S. Lance Cooper

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Professional Preparation

University of Virginia	Physics	B.S., *summa cum laude*	1982
University of Illinois, Urbana	Physics	Ph.D.	1988
AT&T Bell Laboratories	Materials Science	postdoctoral training	1988–1990

Appointments

Associate Head for Graduate Programs, Dept. of Physics, University of Illinois	2011–present
Professor of Physics, University of Illinois, Urbana	2001–present
Associate Professor of Physics, University of Illinois, Urbana	1996–2001
Assistant Professor of Physics, University of Illinois, Urbana	1990–1996

Awards and Honors

2023 Education Innovation Fellow, College of Engineering, 2023-2026
2018 Campus Award for Excellence in Graduate Student Mentoring
2013 American Physical Society Outstanding Referee Award
2011 College of Engineering Outstanding Advisor Award
2008 Arnold T. Nordsieck Award for Teaching Excellence
Sony Faculty Scholar Award, College of Engineering, University of Illinois, 2003-2006
Fellow of the American Physical Society, 2003
2007 Multi-Year Faculty Achievement Award, College of Engineering, UIUC
2006 Excellence in Lecturing Award, UIUC Student Senate
UIUC Engineering Council Award for Academic Advising, 2006 and 2007
University of Illinois "List of Teachers Rated as Excellent," 1998, 2001, 2004-2023
Anderson Award for Excellence in Undergraduate Advising, 1992, 1996
IBM Predoctoral Fellow, 1986-1987
Phi Beta Kappa, 1982

Editorial Boards and Scientific Advisory Committees

Divisional Associate Editor, *Physical Review Letters* (Condensed Matter), 2006-2011
Member of Scientific Advisory Committee, Helmholtz Research Center, University of Hamburg.
Member of the Defense Science Study Group, Institute for Defense Analysis (1993 – 1995).

Professional Service

Secretary/Treasurer and member of the Executive Committee for the Division of Condensed Matter Physics, American Physical Society, 2015-2019
Site Leader, Inclusive Graduate Education Network (IGEN), American Physical Society, 2016-present
2010 American Physical Society Frank Isakson Prize Selection Committee, Chair
2008 American Physical Society Frank Isakson Prize Selection Committee, Vice Chair
National Science Foundation Review Panels, 2005, 2006, 2008, 2010-2018, 2021-2023

Conference/Symposium Organization

Session Chair, *Correlated Physics*, 2012 Low Energy Electrodynamics in Solids (LEES) Conference, Napa, California, July 22-27, 2012.
Co-organizer, *Workshop on Quantum Materials at the Nanoscale*, Urbana, IL, Sept. 2009
National Advisory Committee, Low Temperature 24 Conference, Orlando, Florida, Aug. 10-17, 2005
Co-organizer, *Workshop on Novel Electronic Materials*, Lexington, Kentucky, April 25-27, 2005

Session Chair, *Symposium on Competing States and Inhomogeneity in Transition Metal Oxides,* 2004 American Physical Society March Meeting, Montreal, Canada, March, 2004.

Session Chair, *Workshop on Phase Competition in Transition Metal Oxides and Other Compounds*, University of California at Berkeley, California, May 14-16, 2003.

Co-organizer, *50th Midwest Solid State Physics Conference,* Loomis Laboratory of Physics, Urbana, Illinois, October 18-20, 2002.

Session Chair, *Magnetoresistive Oxides: Spin and Charge Excitations*, 2002 American Physical Society March Meeting, Indianapolis, Indiana, March 2002.

Session Chair, *Charge/Orbital Order*, 2001 American Physical Society March Meeting, Seattle, Washington, March 2001.

Co-organizer of *Kleinfest*, retirement symposium for Miles V. Klein, Urbana, IL, November 2000.

Teaching and Course Development

Lecturer: Physics 595, Communicating Science Research (Spring semesters 2023, 2024): Scientific communication course for graduate students.

Lecturer: Physics 598PEN, Communicating Physics Research (Spring semesters 2013 - 2022): Developed scientific communication course for graduate students on how to write scientific papers, give scientific presentations, referee papers, write scientific proposals, etc.

Lecturer: Physics 596, Graduate Physics Orientation (Fall semesters 2011 - 2023): Added professional development lectures on how to write scientific papers, give scientific presentations, referee papers, and use online resources.

Lecturer: Physics 211, Classical Mechanics (Spring 2011)

Lecturer: Physics 496/499, Intro. to Physics Research/Senior Thesis (Spring 2008 – Fall 2010)

Lecturer: Physics 486-487, Quantum Physics I & II (Spring 2006, Fall 2006, Spring 2007, Fall 2007)

Lecturer: Physics 498ST (499), Senior Thesis (Fall 2004, Fall 2005, Fall 2008)

Lecturer: Physics 498IPR (496), Introduction to Physics Research (Spring 2005, Spring 2008)

Lecturer: Physics 383, Quantum Mechanics and Atomic Theory (Spring 2004)

Lecturer and Developer: Physics 199HT, Honors Physics 113/114 (Fall 2002 – Spring 2004): Developed Discussion problems and Computer/Laboratory activities for new Honors section to accompany Physics 113/114.

Lecturer: Physics 113/114, Thermal and Quantum Physics (Fall 2000- Fall 2003): Developed new lectures for Physics 114.

Discussion Section Administrator: Physics 113/114, Thermal and Quantum Physics (Spring 1999 – Spring 2000)

Lab Administrator and Developer: Physics 111, Classical Mechanics (Fall 1996 – Spring 1998): Developed 10 Laboratories and an associated Lab Manual for new Physics 111 (mechanics) course.

Lab Administrator: Physics 101, Physics I (Spring 1996)

Lab Administrator: Physics 106, Introduction to Mechanics (Fall 1995)

Lecturer: Physics 383, Quantum Mechanics and Atomic Theory (Fall 1994 and Spring 1995)

Lecturer: Physics 331, Electricity and Magnetism (Spring 1993 – Spring 1994)

Lecturer: Physics 371, Light and Optics (Fall 1991 – Fall 1992)

Discussion Administrator: Physics 108, Introduction to Modern Physics (Fall 1990 – Spring 1991)

Advising Activities

Graduate Advisor for 40-70 first-year graduate students each year.

PhD Thesis Advisor for 14 PhD students: Marvin Karlow, Texas Instruments; Paul Nyhus, Intel Corp.; Praveen Dua, Lattice Semiconductor; Seokhyun Yoon, Professor at Ewha Women's College, Seoul, South Korea; Clark Snow, Member of Technical Staff at Sandia National Laboratory; John Karpus, Intel Corp.; Harini Barath, freelance science writer; Minjung Kim, Intel Corp.; Shi Yuan, Intel Corp.; Taylor Byrum, Texas Instruments; Sam Gleason, Inprentus, Inc.; Yewon Gim, senior member of technical staff, AT&T Foundry; Astha Sethi, Intel Corp; John Eddie Slimak, Honeywell Corp.

Past Postdoctoral Advisor for 4 Research Associates: Rajeev Gupta, Asst. Professor at IIT, New Delhi, India; Heesuk Rho, Asst. Professor at Chonbuk University, Korea; Michael Ruebhausen, Professor, University of Hamburg; Hsiang-Lin Liu, Assoc. Professor at Taiwan National University.

Departmental Service

Associate Head for Graduate Programs (2011-2024)
Graduate Admissions Committee (1998-present); Chair (2003-2024)
Faculty Diversity Committee (2018-2024)
Graduate Student Advisor (2011-2024)
Condensed Matter Experimental Search Committee (2024)
McMillan Award Committee (2011-2012)
Communications Coordinator Search Committee (2011-2012)
Condensed Matter Search Committee, Chair (2010-2011)
Appointments, Promotions, and Strategic Planning Committee (2006-2011)
Atomic, Molecular, and Optical Search Committee (2006-2007)
Condensed Matter Theory Search Committee (2003-2006)
1st year Graduate Student Advisor and Mentor (2002-2004)
PhD Qualifying Examination Committee, Spring 1993, Fall 1999, Fall 2003, and Spring 2008
Representative to Faculty Senate (2001-2003)
Undergraduate Studies Committee (1998 – 2002)
Condensed Matter Experimental Search Committee, Co-Chair (1998-1999)
McMillan Award Committee (1997-1999); Chair (1999)
Undergraduate Advisor (1992 – present); Chief Advisor (1993 – 2000)
Physics Colloquium Chair, Fall 1996 and Spring 1997
Departmental Advisory Committee (1993 – 1995)
Safety and Security Committee (1992 – 1994)
Condensed Matter Seminar Chair, Spring 1992 and Fall 2006

College of Engineering Service

Education Innovation Fellow, 2023-2026
Strategic Instructional Innovations Program (SIIP) project on "Improving the writing skills of undergraduate engineering students: Empowering engineering faculty and teaching assistants" (2017-2023)
IDEA Institute GIANT Project Mentor (2019-2023)
College of Engineering Diversity Committee (2017-2020)
Strategic Instructional Innovations Program (SIIP) project on "Improving the writing skills of undergraduate engineering students" (2016-2019)
MRL Director Search Committee (2015)
Lam Fellowship Selection Committee (2014)
MRL Facilities Director Search Committee, Chair (2010-2011)
MRL Executive Committee (2007-2016)
MRL Facilities Committee, Chair (2006-2011)
Physics Department Head Search Committee (2006)
College ad hoc Promotion and Tenure Appeals Committee (2005)
FS-MRL Laser and Spectroscopy Laboratory Committee (2000-present)
College Executive Committee (2000-2004); Vice-Chair (2002-2003); Secretary (2001-2002)
College Administrative Committee (2001-2003)
College Promotions and Tenure Committee (2001-2003); Chair (2002-2003)
College Grievance Committee (2002-2003)
Roy J. Carver Fellowship Selection Committee (2000-2003)
Women in Engineering Scholarship Committee (1998-2002)

Campus Service

Co-PI, Member of Steering Committee, and Member of Scholarship Review Board for Illinois Sloan University Center for Exemplary Mentoring (2015-2024)
Diversity Realized at Illinois by Visioning Excellence (DRIVE) Committee (2018-2024)
Graduate College Fellowship Board (2015-2024)
Office of Access and Equity Faculty Appeals Committee (2018-2024)
Illinois AAU PhD Education Initiative Administrative and STEM Teams (2019-2022)
Graduate College Graduate Mentoring Guidelines Working Group (2018-2019)
Graduate College Block Grant Allocations Working Group (2018-2019)
Center for Writing Studies Campus Advisory Committee (2017-2018)
I-STEM Review Committee (2016)
Graduate College Focal Point Review Panel (2015)
Global Young Scientists Summit Travel Award Review Committee (2014)
Member of Advisory Committee for NSF-funded project Role-Play Scenarios for Teaching Responsible Conduct of Research (2006-2010)
Campus Promotions and Tenure Committee (2005-2006)
Faculty Senate (2000-2003)

Publications - Book Chapters/Review Articles

S. L. Cooper, "Exploring the magnetostructural phases of the layered ruthenates with Raman scattering", Chapter 5 in *Frontiers of 4d and 5d Transition Metal Oxides* (World Scientific Publishing, 2013).

S. L. Cooper, P. Abbamonte, N. Mason, C.S. Snow, M. Kim, H. Barath, J.F. Karpus, C. Chialvo, J.P. Reed, Y.I. Joe, X. Chen, D. Casa, and Y. Gan, "Raman scattering as a tool for studying complex materials", Chapter 6 in *Optical Techniques for Solid State Materials Characterization* (Taylor & Francis, 2011).

S.L. Cooper, H. Rho, C.S. Snow, "Illuminating magnetic cluster formation with inelastic light scattering," Chapter 20 in *Nanoscale Phase Separation and Colossal Magnetoresistance,* ed. by E. Dagotto (Springer-Verlag, Berlin, 2003).

S.L. Cooper, "Magnetic and electronic Raman scattering studies of high T_c superconductors," *Handbook on the Physics and Chemistry of Rare Earths* **31**, 505–559, ed. K.A. Gschneidner, L. Eyring, and M.B. Maple (Elsevier, Amsterdam), 2001.

S.L. Cooper, "Optical spectroscopic studies of metal-insulator transitions in perovskite-related oxides," *Structure and Bonding* **98**, p. 161–219 (2001).

S.L. Cooper, H.L. Liu, S.-W. Cheong, J. Sarrao, and Z. Fisk, "Spectroscopic studies of inhomogeneous electronic phases in colossal magnetoresistance and charge-ordering compounds," ed. by Z. Fisk, L. Gorkov, and R. Schrieffer (World Scientific Press: Singapore), *Physical Phenomena at High Magnetic Fields III* (1999).

S.L. Cooper and K.E. Gray, "Anisotropy and interlayer coupling in the high T_c cuprates," *Physical Properties of High Temperature Superconductors IV,* ed. by D. M. Ginsberg (World Scientific: Singapore), p. 61-188 (1994).

S.L. Cooper and M.V. Klein, "Light scattering studies of the low frequency excitation spectra of high temperature superconductors," *Comments on Cond. Matt. Phys.* **15**, 99-124 (1990).

Publications – Journal Articles

J. E. Slimak, A. Cote, G. J. MacDougall, and S. L. Cooper, "Soft Phonon Anomalies and Crystal Electric Field-Phonon Coupling in Cubic Lanthanide Sesquioxides Eu_2O_3 and Yb_2O_3," *Physical Review B* **108**, 045128 (2023).

A. Cote, J. E. Slimak, A. Sethi, S. L. Cooper, G. MacDougall, D. Reig-i-Plessis and A. M. Hallas, Q. Zhang, Y. Zhao, C. Brown, J. Lynn, D. Adroja, G. Morris, and T. Kolodiazhnyi, "Direct confirmation of long-range magnetic order and evidence for multipoles in Ce_2O_3," submitted to *Physical Review B* and posted in arXiv:2303.11878 (2023).

R. Ware, M. Mericle, C. Elliott, J.S. Popovics, S.L. Cooper, J.R. Gallagher, P. Prior, and J.L. Zilles, "Promoting pedagogical change around writing: Observations of discursive turbulence," *2022 ASEE Annual Conference and Exposition (2022)*.

J.E. Slimak, A. Sethi, T. Kolodiazhnyi, and S.L. Cooper, "Soft mode behavior and evidence for pressure-induced magnetostructural effects in Pr_2O_3," *Physical Review Research* **2**, 043169 (2020).

S. Buchenau, S. Scheitz, A. Sethi, J. E. Slimak, T. E. Glier, P. K. Das, T. Dankwort, L. Akinsinde, L. Kienle, A. Rusydi, C. Ulrich, S. L. Cooper, and M. Ruebhausen, "Temperature and magnetic field dependent Raman study of electron-phonon interactions in thin films of Bi_2Se_3 and Bi_2Te_3 nanoflakes," *Physical Review B* **101**, 245431 (2020).

B. Kovanen, R. Ware, M. Mericle, N. Turnipseed, J.P. Coleman, C. Elliott, J.S. Popovics, S.L. Cooper, J.R. Gallagher, P. Prior, and J.L. Zilles, "Implementing Writing-as-Process in Engineering Education," *2020 ASEE Annual Conference and Exposition* (2020).

J. R. Gallagher, N. Turnipseed, J. Y. Yoritomo, C. M. Elliott, S. L. Cooper, J. S. Popovics, P. Prior, and J. L. Zilles, "A collaborative longitudinal design for supporting writing pedagogies of STEM faculty," *Technical Communication Quarterly* **29**, 411-426 (2020).

A. Sethi, J. E. Slimak, T. Kolodiazhnyi, and S. L. Cooper, "Emergent vibronic excitations in the magnetodielectric regime of Ce_2O_3," *Physical Review Letters* **122**, 177601 (2019).

B. Wolin, X. Wang, T. Naibert, S.L. Gleason, G.J. MacDougall, H.D. Zhou, S.L. Cooper, and R. Budakian, "Real-space magnetic imaging of the multiferroic spinels MnV_2O_4 and Mn_3O_4," *Physical Review Materials* 2, 064407 (2018).

J. Y. Yoritomo, N. Turnipseed, S.L. Cooper, C.M. Elliott, J.R. Gallagher, J.S. Popovics, P. Prior, and J.L. Zilles, "Examining engineering writing instruction at a large research university through the lens of writing studies," *2018 ASEE Annual Conference & Exposition* (2018).

D. Phelan, F. Han, A. Lopez-Bezanilla, M. J. Krogstad, Y. Gim, Y. Rong, J. Zhang, D. Parshall, H. Zheng, S. L. Cooper, M. Feygenson, W.G. Yang, and Yu-Sheng Chen, "Structural properties of Barium Stannate," *Journal of Solid State Chemistry* **262**, 142 (2018).

A. Sethi, T. Byrum, R.D. McAuliffe, S.L. Gleason, J.E. Slimak, D.P. Shoemaker, and S.L. Cooper, "Magnons and magnetodielectric effects in $CoCr_2O_4$: Raman scattering studies," *Physical Review B* **95**, 174413 (2017).

R. Soto-Garrido, Y. Wang, E. Fradkin, and S.L. Cooper, "Higgs modes in the pair density wave superconducting state," *Physical Review B* **95**, 214502 (2017).

T. Byrum, S.L. Gleason, A. Thaler, G.J. MacDougall, and S.L. Cooper, "Effects of magnetic field and twinned domains on magnetostructural phase mixture in Mn_3O_4: Raman scattering studies of untwinned crystals," *Physical Review B* **93**, 184418 (2016).

Y. Gim, A. Sethi, Q. Zhao, J.F. Mitchell, G. Cao, and S.L. Cooper, "Isotropic and anisotropic regimes of the field-dependent spin dynamics in Sr_2IrO_4: Raman scattering studies," *Physical Review B* **93**, 024405 (2016).

S.L. Gleason, Y. Gim, T. Byrum, A. Kogar, P. Abbamonte, E. Fradkin, G.J. MacDougall, D.J. Van Harlingen, C. Petrovic, and S.L. Cooper, "Structural contributions to the pressured-tuned charge-density-wave to superconductor transition in $ZrTe_3$: Raman scattering studies," *Physical Review B* **91**, 155214 (2015).

X.M. Chen, C. Nugroho, A.J. Miller, Y.I. Joe, A. Kogar, J.D. Brock, J. Geck, G.J. MacDougall, S.L. Cooper, E. Fradkin, D.J. Van Harlingen, and P. Abbamonte, "Influence of Ti doping on the incommensurate charge density wave in *1T*-TaS_2," *Physical Review B* **91**, 245113 (2015).

S-C. Weng, R. Xu, A.H. Said, B.M. Leu, Y. Ding, H. Hong, X. Fang, M.Y. Chou, A. Bosak, P. Abbamonte, S.L. Cooper, E. Fradkin, S.-L. Chang, and T.-C. Chiang, "Pressure-induced antiferrodistortive phase transition in $SrTiO_3$: Common scaling of soft-mode with pressure and temperature," *Europhysics Letters* **107**, 36006 (2014).

Y.I. Joe, X.M. Chen, P. Ghaemi, K.D. Finkelstein, G.A. de la Pena, Y. Gan, J.C.T. Lee, S. Yuan, J. Geck, G.J. MacDougall, T.C. Chiang, S.L. Cooper, E. Fradkin, P. Abbamonte, "Emergence of charge density wave domain walls above the superconducting dome in $TiSe_2$," *Nature Physics* **10**, 421 (2014).

S.L. Gleason, T. Byrum, Y. Gim, A. Thaler, P. Abbamonte, G.J. MacDougall, L.W. Martin, H.D. Zhou, and S.L. Cooper, "Magnon spectra and strong spin-lattice coupling in magnetically frustrated MnB_2O_4 (*B*=Mn,V): Inelastic light scattering studies," *Phys. Rev. B* **89**, 134402 (2014).

S. Yuan, M. Kim, J.T. Seeley, J.C.T. Lee, S. Lal, P. Abbamonte, and S.L. Cooper, "Inelastic light scattering measurements of a pressure-induced quantum fluid in $KCuF_3$," *Phys. Rev. Lett.* **109**, 217402 (2012).

James C. T. Lee, Shi Yuan, Siddhartha Lal, Young Il Joe, Yu Gan, Serban Smadici, Ken Finkelstein, Yejun Feng, Andrivo Rusydi, Paul M. Goldbart, S. Lance Cooper, and Peter Abbamonte, "Two-step stabilization of orbital order and the dynamical frustration of spin in the model charge-transfer insulator $KCuF_3$," *Nature Physics* **8**, 63-66 (2012).

M. Kim, X.M. Chen, X. Wang, C.S. Nelson, R. Budakian, P. Abbamonte and S.L. Cooper, "Pressure- and field-tuning the magnetostructural phases of Mn_3O_4: Raman scattering and x-ray diffraction studies," *Phys. Rev. B* **84**, 174424 (2011).

M. Kim, X. Chen, Y.I. Joe, E. Fradkin, P. Abbamonte, and S.L. Cooper, "Mapping the magneto-structural quantum phases of Mn_3O_4," *Phys. Rev. Lett.* **102**, 136402, p. 1-4 (2010).

M. Kim, H. Barath, X. Chen, Y-I. Joe, E. Fradkin, P. Abbamonte, and S.L. Cooper, "Magnetic-field- and pressure-induced quantum phases in complex materials," *Advanced Materials* **22**, p. 1148-1155 (2010).

H. Barath, M. Kim, S.L. Cooper, P. Abbamonte, I. Mahns, M. Rübhausen, N. Aliouane and D.N. Argyriou, Domain fluctuations near the field-induced incommensurate-commensurate transition in $TbMnO_3$, *Phys. Rev. B* **78**, 134407, p. 1-7 (2008). *Selected by the editors of *Phys. Rev. B* as an 'Editors Suggestion' paper.

A. Rusydi, R. Rauer, G. Neuber, M. Bastjan, I. Mahns, S. Muller, P. Saichu, B. Schulz, S. G. Singer, A. I. Lichtenstein, D. Qi, X. Gao, X. Yu, A.T.S. Wee, G. Stryganyuk, K. Dorr, G. A. Sawatzky, S.L. Cooper, and M. Rubhausen, Metal to insulator transition in manganites - optical conductivity changes up to 22 eV, *Phys. Rev. B* **78**, 125110, p. 1-5 (2008). *Selected by the editors of *Phys. Rev. B* as an 'Editors Suggestion' paper.

M. Bastjan, S.G. Singer, G. Neuber, S. Eller, N. Aliouane, D.N. Argyriou, S.L. Cooper, M. Rubhausen, Magneto-optical study of the spin polarized electronics states in multiferroic $TbMnO_3$, *Phys. Rev. B* **77**, 193105, p. 1-3 (2008).

H. Barath, M. Kim, J.F. Karpus, S.L. Cooper, P. Abbamonte, E. Fradkin, E. Morosan, and R.J. Cava, Quantum and classical mode softening near the charge-density-wave/superconductor transition of Cu_x-$TiSe_2$, *Phys. Rev. Lett.* **100**, 106402, p. 1-4 (2008).

M. Kim, H. Barath, S.L. Cooper, P. Abbamonte, E. Fradkin, M. Rübhausen, C.L. Zhang, and S-W. Cheong, Raman scattering studies of temperature- and field-Induced melting of charge order in $(La,Pr,Ca)MnO_3$, *Phys. Rev. B* **77**, 134411, p. 1-13 (2008).

H. Rho, S.L. Cooper, S. Nakatsuji, and Y. Maeno, Second-order phase transition in $Ca_{2-x}Sr_xRuO_4$: A Raman study, *J. Magn. Magn. Mat*. **310**, e266-268 (2007).

R. Gupta, M. Kim, H. Barath, S.L. Cooper, and G. Cao, "Field- and pressure-induced phases in $Sr_4Ru_3O_{10}$: a spectroscopic investigation," *Phys. Rev. Lett.* **96**, 067004, p. 1-4 (2006).

J.F. Karpus, C.S. Snow, R. Gupta, H. Barath, S.L. Cooper, and G. Cao, "Spectroscopic study of the field- and pressure-induced phases of the bilayered ruthenate $Ca_3Ru_2O_7$," *Phys. Review B* **73**, 134407, p. 1-15 (2006).

J.K. Freericks, T.P. Devereaux, M. Moraghebi, and S.L. Cooper, "Optical sum rules that relate to the potential energy of strongly correlated systems," *Phys. Rev. Lett.* **94**, 216401, p. 1-4 (2005).

A. Comment, J-P. Ansermet, C.P. Slichter, H. Rho, C.S. Snow, and S.L. Cooper, "Magnetic properties of pure and Gd-doped EuO probed by NMR," *Phys. Rev. B* **72**, 014428, p. 1-12 (2005).

H. Rho, S.L. Cooper, S. Nakatsuji, H. Fukazawa, and Y. Maeno, "Lattice dynamics and the electron-phonon interaction in Ca_2RuO_4," *Phys. Rev. B* **71**, 245121, p. 1-6 (2005).

S.G. Choi, S.K. Srivastava, C.J. Palmstrom, Y.D. Kim, S.L. Cooper, D.E. Aspnes, "Optical properties of $(GaSb)_{3n}(AlSb)_n$ ($1 \le n \le 5$) superlattices," *J. Vac. Sci. Technol. B* **23**, 1149-1153 (2005).

S.G. Choi, C.J. Palmstrom, Y.D. Kim, S.L. Cooper, D.E. Aspnes, "Dielectric functions of $Al_xGa_{1-x}Sb$ ($0.00 \le x \le 0.39$) alloys from 1.5 to 6.0 eV," *J. Applied Physics* **98**, 104108 (2005).

J.F. Karpus, R. Gupta, H. Barath, S.L. Cooper, and G. Cao, "Raman scattering studies of field-induced melting of the orbital-ordered state in $Ca_3Ru_2O_7$," *Physica B* **359-361**, 1234-1236 (2005).

H. Rho, S.L. Cooper, S. Nakatsuji, H. Fukazawa, and Y. Maeno, "Raman scattering studies of phase transitions in $Ca_{2-x}Sr_xRuO_4$," *Physica B* **359-361**, 1270-1272 (2005).

J.F. Karpus, R. Gupta, H. Barath, S.L. Cooper, and G. Cao, "Field-induced orbital and magnetic phases in $Ca_3Ru_2O_7$," *Phys. Rev. Lett.* **93**, 167205, p. 1-4 (2004).

C.S. Snow, J.F. Karpus, S.L. Cooper, T.E. Kidd, T.-C. Chiang, "Quantum melting of the charge density wave state in *1T*-$TiSe_2$," *Phys. Rev. Lett.* **91**, 136402, p. 1-4 (2003).

H. Rho, S.L. Cooper, S. Nakatsuji, H. Fukazawa, and Y. Maeno, "Raman scattering studies of spin, charge, and lattice dynamics in $Ca_{2-x}Sr_xRuO_4$ ($0 < x < 0.2$)," *Phys. Rev. B {Rapid Communications}* **68**, 100404, p. 1-4 (2003).

C.S. Snow, S.L. Cooper, G. Cao, J.E. Crow, S. Nakatsuji, Y. Maeno, "Pressure-tuned collapse of the Mott-like state in $Ca_{n+1}Ru_nO_{3n+1}$ (n=1,2): Raman spectroscopic studies," *Phys. Rev. Lett.* **89**, 226401, p. 1-4 (2002).

H. Rho, C.S. Snow, S.L. Cooper, Z. Fisk, A. Comment, and J-Ph. Ansermet, "Evolution of magnetic polarons and spin-carrier interactions through the metal-insulator transition in $Eu_{1-x}Gd_xO$," *Phys. Rev. Lett.* **88**, 127401, p. 1–4 (2002).

R. Rauer, J. Backstrom, D. Budelmann, M. Kurfith, M. Schilling, M. Ruebhausen, T. Walter, K. Dorr, and S. L. Cooper, "Thickness dependent phase separation in $La_{0.7}Ca_{0.3}MnO_3$ films," *Appl. Phys. Lett*. **81**, 3777-3779 (2002).

H. Rho, C.S. Snow, S.L. Cooper, Z. Fisk, A. Comment, and J-Ph. Ansermet, "Raman scattering study of temperature- and field-dependent magnetic polaron formation in (Eu,Gd)O," *Int. J. Mod. Phys. B* **16**, 3364-3367 (2002).

S. Naler, M. Ruebhausen, S. Yoon, S.L. Cooper, K.H. Kim, and S.W. Cheong, "Lattice dynamics and charge ordering in $La_{1-x}Ca_xMnO_3$ ($0.45 < x < 0.76$)," *Phys. Rev. B* **65**, 092401, 1-4 (2002).

J.W. Allen, M. Aronson, G.S. Boebinger, C.L. Broholm, S.L. Cooper, J.E. Crow, P.C. Hammel, and G. Lander, "Future probes in materials science," *Physica B* **318**, 12-23 (2002).

H. Rho, C.S. Snow, S.L. Cooper, Z. Fisk, A. Comment, and J-Ph. Ansermet, "The evolution of magnetic polarons in $Eu_{1-x}Gd_xO$: A light scattering study," *Physica B* **312**, 775-776 (2002).

C.S. Snow, S. L. Cooper, D. P. Young, Z. Fisk, A. Comment, and J-Ph. Ansermet, "Magnetic polarons and the metal-semiconductor transitions in (Eu,La)B_6 and EuO: Raman scattering studies," *Phys. Rev. B* **64**, 174412, 1-12 (2001).

G.A. Thomas, D.A. Ackerman, P.R. Prucnal, and S.L. Cooper, "Physics in the whirlwind of optical communications," *Physics Today* **53**, 30–36 (2000).

S. Yoon, M. Ruebhausen, S.L. Cooper, K.H. Kim, and S-W. Cheong, "Raman scattering study of anomalous spin, charge, and lattice dynamics in the charge-ordered phase of $Bi_{1-x}Ca_xMnO_3$ ($x > 0.5$)," *Phys. Rev. Lett.* **85**, 3297–3300 (2000).

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