Mengen Wang, Joel B. Varley, John L. Lyons, Darshana Wickramaratne, and Chris G. Van de Walle	
Energy loss rate of an electron in three-dimensional tilting Dirac semimetals (9 pages)	155202
Xiaokang Dai and Qinjun Chen	
Band-edge absorption characteristics of semi-insulating indium phosphide under unified Franz-Keldysh and Einstein models (8 pages)	155203
Alexander C. MacGillivray, Nikolai I. Lesack, Ilija R. Hristovski, Matthias F. Jenne, Benjamin C. Maglio, Sayra Gorgani, and Jonathan F. Holzman	
Semiconductors II: surfaces, interfaces, microstructures, and related topics	
Interchannel coupling induced gapless modes in multichannel zero-line systems (8 pages)	155301
Yulei Han, Sanyi You, and Zhenhua Qiao	
Unified approach to cyclotron and plasmon resonances in a periodic two-dimensional GaAs electron gas hosting the Hofstadter butterfly (13 pages)	155302
Vidar Gudmundsson, Vram Mughnetsyan, Nzar Rauf Abdullah, Chi-Shung Tang, Valeriu Moldoveanu, and Andrei Manolescu	
Persistent destructive quantum interference in the inverted graph method (7 pages)	155303
M. Niță and D. C. Marinescu	
Exploring the phase diagram of InAs/GaSb/InAs trilayer quantum wells (6 pages)	155304
S. Schmid, M. Meyer, F. Jabeen, G. Bastard, F. Hartmann, and S. Höfling	
Simultaneous measurements of nuclear-spin heat capacity, temperature, and relaxation in GaAs microstructures (11 pages)	155305
M. Vladimirova, S. Cronenberger, A. Colombier, D. Scalbert, V. M. Litvyak, K. V. Kavokin, and A. Lemaître	
Screening nearest-neighbor interactions in networks of exciton-polariton condensates through spin-orbit coupling (8 pages)	155306
Denis Aristov, Helgi Sigurdsson, and Pavlos G. Lagoudakis	
Hydrodynamic electron transport in graphene Hall-bar devices (8 pages)	155307
Songci Li, A. V. Andreev, and Alex Levchenko	

(Continued)

Surface physics, nanoscale physics, low-dimensional systems

Absence and recovery of cost-precision tradeoff relations in quantum transport (<i>13 pages</i>)	155401
Matthew Gerry and Dvira Segal	
Magnetically tunable Shubnikov–de Haas oscillations in MnBi_2Te_4 (<i>6 pages</i>)	155402
Xiao Lei, Liang Zhou, Zhanyang Hao, Hongtao Liu, Shuo Yang, Haipeng Sun, Xiaozhou Ma, Chen Ma, Le Wang, Hai-Zhou Lu, Jia-Wei Mei, Jiannong Wang, and Hongtao He	
Tuning magnetic Mie-exciton interaction from the intermediate to strong coupling regime in a WSe_2 monolayer coupled with dielectric-metal nanoresonators (<i>9 pages</i>)	155403
Shiyu Shen, Yuyang Wu, Yuhang Li, Peng Xie, Qi Ding, Xiaoyu Kuang, Wenxin Wang, and Wei Wang	
Resonant enhancement of the near-field radiative heat transfer in nanoparticles (<i>8 pages</i>)	155404
S. G. Castillo-López, A. Márquez, and R. Esquivel-Sirvent	
Optical response of two-dimensional Dirac materials with a flat band (<i>18 pages</i>)	155405
Chen-Di Han and Ying-Cheng Lai	
Dynamical construction of quadrupolar and octupolar topological superconductors (<i>7 pages</i>)	155406
Arnob Kumar Ghosh, Tanay Nag, and Arijit Saha	
 Tunable artificial topological Hall effects in van der Waals heterointerfaces (<i>7 pages</i>)	155407
Meri Algarni, Cheng Tan, Guolin Zheng, Sultan Albarakati, Xiangde Zhu, James Partridge, Yanglin Zhu, Lawrence Farrar, Mingliang Tian, Jianhui Zhou, Xiaolin Wang, Zhiqiang Mao, and Lan Wang	
 Surface plasmon driven enhancement of linear and nonlinear magneto-optical Kerr effects in bimetallic magnetoplasmonic crystals in conical diffraction (<i>10 pages</i>)	155408
V. B. Novikov, A. M. Romashkina, D. A. Ezenkova, I. A. Rodionov, K. N. Afanasyev, A. V. Baryshev, and T. V. Murzina	
Quantum transport through a quantum dot side-coupled to a Majorana bound state pair in the presence of electron-phonon interaction (<i>27 pages</i>)	155409
Levente Máthé, Doru Sticlet, and Liviu P. Zárbo	
Interplay of band geometry and topology in ideal Chern insulators in the presence of external electromagnetic fields (<i>14 pages</i>)	155410
Christian Northe, Giandomenico Palumbo, Jonathan Sturm, Christian Tutschku, and Ewelina. M. Hankiewicz	
Dissipation and gate timing errors in SWAP operations of qubits (<i>6 pages</i>)	155411
Nathan L. Foulk, Robert E. Throckmorton, and S. Das Sarma	
Dynamical approach to improving Majorana qubits and distinguishing them from trivial bound states (<i>20 pages</i>)	155412
Brett Min, Bastien Fajardo, T. Pereg-Barnea, and Kartiek Agarwal	
Metallization and proximity superconductivity in topological insulator nanowires (<i>10 pages</i>)	155413
Henry F. Legg, Daniel Loss, and Jelena Klinovaja	
Symmetry-enforced nodal lines in the band structures of vacancy-engineered graphene (<i>8 pages</i>)	155414
Matheus S. M. de Sousa, Fujun Liu, Mariana Malard, Fanyao Qu, and Wei Chen	
Bipolar semiconductor in two-dimensional covalent organic frameworks (<i>9 pages</i>)	155415
Xu Guo, Haimen Mu, Tianyi Hu, Qunxiang Li, and Z. F. Wang	

(Continued)

Terahertz radiation induced circular Hall effect in graphene (<i>11 pages</i>)	155416
S. Candussio, S. Bernreuter, T. Rockinger, K. Watanabe, T. Taniguchi, J. Eroms, I. A. Dmitriev, D. Weiss, and S. D. Ganichev	
Linewidths and energy shifts of electron-impurity resonant states in quantum wells with infinite barriers (<i>11 pages</i>)	155417
Pavel A. Belov	
Multiterminal ballistic Josephson junctions coupled to normal leads (<i>22 pages</i>)	155418
Régis Mélin	
Rashba-split image-potential state and unoccupied surface electronic structure of Re(0001) (<i>9 pages</i>)	155419
Fabian Schöttke, Sven Schemmelmann, Peter Krüger, and Markus Donath	
☞ All-order correlation of single excitons in nanocrystals using a $\mathbf{k} \cdot \mathbf{p}$ envelope-function approach: Application to lead halide perovskites (<i>14 pages</i>)	155420
S. A. Blundell and C. Guet	
Nonequilibrium phase transition in a single-electron micromaser (<i>13 pages</i>)	155421
Fredrik Brange, Aydin Deger, and Christian Flindt	
Large suppression of spin-relaxation rate in graphene nanoribbons in the presence of magnetic impurities (<i>18 pages</i>)	155422
Van Minh Nguyen and C. S. Chu	
Higher-order topological superconductor on the bipartite triangular lattice (<i>10 pages</i>)	155423
A. D. Fedoseev	

ERRATA

Erratum: Topological band evolution between Lieb and kagome lattices [Phys. Rev. B 99 , 125131 (2019)] (<i>1 page</i>)	159901(E)
Wei Jiang, Meng Kang, Huaqing Huang, Hongxing Xu, Tony Low, and Feng Liu	
Erratum: Two-component electronic phase separation in the doped Mott insulator $\text{Y}_{1-x}\text{Ca}_x\text{TiO}_3$ [Phys. Rev. B 104 , 045112 (2021)] (<i>1 page</i>)	159902(E)
S. Hameed, J. Joe, D. M. Gautreau, J. W. Freeland, T. Birol, and M. Greven	
Erratum: Quantum criticality in NdFe_2Ga_8 under magnetic field [Phys. Rev. B 103 , 035107 (2021)] (<i>1 page</i>)	159903(E)
Cuixiang Wang, Xingyu Wang, Le Wang, Meng Yang, Youting Song, Zhenyu Mi, Gang Li, Youguo Shi, Shiliang Li, and Yi-feng Yang	
Erratum: Origin of orbital ordering in YTiO_3 and LaTiO_3 [Phys. Rev. B 102 , 035113 (2020)] (<i>1 page</i>)	159904(E)
Xue-Jing Zhang, Erik Koch, and Eva Pavarini	
Erratum: Why the first magic-angle is different from others in twisted graphene bilayers: Interlayer currents, kinetic and confinement energy, and wave-function localization [Phys. Rev. B 105 , 115434 (2022)] (<i>1 page</i>)	159905(E)
Leonardo A. Navarro-Labastida, Abdiel Espinosa-Champo, Enrique Aguilar-Mendez, and Gerardo G. Naumis	