

## N. Peter Armitage

September 20th, 2022

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### RESEARCH INTERESTS

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Correlated electrons, quantum phase transitions, quantum measurement, topological states of matter, superconductivity, quantum magnetism, electron glasses, optical spectroscopy, terahertz instrumentation, microwave spectroscopy

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### APPOINTMENTS

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**Professor**, Dept of Physics and Astronomy, The Johns Hopkins University, July 2017 – Present

**Visiting Professor**, Institute for Solid State Physics, University of Tokyo, Sept. 2018-March 2019

**Vice-Chair for Research and Facilities**, Dept of Physics and Astronomy, The Johns Hopkins University, Sept. 2013 – present

**Associate Professor with tenure**, Dept of Physics and Astronomy, The Johns Hopkins University, July 2013 – June 2017

**Asst. Professor**, Dept of Physics and Astronomy, The Johns Hopkins University, July 2006 – June 2013 (*on leave July 2005 – July 2006*)

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### EDUCATION AND TRAINING

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**NSF International Research Fellow**, University of Geneva, Switzerland, September 2004-July 2006: group of Dirk van der Marel

**Postdoctoral Fellow**, University of California, Los Angeles, October 2001-August 2004: group of George Gruner

**Stanford University**, Stanford, CA, 2002

**Ph.D.** in Physics

Dissertation: "Doping the copper-oxygen planes with electrons: The view with photoemission", Advisor: Z.-X. Shen

**Rutgers University**, New Brunswick, NJ, 1994

**B.Sc.** in Physics,

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### AWARDS AND HONORS

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- **2019-2024 Fellow** of the Canadian Institute for Advance Research (CIFAR) program in Quantum Materials
- **2020** Gordon and Betty Moore Foundation, EPIQS Experimental Investigator
- **2019 Nakamura Lecturer** University of Santa Barbara, Dept. of Materials Science and Engineering
- **2019 Zhong-Guan-Cun Forum Lecturer** IoP, Chinese of Academy of Sciences
- **2018-2019 JSPS Invitational Fellowships for Research** in Japan and Visiting Professor at the University of Tokyo
- **2016 Ludwig Genzel Prize** for exceptional contributions to the field of condensed-matter spectroscopy
- **2011, 2010, 2009 Kavli Frontiers Fellow, National Academy of Sciences**
- **2010 DARPA Young Faculty Award**
- **2009 NSF Career Award**
- **2007 Alfred P. Sloan Research Fellowship**
- **2005 William L. McMillan Award** for outstanding contributions in condensed matter physics from University of Illinois
- **2004 W.E. Spicer Award** for scientific excellence from *Stanford Synchrotron Radiation Laboratory*
- **2004 NSF International Research Fellowship Award** for research at University of Geneva 2004-2005
- **Richard T. Weidner Prize** for Physics Honors, Rutgers University, 1994
- **Mary Wheeler Wigner Memorial Scholarship** for undergraduate research, Rutgers University, 1993

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## MENTORING

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### Postdoctoral Fellows:

Kota Katsumi	September 2022 - present
Liyu Shi	October 2021 - present
Santhosh Kadakuntla	April 2021 - present
Anaëlle Legros	March 2019 – Dec. 2021: Lecturer Montpellier
Fahad Mahmood	July 2016 – July 2020: Asst. Professor Univ. Illinois
Mintu Mondal	June - 2016 - June 2017: Asst. Prof, IACS Kolkata
Chris Morris	Oct. 2011 - July 2015: Industry
Yuval Lubashevky	Aug. 2011 – May 2014: Industry
Andreas Stier	Aug. 2011 – April 2013, group leader TU Munich
LiDong Pan	June 2011 – August 2015: Industry
Mohammad Neshat	Nov. 2010 – Oct. 2012: Assoc. Prof. Univ. Tehran
Rolando Valdes Aguilar	Nov. 2008 – Aug. 2012: Asst. Prof. Ohio State

### Graduate Students:

Will Liang  
 Ralph Romero  
 Sirak Mekonen  
 Zhenisbek Tagay

David Barbalas  
Rishi Bhandia  
Prashant Chauhan                      PhD. Oct. 2022 (Staff Intel)  
Dipanjan Chaudhuri                 PhD. Oct. 2021 (Postdoc UIUC)  
Xinshu Zhang                           PhD. April 2021 (Postdoc UCLA)  
Youcheng Wang                        PhD. Sept. 2020 (Postdoc NHMFL)  
Bing Chen                                PhD. Sept. 2019 (Postdoc Stanford, then Ames)  
Nicholas Laurita                        PhD. July 2017 (Lockheed Research Staff)  
Liang Wu                                 PhD. December 2015, (Asst. Prof., Univ. of Penn.)  
Grace Bosse                              PhD. August 2015, (Lecturer Univ. N. Florida)  
Wei Liu                                     PhD. Dec. 2012, (Industry)  
Lucas Bilbro                              PhD. July 2012 (Industry)

**Undergraduate:**

Alec Farid                                 Fall 2014  
Daniel Weissglass                       Summer 2012 – Fall 2013  
Jiyeong Kim                               Summer 2010 – Spring 2012  
Alex Day                                    Fall 2008 – Summer 2010  
Matthew Pines                            Summer 2007  
James McIver                             Spring 2007, Harvard PhD., now group leader Hamburg

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**PUBLICATIONS**

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Publications: 135 Citations: 11,200+    h-index: 49 [Google Scholar]

135. Tanya Berry, Nicodemos Varnava, Dominic Ryan, Veronica Stewart, Riho Rästa, Ivo Heinmaa, Nitesh Kumar, Walter Schnelle, Rishi Bhandia, Christopher Pasco, **N.P. Armitage**, Raivo Stern, Claudia Felser, David Vanderbilt, Tyrel M McQueen  
Magnetic phase crossover in strongly correlated  $\text{EuMn}_2\text{P}_2$   
arXiv preprint arXiv:2209.01707

134. Alexey Kimel, Anatoly Zvezdin, Sangeeta Sharma, Samuel Shallcross, Nuno De Sousa, Antonio Garcia-Martin, Georgeta Salvan, Jaroslav Hamrle, Ondrej Stejskal, Jeffrey Mccord, Silvia Tacchi, Giovanni Carlotti, Pietro Gambardella, Gian Salis, Markus Muenzenberg, Martin Schultze, Vasily Temnov, Igor V Bychkov, Leonid N Kotov, Nicolò Maccaferri, Daria Ignatyeva, Vladimir Belotelov, Claire Donnelly, Aurelio Hierro Rodriguez, Iwao Matsuda, Thierry Ruchon, Mauro Fanciulli, Maurizio Sacchi, Chunhui Rita Du, Hailong Wang, **N Peter Armitage**, Mathias Schubert, Vanya Darakchieva, Bilu Liu, Ziyang Huang, Baofu Ding, Andreas Berger, Paolo Vavassori  
The 2022 Magneto-Optics Roadmap  
Journal of Physics D: Applied Physics

133. Thomas Halloran, Yishu Wang, Mengqun Li, Ioannis Rousochatzakis, Prashant Chauhan, MB Stone, Tomohiro Takayama, Hidenori Takagi, **N.P. Armitage**, Natalia B Perkins, Collin Broholm  
Magnetic excitations and interactions in the Kitaev hyperhoneycomb iridate  
Physical Review B 106 (6), 064423 (2022)

132. A Legros, K.W. Post, Prashant Chauhan, D.G. Rickel, Xi He, Ivan Bozovic, S.A. Crooker, **N.P. Armitage**  
Evolution of the cyclotron mass with doping in  $\text{LaSrCuO}_4$   
arXiv preprint arXiv:2205.12444
131. D. Barbalas, A. Legros, G. Rimal, S. Oh, **N.P. Armitage**  
Disorder-enhanced effective masses and deviations from Matthiessen's rule in  $\text{PdCoO}_2$  thin films  
arXiv preprint arXiv:2205.05006
130. D Chaudhuri, D Barbalas, R Romero III, F Mahmood, J Liang, ...  
Anomalous high-temperature THz nonlinearity in superconductors near the metal-insulator transition  
arXiv preprint arXiv:2204.04203
129. Prashant Chauhan, Candice Thomas, Tyler Lindemann, Geoffrey C. Gardner, J. Gukelberger, M. J. Manfra, **N. P. Armitage**  
Measurements of cyclotron resonance of the interfacial states in strong spin-orbit coupled 2D electron gases proximitized with aluminum  
Applied Physics Letters 120 (14), 142105
128. J. R. Chamorro, P. Chauhan, C. Sun, N. Varnava, M. J. Winiarski, N. Ng, H. K. Vivanco, L. A. Pressley, C. M. Pasco, D. Vanderbilt, Yi Li, **N. P. Armitage**, T. M. McQueen  
Anomalous Residual Surface Conductivity in a Superconductor with Strong Spin-Orbit Coupling  
Submitted 2022
- 127 Q.L. He, T.L. Hughes, **N.P. Armitage**, Y. Tokura, K.L. Wang  
Topological spintronics and magnetoelectronics  
Nature Materials 21 (1), 15-23 (2022).
- 126 Wang, LS; Xu, Y; Huang, YY; Ni, JM; Zhao, CC; Dai, YF; Pan, BY; Hong, XC; Chauhan, P; Koohpayeh, SM; **Armitage, NP**; SY Li  
Quantum Critical Magnetic Excitations in Spin-1/2 and Spin-1 Chain Systems, accepted  
Physical Review X 12 (2), 021020 (2022)
- 125 Mahmood, Fahad; Ingram, David; He, Xi; Clayhold, JA; Bozovic, Ivan, **N.P. Armitage**, Effect of radiation-induced defects on the superfluid density and optical conductivity of overdoped  $\text{La}_{2-x}\text{Sr}_x\text{CuO}_4$   
Physical Review B 105 (17), 174501 (2022)
- 124 Chauhan, Prashant; Budhani, Ramesh; **Armitage, NP**,  
Anomalous small superconducting gap in the strong spin-orbit coupled superconductor:  $\beta$ -Tungsten, Physical Review B 105 (6), L060503
- 123 Zhang, Xinshu; Xu, Yuanyuan; Zhong, Ruidan; Cava, RJ; Drichko, N; **Armitage, N.P.**

In-and out-of-plane field induced quantum spin-liquid states in a more ideal Kitaev material:  $\text{BaCo}_2(\text{AsO}_4)_2$ , arXiv preprint arXiv:2106.13418 (2021), Accepted Nature Materials

122 Mekonen, Sirak M; Kang, Chang-Jong; Chaudhuri, Dipanjan; Barbalas, David; Ran, Sheng; Kotliar, Gabriel; Butch, Nicholas P; **Armitage, NP**  
An optical investigation of the heavy fermion normal state in superconducting  $\text{UTe}_2$ ,  
Physical Review B 106 (8), 085125

121 Rishi Bhandia, Bing Cheng, Tobias L Brown-Heft, Shouvik Chatterjee, Christopher J Palmström, **NP Armitage**  
THz-range Faraday rotation in the Weyl semimetal candidate  $\text{Co}_2\text{TiGe}$   
Journal of Applied Physics 128 (24), 2443032020 (2020).

120 Youcheng Wang, HP Nair, NJ Schreiber, JP Ruf, Bing Cheng, DG Schlom, KM Shen, **NP Armitage**  
Separated transport relaxation scales and interband scattering in  $\text{SrRuO}_3$ ,  $\text{CaRuO}_3$ , and  $\text{SrRuO}_3$  thin films  
Physical Review B 103 (20), 205109 (2021).

119 B Cheng, T Schumann, S Stemmer, **N.P. Armitage**  
Probing charge pumping and relaxation of the chiral anomaly in a Dirac semimetal  
Science Advances 7 (16), eabg0914 (2021)

118 Anaëlle Legros, Shang-Shun Zhang, Xiaojian Bai, Hao Zhang, Zhiling Dun, W Adam Phelan, Cristian D Batista, Martin Mourigal, **NP Armitage**  
Observation of 4- and 6-magnon bound-states in the spin-anisotropic frustrated antiferromagnet  $\text{FeI}_2$   
Physical Review Letters 127, no. 26 267201 (2021)

117 F Mahmood, D Chaudhuri, S Gopalakrishnan, R Nandkishore, **N.P. Armitage**  
Observation of a marginal Fermi glass using THz 2D coherent spectroscopy  
Nature Physics (2021). <https://doi.org/10.1038/s41567-020-01149-0>

116 CM Morris, Nisheeta Desai, J Viirik, D Huvonen, U Nagel, T Room, JW Krizan, RJ Cava, TM McQueen, SM Koohpayeh, Ribhu K Kaul, **NP Armitage**  
Duality and domain wall dynamics in a twisted Kitaev chain  
Nature Physics 1-5 (2021).

115 Z. Tagay, F. Mahmood, A. Legros, T. Sarkar, R.L. Greene, **N.P. Armitage**  
BCS d-wave behavior in the THz electrodynamic response of an electron-doped cuprate superconductor  
Physical Review B 104 (6), 064501 (2021)

114 D. Barbalas, S Chatterjee, DG Schlom, KM Shen, **NP Armitage**  
Terahertz Electrodynamics of Mixed-Valent  $\text{YbAl}_3$  and  $\text{LuAl}_3$  Thin Films  
The European Physical Journal B 94 (9), 1-8 (2021)

- 113 Youcheng Wang, G Bossé, HP Nair, NJ Schreiber, JP Ruf, B Cheng, C Adamo, DE Shai, Y Lubashevsky, DG Schlom, KM Shen, **NP Armitage**  
Subterahertz Momentum Drag and Violation of Matthiessen's Rule in an Ultraclean Ferromagnetic Metallic Thin Film  
Physical Review Letters 125 (21), 217401 (2021)
- 112 Dipanjan Chaudhuri, Maryam Salehi, Sayak Dasgupta, Mintu Mondal, Jisoo Moon, Deepti Jain, Seongshik Oh, **NP Armitage**  
Ambipolar magneto-optical response of ultra-low carrier density topological insulators  
Physical Review B 103 (8), L081110 (2021)
- 111 A Alexandradinata, **NP Armitage**, A Baydin, W Bi, Y Cao, HJ Changlani, ...  
The Future of the Correlated Electron Problem  
arXiv preprint arXiv:2010.005842020
- 110 Xinshu Zhang, Yi Luo, T Halloran, J Gaudet, Huiyuan Man, SM Koohpayeh, **NP Armitage**  
Low Energy Magneto-optics of TbTiO in [111] Magnetic Field  
Physical Review B 103 (14), L140403 (2021).
- 109 K Wang, Bing Xu, CW Rischau, N Bachar, B Michon, J Teyssier, Y Qiu, T Ohtsuki, Bing Cheng, **NP Armitage**, S Nakatsuji, D van Der Marel  
Unconventional free charge in the correlated semimetal  $\text{Nd}_2\text{Ir}_2\text{O}_7$   
Nat. Phys. **16**, 1194–1198 (2020).
- 108 KW Post, A Legros, DG Rickel, J Singleton, RD McDonald, Xi He, I Bozovic, X Xu, X Shi, **N.P. Armitage**, SA Crooker  
Observation of cyclotron resonance and measurement of the hole mass in optimally-doped  $\text{La}_{2-x}\text{Sr}_x\text{CuO}_4$   
Physical Review B 103 (13), 134515
- 107 Bing Cheng, Natsuki Kanda, Tatsuhiko N Ikeda, Takuya Matsuda, Peiyu Xia, Timo Schumann, Susanne Stemmer, Jiro Itatani, **N.P. Armitage**, Ryusuke Matsunaga  
Efficient Terahertz Harmonic Generation with Coherent Acceleration of Electrons in the Dirac Semimetal  $\text{Cd}_3\text{As}_2$   
Physical Review Letters 124 (11), 117402 (2020)
- 167 L Wu, A Farid, NJ Laurita, T Mueller, **N.P. Armitage**  
A compact broadband terahertz range quarter-wave plate  
Journal of Infrared, Millimeter, and Terahertz Waves, 1-13 (2020)
- 105 T Matsuda, N Kanda, T Higo, **N.P. Armitage**, S Nakatsuji, R Matsunaga  
Room-temperature terahertz anomalous Hall effect in Weyl antiferromagnet  $\text{Mn}_3\text{Sn}$  thin films  
Nature Communications 11 (1), 1-8 (2020)
- 104 P Chauhan, F Mahmood, HJ Changlani, SM Koohpayeh, **N.P. Armitage**  
Tunable Magnon Interactions in a Ferromagnetic Spin-1 Chain  
Physical Review Letters 124 (3), 037203 (2020)

103 **N.P. Armitage**

Superconductivity mystery turns 25  
*Nature* **576**, 386-387 (2019)

102 A Mukherjee, J Seo, MM Arik, H Zhang, C Zhang, T Kirzhner, DK George, AG Markelz, **N.P. Armitage**, G Koren, JYT Wei, J Cerne  
Linear dichroism infrared resonance in over-, under-, and optimally-doped cuprate superconductors  
*Physical Review B* 102 (5), 054520 (2020)

101 Bing Cheng, T Schumann, YC Wang, XS Zhang, D Barbalas, S Stemmer, **N.P. Armitage**

A large effective phonon magnetic moment in a Dirac semimetal  
*Nano Letters* 20 (8), 5991-5996 (2020)

100. Y Wan, **N.P. Armitage**

Resolving continua of fractional excitations by spinon echo in THz 2D coherent spectroscopy  
*Physical Review Letters* 122 (25), 257401 (2019)

99. Bing Cheng, Youcheng Wang, D. Barbalas, Tomoya Higo, S. Nakatsuji, and **N.P. Armitage**

Terahertz conductivity of the magnetic Weyl semimetal  $Mn_3Sn$  films  
*Appl. Phys. Lett.* 115, 012405 (2019)

98. Bing Cheng, P. Taylor, P. Folkes, Charles Rong, **N. P. Armitage**

Magnetoterahertz Response and Faraday Rotation from Massive Dirac Fermions in the Topological Crystalline Insulator  $Pb_{0.5}Sn_{0.5}Te$   
*Phys. Rev. Lett.* 122, 097401 (2019)

97. J Steinberg, **N.P. Armitage**, F.H.L. Essler, S Sachdev

NMR relaxation in Ising spin chains  
*Physical Review B* 99.3 035156 (2019)

96. **N.P. Armitage**, L Wu

On the matter of topological insulators as magnetoelectrics  
*SciPost Physics* 6 (4), 046

95. P. Chauhan, F. Mahmood, D. Yue, P.C. Xu, X. Jin, **N.P. Armitage**

Nodeless bulk superconductivity in the time-reversal symmetry breaking Bi/Ni bilayer system  
*Physical Review Letters* 122, 017002 (2019).

94. Fahad Mahmood, Xi He, Ivan Bozovic, and **N.P. Armitage**

Locating the missing superconducting electrons in overdoped cuprates  
*Physical Review Letters* 122 (2), 027003 (2019)

93. Mintu Mondal, Dipanjan Chaudhuri, Maryam Salehi, Cheng Wan, N.J. Laurita, Bing Cheng, Andreas V. Stier, Michael A. Quintero, Jisoo Moon, Deepti Jain, Pavel P.

Shibayev, James R. Neilson, Seongshik Oh, **N.P. Armitage**  
Electric field modulated topological magnetoelectric effect in  $\text{Bi}_2\text{Se}_3$   
Physical Review B 98 (12), 121106 (2018)

92. Xinshu Zhang, Fahad Mahmood, Marcus Daum, Zhiling Dun, Joseph A.M. Paddison, Nicholas J. Laurita, Tao Hong, Haidong Zhou, **N.P. Armitage**, Martin Mourigal  
Hierarchy of exchange interactions in the triangular-lattice spin-liquid  $\text{YbMgGaO}_4$   
Physical Review X 8 (3), 031001 (2018)

91. Y. Wang, I. Tamir, D. Shahar, **N.P. Armitage**  
Absence of Cyclotron Resonance in the Anomalous Metallic Phase in  $\text{InOx}$   
Physical Review Letters 120 (16), 167002 (2018)

90. **N.P. Armitage**, E. J. Mele, Ashvin Vishwanath  
Weyl and Dirac Semimetals in Three Dimensional Solids  
Reviews of Modern Physics 90 (1), 015001 (2018)

89. Bing Cheng, T. Ohtsuki, Dipanjan Chaudhuri, S. Nakatsuji, Mikk Lippmaa, and **N. P. Armitage**  
Dielectric anomalies and interactions in the 3D quadratic band touching Luttinger semimetal  $\text{Pr}_2\text{Ir}_2\text{O}_7$   
Nature Communications 8 (1), 2097 (2017)

88. **N.P. Armitage**  
Inertial effects in systems with magnetic charge  
Physica B: Condensed Matter (2017)

87. N.J. Laurita, C.M. Morris, S.M.Koohpayeh, W.A. Phelan, T.M. McQueen, **N.P. Armitage**  
Impurities or a neutral Fermi surface? A further examination of the low-energy ac optical conductivity of  $\text{SmB}_6$   
Physica B: Condensed Matter (2017).

86. N. J. Laurita, Yi Luo, Rongwei Hu, Meixia Wu, S. W. Cheong, O. Tchernyshyov, and **N. P. Armitage**  
Anomalous exchange interactions between  $\text{RE}^{+3}$  and  $\text{Mn}^{+3}$  moments in multiferroic  $\text{h-REMnO}_3$   
Physical Review Letter (2017).

85. N. J. Laurita, G. G. Marcus, B. A. Trump, J. Kindervater, M. B. Stone, T. M. McQueen, C. L. Broholm, **N. P. Armitage**  
Low energy magnon dynamics and magneto-optics of the skyrmionic Mott insulator  $\text{Cu}_2\text{OSeO}_3$   
Physical Review B, 95(23), 235155. (2017).

84. Dipanjan Chaudhuri, Bing Cheng, Alexander Yaresko, Quinn D. Gibson, R. J. Cava, **N.P. Armitage**  
Optical investigation of the strong spin-orbital coupled magnetic semimetal  $\text{YbMnBi}_2$



Physical Review B 96 (7), 075151(2017).

83. R. M. Ireland, Liang Wu, M. Salehi, S. Oh, **N. P. Armitage**, H. E. Katz  
Nonvolatile Solid-State Charged-Polymer Gating of Topological Insulators into the  
Topological Insulating Regime  
Physical Review Applied 9(4), 044003 (2017).

82. Liang Wu, M. Salehi, N. Koirala, J. Moon, S. Oh, **N.P. Armitage**  
Quantized Faraday and Kerr rotation and axion electrodynamics of the surface states of  
three-dimensional topological insulator  
Science 354, 1124-1127 (2016).

81. L. Zhao, C. A. Belvin, R. Liang, D. A. Bonn, W. N. Hardy, **N. P. Armitage**, D. Hsieh  
A global inversion-symmetry-broken phase inside the pseudogap region of  $\text{YBa}_2\text{Cu}_3\text{O}_y$   
Nature Physics (2016).

80. Bing Cheng, Liang Wu, S. K. Kushwaha, R. J. Cava, and **N. P. Armitage**  
Measurement of the topological surface state optical conductance in bulk-insulating Sn-  
doped  $\text{Bi}_{1.1}\text{Sb}_{0.9}\text{Te}_2\text{S}$  single crystals  
Phys. Rev. B **94**, 201117(R) (2016).

79. N. J. Laurita, C. M. Morris, S. M. Koohpayeh, P. F. S. Rosa, W. A. Phelan, Z. Fisk, T.  
M. McQueen, **N. P. Armitage**  
Anomalous three-dimensional bulk ac conduction within the Kondo gap of  $\text{SmB}_6$   
single crystals  
Phys. Rev B 94, 165154 (2016).

78. A. Akrap, M. Haki, S. Tchoumakov, I. Crassee, J. Kuba, M. O. Goerbig, C. C.  
Homes, O. Caha, J. Novak, F. Teppe, S. Koohpayeh, Liang Wu, **N. P. Armitage**, A.  
Nateprov, E. Arushanov, Q. D. Gibson, R. J. Cava, D. van der Marel, C. Faugeras, G.  
Martinez, M. Potemski, M. Orlita  
Magneto-optical signature of massless Kane electrons in  $\text{Cd}_3\text{As}_2$   
Phys. Rev. Lett. 117, 136401 (2016).

77. Matthew Brahlek, Nikesh Koirala, Maryam Salehi, Jisoo Moon, Wenhan Zhang,  
Haoxiang Li, Xiaoqing Zhou, Myung-Geun Han, Liang Wu, Thomas Emge, Hang-Dong  
Lee, Can Xu, Seuk Joo Rhee, Torgny Gustafsson, **N. Peter Armitage**, Yimei Zhu,  
Daniel S. Dessau, Weida Wu, Seongshik Oh  
Disorder-driven topological phase transition in  $\text{Bi}_2\text{Se}_3$  films  
Phys. Rev. B 94, 165104 (2016).

76. **N. Peter Armitage**  
Kitaev's exact solution approximated  
Nature Materials 15, 701–702 (2016).

75. A. Farid, N.J. Laurita, B. Tehrani, J. Hester, M.M. Tenteris, **N.P. Armitage**  
Inkjet Printed Wire-Grid Polarizers for the THz Frequency Range  
Infrared Millimeter Terahertz Waves (2016).

74. N.J. Laurita, Bing Cheng, R. Barkhouser, V.A. Neumann, and **N.P. Armitage**  
A Modified 8f Geometry With Reduced Optical Aberrations For Improved Time Domain Terahertz Spectroscopy  
Infrared Millimeter Terahertz Waves (2016).
73. Liang Wu, Tim Mueller, **N.P. Armitage**  
A compact broadband Terahertz range quarter-wave plate  
Submitted Journal of Infrared, Millimeter and Terahertz waves (2016).
72. Liang Wu, R.M. Ireland, M. Salehi, B. Cheng, N. Koirala, S. Oh, H. E. Katz, **N.P. Armitage**  
Tuning and Stabilizing Topological Insulator  $\text{Bi}_2\text{Se}_3$  in the Intrinsic Regime by Charge Extraction with Organic Overlayers  
Appl. Phys. Lett. 108, 221603 (2016).
71. Bing Cheng, Liang Wu, N. J. Laurita, Harkirat Singh, Madhavi Chand, Pratap Raychaudhuri, and **N.P. Armitage**  
Anomalous gap edge dissipation in disordered superconductors on the brink of localization  
Phys. Rev. B 93, 180511(R) (2016).
70. G. Bossé, LiDong Pan, Y. Li, L. H. Greene, J. Eckstein, and **N.P. Armitage**  
Hund's coupling and anomalous frequency and temperature dependent scattering in the almost quantum critical heavy fermion system  $\text{CeFe}_2\text{Ge}_2$   
Phys. Rev. B 93, 085104 (2016).
69. Nikesh Koirala, Matthew Brahlek, Maryam Salehi, Liang Wu, Jixia Dai, Justin Waugh, Thomas Nummy, Myung-Geun Han, Jisoo Moon, Yimei Zhu, Daniel Dessau, Weida Wu, **N. Peter Armitage**, Seongshik Oh  
Record surface state mobility and quantum Hall effect in topological insulator thin films via interface engineering  
Nano Letters 15, 8245-8249 (2015).
68. LiDong Pan, Christopher M. Morris, Kate A. Ross, Edwin Kermarrec, Bruce D. Gaulin, S. M. Koohpayeh, and **N.P. Armitage**  
Measurement of monopole inertia in a quantum spin ice  
Nature Physics December (2015) doi:10.1038/nphys3608.
67. Liang Wu, Wang-Kong Tse, M. Brahlek, C. M. Morris, R. Valdés Aguilar, N. Koirala, S. Oh, and **N.P. Armitage**  
High-Resolution Faraday Rotation and Electron-Phonon Coupling in Surface States of the Bulk-Insulating Topological Insulator  $\text{Cu}_{0.02}\text{Bi}_2\text{Se}_3$   
Phys. Rev. Lett. 115, 217602 (2015).
66. Maryam Salehi, Matthew Brahlek, Nikesh Koirala, Jisoo Moon, Liang Wu, **N.P. Armitage**, Seongshik Oh  
Stability of low-carrier-density topological-insulator  $\text{Bi}_2\text{Se}_3$  thin films and effect of capping layers  
APL Materials 3, 091101 (2015).

65. V. A. Neumann, N. J. Laurita, LiDong Pan, **N.P. Armitage**  
Reduction of Effective Terahertz Focal Spot Size By Means Of Nested Concentric Parabolic Reflectors  
AIP Advances 5, 097203 (2015).
64. N. J. Laurita, J. Deisenhofer, LiDong Pan, C. M. Morris, A. Loidl, and **N.P. Armitage**  
Singlet-triplet excitations in the spin-orbital liquid candidate  $\text{FeSc}_2\text{S}_4$   
Phys. Rev. Lett. 114, 207201 (2015).
63. LiDong Pan, Se Kwon Kim, A. Ghosh, Christopher M. Morris, Kate A. Ross, Edwin Kermarrec, Bruce D. Gaulin, S. M. Koohpayeh, Oleg Tchernyshyov and **N.P. Armitage**  
Low Energy Electrodynamics of Novel Spin Excitations in the Quantum Spin Ice  $\text{Yb}_2\text{Ti}_2\text{O}_7$   
Nature Communications 5, 4970 (2014).
62. **N.P. Armitage**  
Cuprate superconductors: Dynamic stabilization?  
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Physica C 341-348 (2000) 2087-2090

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### PROFESSIONAL SERVICE

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- 2022 APS Richard L. Greene Thesis Award Committee.

- 2021-2024 American Physical Society – Executive Committee, Division of Condensed Matter Physics
- 2021 Max Planck Dresden Director Hiring Committee
- 2021 Co-organizer Aspen Center for Physics, Topological Materials across the Correlation Spectrum
- 2020 Conference Organizer – Low Energy Electrodynamics of Solids
- 2020 DoD Topological Materials Advisory Panel
- 2020 Conference Organizer– The Future of the Correlated Electron System
- 2019 LBNL DOE external referee
- 2019 Conference Organizer – The challenge of 2D superconductivity
- 2017 LANL LDRD external site visit panel member
- 2017 Quantum 4 Africa; Program Committee Member
- 2016 Materials and Mechanisms of Superconductivity; Program Committee Member
- Site visit Harvard/MIT/Howard STC Center for Integrated Quantum Materials
- Panelist and Author for DOE report on “Basic Research Needs (BRN) for Quantum Materials for Energy Relevant Technology”
- DMP Focus session organizer for Topological Materials 2016 March Meeting
- External Thesis referee, University of Augsburg
- Chair 2014 Gordon Conference on “Correlated Electron Systems”
- Lecturer 2014 Paul Scherrer Institut Summer School
- Vice-Chair 2013-2015 Proposal Review Panel, LCLS, SLAC
- 2014 APS March Meeting DMP Topological Materials Focus Session coorganizer
- 2013 External Review Committee Member Cornell Center for Materials Research
- 2011-2015 Proposal Review Panel, LINAC Coherent Light Source, SLAC
- External Thesis referee, University of British Columbia
- European Research Council External Referee
- External Referee Dutch Science Foundation
- External Referee Georgian Science Foundation
- Vice-Chair 2012 Gordon Conference on “Correlated Electron Systems”
- Co-Organizer Lorentz Center Conference on “Strongly disordered superconductors and electronic segregation”, Leiden August 2011.
- Lecturer 2011 Princeton Summer School for Condensed Matter Physics
- External Referee for Phd. Thesis Sophie Charpetier, Univ. of Sherbrooke
- Subject Organizer for Strong Correlated Electron Systems for APS March meeting, 2009, 2010
- Organizer 2010, 2011 National Academy Kavli Frontiers of Science Conference
- Multiple time Professor Extraordinaire Demonstration Show at JHU Physics Fair
- Multiple time Demonstration Show for Roland Park Elementary Sch. 5<sup>th</sup> Grade
- Lecturer 2008 Boulder Summer School for Condensed Matter Physics
- Co-Organizer for 2010 JHU Conference on “Exotic Insulating States of Matter”
- Proposal Referee for US DOE, *Office of Basic Energy Sciences*
- Civilian Research and Development Foundation Proposal Referee
- *NSF* Proposal Referee and Panelist
- *Petroleum Research Fund* Proposal Referee
- Faculty reviewer for updated edition Tipler/Mosca's *Physics for Scientists & Engineers*

- Referee- *Nature*
- Referee- *Science*
- Referee- *Nature Physics*
- Referee- *Nature Materials*
- Referee- *Proceedings of the National Academy*
- Referee - *Physical Review Letters*
- Referee - *Physical Review B*
- Referee – *New Journal of Physics*
- Referee – *Europhysics Letters*
- Referee - *Journal of Electron Spectroscopy and Related Phenomena*
- Referee – *Journal of Physics and Chemistry of Solids*
- Referee - *Physica Status Solidi*

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## GRANTS

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*(Contribution from multi-investigator grants given as a proportion considering the total number of PIs)*

Canadian Institute for Advanced Research (CIFAR) Fellow  
07/01/2019 – 07/01/25 \$240,000

Gordon and Betty Moore Foundation, EPIQS Experimental Investigator  
4/01/2020 - 4/01/2025, \$1,600,000

MURI: Implementation of axion electrodynamics in topological films and devices  
Army Research Office  
05/01/2020 – 04/30/2025, \$892,857 (7 PIs)

The Future of the Correlated Electron Problem Workshop  
NSF  
\$49,673, 11/01/2019 – 02/29/2020

Non-linear THz optical effects as a probe of Berry's phase in topological materials  
NSF  
\$360,000 11/01/2019-11/30/2022

Long-term High-Temperature Coherence in Driven Superconductors  
DARPA  
\$254,069 10/01/2018 - 03/31/2021

MRI: Acquisition of Magnetic Property Measurement System  
NSF  
06/01/2019 - 05/31/2020, \$458,254

EFRC: The Institute for Quantum Matter  
Department of Energy

08/01/2018 – 07/31/2022, \$395 833.333 (with 11 PIs)

Engineering topological surface states in 2D chalcogenide heterostructures  
National Science Foundation  
\$330,000 10/01/15 - 10/01/18 (with 4 PIs)

THz Measures of Axion Electrodynamics and Exotic Superconducting Interfaces in  
Topological Insulator Films and Their Heterostructures  
Army Research Office  
\$523,251 9/01/15 - 2/28/20

Low energy electrodynamics of strongly interacting disordered systems: quantum phase  
transitions and many-body localization  
National Science Foundation  
\$360,000 7/01/15 - 7/01/18

Johns Hopkins Institute for Quantum Matter, Department of Energy, 09/01/14 - 08/31/17,  
\$714,000 (7 co-PIs)

NSF, "Gate-Modulated Charge Density-Dependent Physics of Low-Dimensional  
Inorganic Semiconductors in Organic Multilayers," with Howard E. Katz, Seongshik Oh,  
Norman P. Armitage, 09/01/13 - 08/31/16 \$520,000

CERDEC-STCD US Army, "A Novel Low Cost Fabrication Technique for Produce  
Topological Insulators for use in RF switches - Bismuth Selenide Thin Films", \$20,000  
03/2012 – 03/2013

Johns Hopkins Institute for Quantum Matter, Department of Energy, 09/01/11 - 08/31/14,  
\$660,000 (6 co-PIs)

Funding for workshop "2012 Low energy electrodynamics of solids", 07/11, Institute of  
Complex Adaptive Matter, \$15,000, (with Dmitri Basov)

Funding for workshop "Lorentz Center workshop on Strongly disordered  
superconductors and electronic segregation", 02/11, Institute of Complex Adaptive  
Matter, \$5,000 (with Lev Ioffe)

Moore Foundation "Terahertz investigations of complex condensed matter", 9/10/- 9/15,  
\$2,401,755

DARPA Young Faculty Award, Department of Defense, 07/01/10 – 06/30/12, \$299,066

Equipment Supplement for IQM: Acquisition of a high-resolution Raman spectrometer for  
measurements on correlated electron systems, 09/01/10 – 08/31/11, (Lead PI, but with  
C. Broholm) \$417,625

JHU Workshop on "Exotic superconducting and insulating phases of quantum matter",  
01/10, Institute of Complex Adaptive Matter, \$20,000

NSF Career Award: Terahertz and microwave investigations of complex quantum matter, National Science Foundation, 07/01/09 - 06/30/14, \$691,160

Time-Domain Terahertz Ellipsometer (TDTE) for Reflection-Mode Sensing, Department of Defense, 07/01/08 - 12/31/08, \$50,000

Johns Hopkins Institute for Quantum Matter, Department of Energy, 09/01/08 - 08/31/11, \$642,860 (5 co-PIs)

NSF MRI: Acquisition of a high field, multi-probe cryogenic system for quantum and nanostructured materials research, National Science Foundation, 10/01/08 - 09/30/09, \$501,374 (8 co-PIs)

Invention, Development, and Application of a Time-domain THz Ellipsometer, JHU Applied Physics Laboratory Partnership Award, 02/15/06 - 02/15/07, ~ \$20,000

Alfred P. Sloan Foundation Fellowship, 09/16/07 - 09/15/09, \$45,000

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## PATENTS

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Patent No. 7,956,525 - Flexible Nanostructure Electronic Devices  
Issued to UCLA Technology Transfer office, June 7, 2011.

Patent filed with JHU Technology Transfer on –*Time-domain THz ellipsometry*  
Public disclosure March 2012  
Provisional patent filed January 2013  
Patent approved 2016

Provisional patent under preparation  
*A Broad-band THz quarter wave plate*

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## TEACHING

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	Course taught		Enrollment
Spring 2022	171.622	Adv. Cond Matter Physics	10
Fall 2021	171.703	Adv. Statistical Mechanics	20
Spring 2021	171.622	Adv. Cond Matter Physics	10
Fall 2020	171.312	Statistical Mechanics	10
Spring 2020	171.622	Adv. Cond Matter Physics	10
Fall 2019	171.312	Statistical Mechanics	10
Spring 2018	171.104	Intro to Physics for Bio Major	340
Fall 2017	171.312	Statistical Mechanics	10
Spring 2017	171.104	Intro to Physics for Bio Major	290

Fall 2016	171.312	Statistical Mechanics	10
Spring 2016	171.104	Intro to Physics for Bio Major	250
Fall 2015	171.312	Statistical Mechanics	10
Spring 2015	171.104	Intro to Physics for Bio Major	250
Fall 2014	171.105	Intro to Mechanics for Phys. Maj.	35
Spring 2014	171.622	Adv. Cond Matter Physics	5
Fall 2013	171.105	Intro to Mechanics for Phys. Maj.	35
Spring 2013	171.622	Adv. Cond Matter Physics	5
Fall 2012	171.105	Intro to Mechanics for Phys. Maj.	34
Spring 2012	171.62	Adv. Cond Matter Physics	15
Fall 2011	171.15	Intro to Mechanics for Phys. Maj.	30
Fall 2010	171.405 / 171.621	Intro to Condensed Matter	10
Fall 2009	172.114	Frontier Physics w/ Tchernyshyov	20
Fall 2009	171.405 / 171.621	Intro to Condensed Matter	10
Spring 2009	173.308	Advanced Laboratory	20
Fall 2008	171.405 / 171.621	Intro to Condensed Matter	10
Spring 2008	173.308	Advanced Laboratory	20
Fall 2007	171.405 / 171.621	Intro to Condensed Matter	10
Spring 2007	172.114	Frontier Physics w/ Markovic	20
Fall 2006	173.308	Advanced Laboratory	4

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### DEPARTMENTAL AND UNIVERSITY SERVICE

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2021-2022 KSAS Faculty Senate Chair

2021-2022 KSAS Faculty Senate Secretary

Department Vice-chair for Research: September 2013 – present  
Managed space and renovations to laboratory buildings

Lead acquisition of \$500,000 project for Helium Requiifier in Bloomberg Center

Faculty Czar of Helium Requiifier in Bloomberg Center August 13 – present

Member of Department Graduate Admissions Committee Fall 2012

Physical Science Machine Shop Faculty Advisor Spring 2007 –Sept. 2013

Chairman of Recruitment Committee Fall 2009 –Fall 2012

Dept. of Physics and Astronomy, Graduate Admissions Committee  
Spring 2013

Dept. of Physics and Astronomy, Faculty Search Committee  
Spring 2013

Served on approximately 20 PhD. thesis defenses, 25 Graduate Board Orals, and 25 Preliminary Oral Exams, and a reader of 10 PhD. theses.

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## **PERSONAL**

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Interests: World history, Politics, Philosophy, Bicycling, Running, Skiing, Mountaineering, Anything outdoors...

2 time National Collegiate Cycling Champion

Multiple-time State Cycling Champion (New Jersey and California)