

# JOSHUA J. TURNER

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## EDUCATION

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*Doctor of Philosophy Degree in Physics* 2003 – 2008

University of Oregon · Eugene, OR

Thesis: “Probing Complex Ordering and Dynamics in Colossal Magnetoresistive Transition-metal Oxides Using Coherent Resonant Soft X-ray Scattering”

Advisor: Prof. Stephen D. Kevan

*Master of Arts Degree in Physics* 2001 – 2002

Boston University · Boston, MA

*Bachelor of Science Degree in Mathematics* 1997 – 2001

University of California, Santa Barbara · Santa Barbara, CA

*Bachelor of Arts Degree in Physics* 1997 – 2001

University of California, Santa Barbara · Santa Barbara, CA

## RESEARCH INTERESTS

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- Highly correlated electron physics, orbital ordering, and transition-metal oxides
- Nanomagnetism and low dimensional magnetic systems
- Ultra-fast x-ray and THz science and instrumentation
- Complex and non-ergodic systems
- Nanoporous media and alternative energy
- Coherent x-ray scattering techniques applied to dynamics, metrology, and imaging

## SELECTED PUBLICATIONS

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1. M. Först, et al. *Nature Materials* 14, 883 (2015)
2. H. Xin, et al. *Phys. Rev. Lett.* 114, 156101 (2015)
3. Ph. Wernet, et al. *Nature* 520, 78 (2015)
4. H. Öström, et al. *Science* 347, 978 (2015)
5. S. Eckert, et al. *Appl. Phys. Lett.* 106, 061104 (2015)
6. D. S. Rackstraw, et al. *Phys. Rev. Lett.* 114, 015003 (2015)
7. M. Först, et al. *Phys. Rev. Lett.* 112, 157002 (2014)
8. T. Kubacka, et al. *Science* 343, 1333 (2014)
9. S. de Jong, et al. *Nature Materials* 12, 882 (2013)
10. M. Beye, et al. *Phys. Rev. Lett.* 110, 186101 (2013)
11. Y. D. Chuang, et al. *Phys. Rev. Lett.* 110, 127404 (2013)
12. C. E. Graves, et al. *Nature Materials* 12, 293 (2013)

13. M. Dell'Angela, et al. *Science* 339, 1302 (2013)
14. S. Bernitt, et al. *Nature* 492, 225 (2012)
15. B. I. Cho, et al. *Phys. Rev. Lett.* 109, 245003 (2012)
16. O. Ciricosta, et al. *Phys. Rev. Lett.* 109, 065002 (2012)
17. T. Wang, et al. *Phys. Rev. Lett.* 108, 267403 (2012)
18. S. M. Vinko, et al. *Nature* 482, 592 (2012)
19. S. L. Johnson, et al. *Phys. Rev. Lett.* 108, 037203 (2012)
20. S. Roy, et al. *Nature Photonics* 5, 243 (2011)
21. J. J. Turner, et al. *Phys. Rev. Lett.* 107, 033904 (2011)
22. I. A. Vartanyants, et al. *Phys. Rev. Lett.* 107, 144801 (2011)
23. J. Nelson, et al. *PNAS* 107, 7235 (2010)
24. X. Huang, et al. *Phys. Rev. Lett.* 103, 198101 (2009)
25. J. J. Turner, et al. *Appl. Phys. Lett.* 92, 131907 (2008)
26. M. S. Pierce, et al. *Phys. Rev. Lett.* 94, 017202 (2005)

## SYNERGISTIC ACTIVITIES

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- Co-chair of an international workshop on “Frontiers in Quantum Solids: Combining Soft X-rays and Ultra-fast Techniques” at the SLAC National Accelerator Laboratory, Oct. 4th, 2013
- COSMIC advisory panel member for development of the coherent scattering and microscopy facility at the ALS, Lawrence Berkeley Laboratory
- Manuscript reviewer for *Nature Photonics*; *Institute of Physics*, *Journal of Physics: Condensed Matter* and *Journal of Physics B: Atomic, Molecular & Optical Physics*
- Co-chair of the workshop on “Coherent X-ray Scattering on Multi-functional Materials” at the Lawrence Berkeley National Laboratory, Oct. 9th, 2012.
- Private sector outreach, such as invited lecture for Application of LCLS in Industrial Research workshop in Menlo Park, CA (2014) or colloquium given at Lockheed Martin Advanced Technology Center in Palo Alto, CA (2012).
- Program Co-chair and Local Organizing Committee - LCLS/SSRL Users Meeting October 22-26, 2011 at SLAC National Accelerator Laboratory.
- Science communication to the general public, such as a recent video which was entered in the Palo Alto Film Festival, which I did with my (then) three year old daughter. The link to this 3 minute long short film can be seen here:  
<https://news.slac.stanford.edu/video/short-film-light-source-captures-human-side-slac-research>
- Elementary school outreach, such as speaking to 5th graders at the Juana Briones Elementary School in Palo Alto, CA about “Science, Particle Physics, and X-ray lasers” on January 17th, 2014.
- High school outreach activities such as the lecture given at Los Altos High School for California Science, Technology, Engineering, and Mathematics (STEM) week “Illuminating the Invisible: Science at an X-ray Laser” October 19, 2011 and “Discoveries with an X-ray Laser” for the American Junior Academy of Science on February 12, 2015 at the SLAC National Accelerator Laboratory.
- Public lectures such as ‘The Quantum Light Switch’ Public Lecture at the SLAC National Accelerator Laboratory; Menlo Park, CA in January 2013
- International workshop organizer and chair - “Soft X-ray Materials Research (SXR) Instrumentation and Science Opportunities” workshop October 20, 2010 at SLAC National Accelerator Laboratory.

## **SLAC NATIONAL ACCELERATOR LABORATORY SERVICE**

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- AMO staff scientist hiring committee member 2015
- LCLS in-house science proposal review committee member 2014
- LCLS II Working group co-chair on Quantum Materials (2014-present)
- SLAC public tour guide
- Weekly Photon Science Seminar Series, co-organizer 2013-present
- LCLS Experimental Support Working Group 2013
- SXR Consortium Steering Committee member as LCLS representative (2010-present)
- SLAC Speakers Bureau program member
- LCLS II New Instruments Workshops 2012: Materials/Chemistry discussion leader
- Organizer of weekly SXR “Science” meeting, 2012
- Science Bowl 2012 for high school students, moderator
- LUSI II working group member 2012
- LCLS in-house science/development/commissioning proposal review committee member 2012
- LUSI II whitepaper co-author 2012
- LCLS laser scientist search committee member 2011
- LCLS Detector working group member
- LCLS II CD-0 proposal 2010, co-author
- Kids Day at SLAC 2010, sponsor

## **STUDENTS AND POSTDOCS**

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- Jared Fernandez, Homestead High School - 2015
- Victor Magana, Eastside College Preparatory School - 2015
- Rachel Flaherman, SULI summer student from Swarthmore College - 2014
- Simon Lieu, SULI summer student from Harvard University - 2013
- Niklas Garner, summer student from University of California, Santa Cruz - 2013
- Stephanie Mack, SULI summer student from University of Ottawa - 2012
- Matthew Seaberg, postdoc from 2015 - present
- Georgi Dakovski, postdoc from 2011 - 2013, now at LCLS
- Oleg Krupin, postdoc from 2010 - 2012, now at XFEL in Hamburg, Germany

## **FELLOWSHIPS, SOCIETIES, AND HONORS**

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- The Laboratory Directed Research and Development (LDRD) Program Award at SLAC  
Co-principal Investigator, \$300k/2 years
- American Association for the Advancement of Science member
- American Physical Society member
- Material Research Society member
- ALS Doctoral Fellowship 2003-2004

## INVITED TALKS

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- October 2014 “Research highlights: Understanding exotic materials and properties with LCLS” at Application of LCLS in Industrial Research workshop; Menlo Park, CA
- May 2014 “The SLAC National Accelerator Laboratory & Discoveries with the New X-ray Laser” seminar at IBM’s Silicon Valley Lab; San Jose, CA
- May 2014 “Bits, Bittier Bits Qubits: Physics of Computing” at the technology company Ayasdi; Menlo Park, CA
- November 2013 “An overview of recent results on materials from a soft x-ray free electron laser” at the international workshop Frontiers in Quantum Solids: Combining Soft X-rays and Ultra-fast Techniques; Menlo Park, CA
- July 2013 “Soft X-ray FEL Research on Materials” seminar at The Massachusetts Institute of Technology; Cambridge, MA
- May 2013 “Orbital effects in quantum materials: the case of the manganites” Stanford Institute for Materials and Energy Sciences; Menlo Park, CA
- January 2013 “The Quantum Light Switch” Public Lecture at the SLAC National Accelerator Laboratory; Menlo Park, CA
- January 2013 “The Quantum Light Switch” Lunchtime seminar series at the SLAC National Accelerator Laboratory; Menlo Park, CA
- October 2012 “The REDSOX scattering chamber plan” - Toward Controlled Excitations: Ultrafast Mechanisms of Lattice and Electron Dynamics workshop at the SLAC National Accelerator Laboratory; Menlo Park, CA
- October 2012 “Moving to the LCLS” - De-Mystifying the Lightsource Experience workshop at SLAC National Accelerator Laboratory; Menlo Park, CA
- June 2012 “How to take x-ray snapshot of materials without lenses” - Coherence 2012; Fukuoka, Japan
- March 2012 “Materials Research Using Soft X-rays at the LCLS” at the Ringberg FEL Workshop; Ringberg, Germany
- Feb 2012 “How ‘soft’ x-rays reveal new insights into materials” at Lockheed Martin Advanced Technology Center; Palo Alto, CA
- Sept. 2011 “Computational Magnetic Imaging” at the Science Cafe at ALS, Lawrence Berkeley National Laboratory; Berkeley, CA
- May 2011 “Soft x-ray materials research at the LCLS: the case of strongly correlated electrons” Photon Science Seminar Series, SLAC National Accelerator Laboratory; Menlo Park, CA
- Sept. 2009: “The Power of Coherent Soft X-rays: From Biology to Magnetism” - LCLS at SLAC/Stanford University; Palo Alto, CA
- July 2008: “Coherent Soft X-rays: From Domain Dynamics to Imaging Nanostructure” - BESSY Synchrotron Facility; Berlin, Germany
- Dec. 2007: “Coherence to Probe Chaos: The Manganites” - Advanced Photon Source; Argonne, IL
- Dec. 2007: “Domain Wall Dynamics in Manganite Orbital Phases” - Brookhaven National Lab; Upton, NY
- Oct. 2007: “Orbital Ordering Domain Dynamics in a Manganite Measured with Coherent Soft X-rays” - Advanced Photon Source; Argonne, IL
- May 2007: “Spatiotemporal Dynamics in the Orbital Ordering Transition of PCMO” - Stony Brook University; Stony Brook, NY

- Sept. 2004: “Coherent Scattering from Strongly Correlated Electron Systems in Transition Metal Oxide Systems” - Advanced Light Source Seminar; Berkeley, CA

## RESEARCH EXPERIENCE

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- Feb 2010 - present: Linac Coherent Light Source at the SLAC National Accelerator Laboratory; Staff Scientist
  - SXR instrument construction and commissioning
  - Diagnostics and operation of beamline
  - Advanced instrumentation including end station development and construction
  - Pioneering ultra-fast methods, such as pump-probe, applied to traditional techniques such as: soft x-ray diffraction, spectroscopy, imaging, fluorescence, resonant inelastic x-ray scattering, x-ray emission and absorption in the fields of strongly correlated electron physics, laboratory astrophysics, ultra-fast magnetism, liquid phase chemistry, ultra-fast femtosecond surface chemistry, atomic physics, and matter in extreme conditions
  - Hard x-ray pump-probe diffraction for LCLS in-house research program
  - Ultra-fast optical pump-probe and reflectivity studies
  - Imaging developments using random phases mask engineering and iterative relaxation algorithms
  - THz development for in-house program for THz pump-soft x-ray probe studies
  - XPCS and CDI studies at ALS, Lawrence Berkeley National Laboratory
- March 2008 - Feb 2010: Dept. of Physics and Astronomy, Stony Brook University; Postdoctoral Fellow
  - Hard and Soft X-ray Diffraction Microscopy/Coherent Diffraction Imaging at APS and ALS
  - Scanning Transmission X-ray Microscopy
  - Scanning Electron Microscopy (SEM), Focused Ion Beam (FIB) etching and micro-manipulation at Center for Functional Nanomaterials
  - Thin film deposition
  - Advanced instrumentation, beamline 9.0.1 commissioning at ALS
  - IDL software/iterative algorithm programming and parallel processing computations
- July 2006 - March 2008: Condensed Matter Physics and Material Science Dept., Brookhaven National Laboratory; Visiting Jr. Scientist
  - Hard x-ray diffraction at National Synchrotron Light Source
  - Microdiffraction at National Synchrotron Light Source
  - Inelastic hard x-ray scattering at Advanced Photon Source
  - Optical polarized microscopy
  - Soft x-ray scattering at Advanced Light Source
- Sept. 2005 - July 2006: ALS, Lawrence Berkeley National Laboratory; Research Associate
  - Soft x-rays diffraction to study resonant, magnetic scattering from magnetic films and oxides in Bragg and forward scattering geometries
  - Detector development and design
  - Spatial filter pinhole and sample fabrication and preparation
  - Focused Ion Beam etching and Scanning Electron Microscope imaging at the National Center for Electron Microscopy facility

- Beamline alignment and diagnostics
- User support for beamline/endstation
- Speckle analysis in Linux-based IRAF/PyRAF
- Dec. 2002 - Sept. 2004: Scientific Support Group at ALS, Lawrence Berkeley National Laboratory; Research Associate
  - Construction and commissioning of the Coherent Scattering Beamline 12.0.2.2
  - Coherent scattering chamber magnet calibration and characterization
  - Laser calibration of piezoelectric modules
  - Detector design and development
- May 2002 - Aug. 2002: ALS, Lawrence Berkeley Laboratory, Summer Research Internship. Mentor: Dr. Elke Arenholz
  - Performed magnetic field analytic calculations for vector magnetometer, an octapole electromagnet now stationed on beamline 4.0.2 at the ALS for magnetic spectroscopy measurements and circular/linear dichroism.
  - Wrote an algorithm to handle non-linearity of ferromagnetic poles in field distribution.
- 2000 - 2001: Mathematics Dept., University of California, Santa Barbara. Mentor: Prof. Thomas Sideris
  - Independent research in partial differential equations, investigations in elasticity, fluid mechanics, stress waves, and quantum physics.
- 2000 - 2001: Physics Dept., University of California, Santa Barbara. Mentor: Prof. Phillip Lubin
  - Astrophysical research for measuring the polarization of the Cosmic Microwave Background radiation via balloon-based radio telescopes.
  - Microwave telescope physics and interferometric techniques, attenuator design, cryogenics, instrumentation design, machining, and mechanical fabrication.
- 1998 - 2000: ALS, Lawrence Berkeley Lab - Summer Research Mentor: Dr. Scot Kellar
  - Electron-beam heater design, assessment, and testing, evaporator fabrication and analysis, mutual inductance probe design, assembly, and evaluation.

## TEACHING EXPERIENCE

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- 2014 - present: Foothill College, Physics Dept. - Part-time Faculty Member  
Electricity and Magnetism.
  - Labs and tutoring.
- 2009 - 2010: State University of New York at Stony Brook, Physics Dept. - Adjunct Assistant Professor  
Classical Physics for Engineering.
  - Recitation.
- 2008 - 2009: State University of New York at Stony Brook, Physics Dept. - Guest Lecturer  
Modern Physics. Waves and Optics.
  - Class lectures.
- 2004 - 2005: University of Oregon, Physics Dept. - Teaching Assistant  
Energy and the Environment. Astronomy.
  - Discussion sections.

- 2002: Boston University, Physics Dept. - Teaching Fellow  
Modern Physics (for physics majors). Non-classical Physics (for engineering).  
- Lectures, discussion sessions, and labs.
- 2001: Boston University, School of Arts and Science - Teaching Fellow  
Basic Physics laboratory (for non-science majors).  
- Labs and discussion sections.
- 2000-2001: University of California, Santa Barbara, Physics Dept. - Teaching Assistant  
Optics and Modern Physics for physics majors and engineering.  
- Discussion sections and laboratory. Review session lectures.

## FULL REFEREED PUBLICATION LIST

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1. M. C. Langner, S. Zhou, G. Coslovich, Y.-D. Chuang, Y. Zhu, J. S. Robinson, W. F. Schlotter, J. J. Turner, M. P. Minitti, R. G. Moore, W. S. Lee, D. H. Lu, D. Doering, P. Denes, Y. Tomioka, Y. Tokura, R. A. Kaindl, and R. W. Schoenlein “Ultrafast x-ray and optical signatures of phase competition and separation underlying the photoinduced metallic phase in  $\text{Pr}_{1-x}\text{Ca}_x\text{MnO}_3$ ” *Phys. Rev. B* 92, 155148 (2015)
2. J. Chalupsky, P. Bohacek, T. Burian, V. Hájková, S. P. Hau-Riege, P. A. Heimann, L. Juha, M. Messerschmidt, S. P. Moeller, B. Nagler, M. Rowen, W. F. Schlotter, M. L. Swiggers, J. J. Turner, and J. Krzywinski “Imprinting a Focused X-Ray Laser Beam to Measure Its Full Spatial Characteristics” *Phys. Rev. Applied* 4, 014004 (2015)
3. M. Först, A. D. Caviglia, R. Scherwitzl, R. Mankowsky, P. Zubko, V. Khanna, H. Bromberger, S. B. Wilkins, Y.-D. Chuang, W. S. Lee, W. F. Schlotter, J. J. Turner, G. L. Dakovski, M. P. Minitti, J. Robinson, S. R. Clark, D. Jaksch, J.-M. Triscone, J. P. Hill, S. S. Dhesi and A. Cavalleri “Spatially resolved ultrafast magnetic dynamics initiated at a complex oxide heterointerface” *Nature Materials* 14, 883 (2015)
4. Georgi L. Dakovski, Wei-Sheng Lee, David G. Hawthorn, Niklas Garner, Doug Bonn, Walter Hardy, Ruixing Liang, Matthias C. Hoffmann, and Joshua J. Turner “Enhanced coherent oscillations in the superconducting state of underdoped  $\text{YBa}_2\text{Cu}_3\text{O}_{6+x}$  induced via ultrafast terahertz excitation” *Phys. Rev. B* 91, 220506R (2015)
5. H. Xin, J. LaRue, H. Öberg, M. Beye, M. DellAngela, J. J. Turner, J. Gladh, M. L. Ng, J. A. Sellberg, S. Kaya, G. Mercurio, F. Hieke, D. Nordlund, W. F. Schlotter, G. L. Dakovski, M. P. Minitti, A. Föhlisch, M. Wolf, W. Wurth, H. Ogasawara, J. K. Nørskov, H. Öström, L. G. M. Pettersson, A. Nilsson, and F. Abild-Pedersen “Strong Influence of Coadsorbat Interaction on CO Desorption Dynamics on Ru(0001) Probed by Ultrafast X-Ray Spectroscopy and Ab Initio Simulations” *Phys. Rev. Lett.* 114, 156101 (2015)
6. S. Moeller, G. Brown, G. Dakovski, B. Hill, M. Holmes, J. Loos, R. Maida, E. Paisier, W. Schlotter, J. J. Turner, A. Wallace, U. Jastrow, S. Kreis, A. A. Sorokin and K. Tiedtke “Pulse energy measurement at the SXR instrument” *J. Synchrotron Rad.* 22, 606 (2015)
7. J. J. Turner, G. L. Dakovski, M. C. Hoffmann, H. Y. Hwang, A. Zarem, W. F. Schlotter, S. Moeller, M. P. Minitti, U. Staub, S. Johnson, A. Mitra, M. Swiggers, P. Noonan, G. I. Curiel and M. Holmes “Combining THz laser excitation with resonant soft X-ray scattering at the Linac Coherent Light Source” *J. Synchrotron Rad.* 22, 621 (2015)
8. G. L. Dakovski, P. Heimann, M. Holmes, O. Krupin, M. P. Minitti, A. Mitra, S. Moeller, M. Rowen, W. F. Schlotter and J. J. Turner “The Soft X-ray Research instrument at the Linac Coherent Light Source” *J. Synchrotron Rad.* 22, 498 (2015)
9. Ph. Wernet, K. Kunnus, I. Josefsson, I. Rajkovic, W. Quevedo, M. Beye, S. Schreck, S. Grübel, M. Scholz, D. Nordlund, W. Zhang, R. W. Hartsock, W. F. Schlotter, J. J. Turner, B. Kennedy, F. Hennies, F. M. F. de Groot, K. J. Gaffney, S. Techert, M. Odellius, A. Föhlisch “Orbital-specific mapping of the ligand exchange dynamics of  $\text{Fe}(\text{CO})_5$  in solution” *Nature* 520, 78 (2015)

10. H. Öberg, J. Gladh, M. Dell'Angela, T. Anniyev, M. Beye, R. Coffee, A. Föhlisch, T. Katayama, S. Kaya, J. LaRue, A. Mogelhoj, D. Nordlund, H. Ogasawara, W. F. Schlotter, J. A. Sellberg, F. Sorgenfrei, J. J. Turner, M. Wolf, W. Wurth, H. Öström, A. Nilsson, J. K. Nørskov, L. G. M. Pettersson "Optical Laser-Induced CO Desorption from Ru(0001) Monitored with a Free-Electron X-ray Laser: DFT Prediction and X-ray Confirmation of a Precursor State" *Surface Science* — (2015) [doi: 10.1016/j.susc.2015.03.011]
11. M. Dell'Angela, T. Anniyev, M. Beye, R. Coffee, A. Föhlisch, J. Gladh, S. Kaya, T. Katayama, O. Krupin, A. Nilsson, D. Nordlund, W. F. Schlotter, J. A. Sellberg, F. Sorgenfrei, J. J. Turner, H. Öström, H. Ogasawara, M. Wolf and W. Wurth "Vacuum space charge effects in sub-picosecond soft X-ray photoemission on a molecular adsorbate layer" *Struct. Dyn.* 2 025101 (2015)
12. S. M. Vinko, O. Ciricosta, T. R. Preston, D. S. Rackstraw, C. R. D. Brown, T. Burian, J. Chalupsky, B. I. Cho, H.-K. Chung, K. Engelhorn, R. W. Falcone, R. Fiokovini, V. Hájková, P. A. Heimann, L. Juha, H. J. Lee, R. W. Lee, M. Messerschmidt, B. Nagler, W. Schlotter, J. J. Turner, L. Vysin, U. Zastra, J. S. Wark "Investigation of femtosecond collisional ionization rates in a solid-density aluminium plasma" *Nature Communications* 6, 152021 (2015)
13. Nicolas Berggaard, Stefan Schaffert, Victor Lopez-Flores, Nicolas Jaouen, Jan Geilhufe, Christian M. Gunther, Michael Schneider, Catherine Graves, Tianhan Wang, Benny Wu, Andreas Scherz, Cedric Baumier, Renaud Delaunay, Franck Fortuna, Marina Tortarolo, Bharati Tudu, Oleg Krupin, Michael P. Minitti, Joe Robinson, William F. Schlotter, Joshua J. Turner, Jan Lüning, Stefan Eisebitt, and Christine Boeglin "Irreversible transformation of ferromagnetic ordered stripe domains in single-shot infrared-pump/resonant-x-ray-scattering-probe experiments" *Phys. Rev. B* 91, 054416 (2015)
14. H. Öström, H. Öberg, H. Xin, J. LaRue, M. Beye, M. Dell'Angela, J. Gladh, M. L. Ng, J. A. Sellberg, S. Kaya, G. Mercurio, D. Nordlund, M. Hantschmann, F. Hieke, D. Khn, W. F. Schlotter, G. L. Dakovski, J. J. Turner, M. P. Minitti, A. Mitra, S. P. Moeller, A. Föhlisch, M. Wolf, W. Wurth, M. Persson, J. K. Nørskov, F. Abild-Pedersen, H. Ogasawara, L. G. M. Pettersson, A. Nilsson "Probing the transition state region in catalytic CO oxidation on Ru" *Science* 347, 978 (2015)
15. S. Eckert, M. Beye, A. Pietzsch, W. Quevedo, M. Hantschmann, M. Ochmann, M. Ross, M. P. Minitti, J. J. Turner, S. P. Moeller, W. F. Schlotter, G. L. Dakovski, M. Khalil, N. Huse, and A. Föhlisch "Principles of femtosecond X-ray/optical cross-correlation with X-ray induced transient optical reflectivity in solids" *Appl. Phys. Lett.* 106, 061104 (2015)
16. D. S. Rackstraw, O. Ciricosta, S. M. Vinko, B. Barbrel, T. Burian, J. Chalupsky, B. I. Cho, H.-K. Chung, G. L. Dakovski, K. Engelhorn, V. Hájková, P. Heimann, M. Holmes, L. Juha, J. Krzywinski, R. W. Lee, S. Toleikis, J. J. Turner, U. Zastra, and J. S. Wark "Saturable Absorption of an X-Ray Free-Electron-Laser Heated Solid-Density Aluminum Plasma" *Phys. Rev. Lett.* 114, 015003 (2015)
17. M. Först, A. Frano, S. Kaiser, R. Mankowsky, C. R. Hunt, J. J. Turner, G. L. Dakovski, M. P. Minitti, J. Robinson, T. Loew, M. Le Tacon, B. Keimer, J. P. Hill, A. Cavalleri, and S. S. Dhesi "Femtosecond x rays link melting of charge-density wave correlations and light-enhanced coherent transport in  $\text{YBa}_2\text{Cu}_3\text{O}_{6.6}$ " *Phys. Rev. B* 90, 184514 (2014)
18. K. Tiedtke, A. A. Sorokin, U. Jastrow, P. Juranić, S. Kreis, N. Gerken, M. Richter, U. Arp, Y. Feng, D. Nordlund, R. Soufli, M. Fernández-Perea, L. Juha, P. Heimann, B. Nagler, H. J. Lee, S. Mack, M. Cammarata, O. Krupin, M. Messerschmidt, M. Holmes, M. Rowen, W. Schlotter, S. Moeller, and J. J. Turner "Absolute pulse energy measurements of soft x-rays at the Linac Coherent Light Source" *Optics Express* 22, 21214 (2014)
19. Katrin R. Siefertmann, Chaitanya D. Pemmaraju, Stefan Neppel, Andrey Shavorskiy, Amy A. Cordones, Josh Vura-Weis, Daniel S. Slaughter, Felix P. Sturm, Fabian Weise, Hendrik Bluhm, Matthew L. Strader, Hana Cho, Ming-Fu Lin, Camila Bacellar, Champak Khurmi, Jinghua Guo, Giacomo Coslovich, Joseph S. Robinson, Robert A. Kaindl, Robert W. Schoenlein, Ali Belkacem, Daniel M. Neumark, Stephen R. Leone, Dennis Nordlund, Hirohito Ogasawara, Oleg Krupin, Joshua J. Turner, William F. Schlotter, Michael R. Holmes, Marc Messerschmidt, Michael P. Minitti, Sheraz Gul, Jin Z. Zhang, Nils Huse, David Prendergast, and Oliver Gessner "Atomic-Scale



- Perspective of Ultrafast Charge Transfer at a DyeSemiconductor Interface” *J. Phys. Chem. Lett.* 5, 2753 (2014)
20. U. Staub, R. A. de Souza, P. Beaud, E. Möhr-Vorobeva, G. Ingold, A. Caviezel, V. Scagnoli, B. Delley, J. J. Turner, O. Krupin, W.-S. Lee, Y.-D. Chuang, L. Patthey, R. G. Moore, D. Lu, M. Yi, P. S. Kirchmann, M. Trigo, P. Denes, D. Doering, Z. Hussain, Z. X. Shen, D. Prabhakaran, A. T. Boothroyd, and S. L. Johnson “Persistence of magnetic order in a highly excited  $\text{Cu}^{2+}$  state in  $\text{CuO}$ ” *Phys. Rev. B* 89, 220401 (2014)
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