



## Aaron Lindenberg

Professor of Materials Science and Engineering and of Photon Science

### CONTACT INFORMATION

- **Administrator**

Benita Givens - Administrative Associate

**Email** bgivens@stanford.edu

**Tel** 650-723-0698

### Bio

---

#### BIO

Lindenberg's research is focused on visualizing the ultrafast dynamics and atomic-scale structure of materials on femtosecond and picosecond time-scales. X-ray and electron scattering and spectroscopic techniques are combined with ultrafast optical techniques to provide a new way of taking snapshots of materials in motion. Current research is focused on the dynamics of phase transitions, ultrafast properties of nanoscale materials, and charge transport, with a focus on materials for information storage technologies, energy-related materials, and nanoscale optoelectronic devices.

#### ACADEMIC APPOINTMENTS

- Professor, Materials Science and Engineering
- Professor, Photon Science Directorate
- Member, Bio-X
- Affiliate, Precourt Institute for Energy
- Principal Investigator, Stanford Institute for Materials and Energy Sciences
- Principal Investigator, Stanford PULSE Institute

#### HONORS AND AWARDS

- Chambers Fellow, Stanford University (2015-2018)
- Young Faculty Award, DARPA (2010)
- DOE Outstanding Mentor Award, Department of Energy (2009)
- Terman Fellow, Stanford University (2007-2009)
- Faculty Fellow Post-doctoral Fellowship, University of California, Berkeley (2001-2003)
- Alfred Moritz Michaelis Prize in Physics, Columbia University (1996)
- I.I. Rabi Scholar, Columbia University (1992-1996)

#### PROFESSIONAL EDUCATION

- BA, Columbia University (1996)

- PhD, UC Berkeley (2001)

## PATENTS

- Jun Xiao, Aaron Lindenberg. "United States Patent 11,355,697 Nanometer scale nonvolatile memory device and method for storing binary and quantum memory states", Leland Stanford Junior University, Jun 7, 2022
- Edbert Sie, Clara Nyby, Das Pemmaraju Xijie Wang, Aaron Lindenberg. "United States Patent 10861995 Fast topological switch using strained weyl semimetals", Leland Stanford Junior University, Dec 8, 2020

## LINKS

- Group Site: <https://lindenberg.sites.stanford.edu/>

## Teaching

---

### COURSES

#### 2025-26

- Quantum Mechanics of Nanoscale Materials: MATSCI 142 (Aut)

#### 2024-25

- Quantum Mechanics of Nanoscale Materials: MATSCI 142 (Spr)

#### 2023-24

- Quantum Mechanics of Nanoscale Materials: MATSCI 142 (Spr)

#### 2022-23

- X-Ray Science and Techniques: MATSCI 326 (Aut)

### STANFORD ADVISEES

#### Doctoral Dissertation Reader (AC)

Juan Irurita Vernaza, Kelly Xiao

#### Postdoctoral Faculty Sponsor

Kieran Orr

#### Doctoral Dissertation Advisor (AC)

Autumn Lee, Yuejun Shen

#### Doctoral Dissertation Co-Advisor (AC)

Xin Chen, Samuel Lai

#### Postdoctoral Research Mentor

Sheikh Rubaiat Ul Haque

## Publications

---

### PUBLICATIONS

- **Decoding THz-Driven Dynamic Fingerprints of Ferroelectric Nanotwin Networks.** *Advanced materials (Deerfield Beach, Fla.)*  
Li, X., Ross, A., Stoica, V. A., Das, S., Hazra, S., Wang, H. H., Padma, H., Hoffmann, M. C., Kramer, P., Song, S., Nelson, S., Sato, T., Zhu, et al  
2026: e73118
- **Time-domain terahertz emission spectroscopy on van der Waals materials** *MRS COMMUNICATIONS*  
Gollner, C., Lindenberg, A., Heinz, T. F.  
2026

- **Solid-phase heteroepitaxy of oriented Sb<sub>2</sub>Se<sub>3</sub> on GaAs for birefringent thin films** *JOURNAL OF VACUUM SCIENCE & TECHNOLOGY A*  
Xiao, K., Shen, Y., Vailionis, A., Skipper, A. M., Preidl, A., Lindenberg, A. M., Mukherjee, K.  
2026; 44 (2)
- **Non-equilibrium entropy production and information dissipation in a non-Markovian quantum dot** *NATURE PHYSICS*  
Shen, Y., Chen, C., Ma, H., Saunders, A. P., Heide, C., Liu, F., Rotskoff, G. M., Shi, J., Lindenberg, A. M.  
2026
- **Photoinduced twist and untwist of moiré superlattices.** *Nature*  
Duncan, C. J., Johnson, A. C., Maity, I., Rubio, A., Gordon, M., Bartnik, A. C., Kaemingk, M., Li, W. H., Andorf, M. B., Pennington, C. A., Bazarov, I. V., Tate, M. W., Muller, et al  
2025
- **Terahertz-field activation of polar skyrons.** *Nature communications*  
Wang, H. H., Stoica, V. A., Dai, C., Paściak, M., Das, S., Yang, T., Gonçalves, M. A., Kulda, J., McCarter, M. R., Mangu, A., Cao, Y., Padma, H., Saha, et al  
2025; 16 (1): 8994
- **Nonresonant Raman Control of Ferroelectric Polarization.** *Advanced materials (Deerfield Beach, Fla.)*  
Shi, J., Heide, C., Xu, H., Shen, Y., Henstridge, M., Sedwick, I., Mangu, A., Peng, X., Zhang, S., Trigo, M., Heinz, T. F., Li, J., Nelson, et al  
2025: e10524
- **Phase segregation dynamics in mixed-halide perovskites revealed by plunge-freeze cryo-electron microscopy** *CELL REPORTS PHYSICAL SCIENCE*  
Fan, Q., Cui, Y., Li, Y., Vigil, J. A., Jiang, Z., Nandi, P., Colby, R., Zhang, C., Cui, Y., Karunadasa, H. I., Lindenberg, A. M.  
2025; 6 (6)
- **Deviation from Debye-Waller behavior in single crystalline freestanding NiO membranes studied via ultrafast electron diffraction** *PHYSICAL REVIEW APPLIED*  
Wisser, J. J., Reid, A., Harbola, V., Luo, D., Shen, X., Kramer, P. L., Lindgren, E. R., Xia, C., Hoffmann, M. C., Lindenberg, A. M., Hwang, H., Suzuki, Y.  
2025; 23 (3)
- **Analysis methodology of coherent oscillations in time- and angle-resolved photoemission spectroscopy.** *The Review of scientific instruments*  
Gauthier, N., Soifer, H., Sobota, J. A., Pfau, H., Sie, E. J., Lindenberg, A. M., Shen, Z. X., Kirchmann, P. S.  
2025; 96 (2)
- **Hidden domain boundary dynamics toward crystalline perfection.** *Proceedings of the National Academy of Sciences of the United States of America*  
Mangu, A., Stoica, V. A., Zheng, H., Yang, T., Zhang, M., Wang, H. H., Zu, R., Nguyen, Q. L., Song, S., Das, S., Meisenheimer, P., Donoway, E., Chollet, et al  
2025; 122 (2): e2407772122
- **Electrochemical Control of the Ultrafast Lattice Response of a Layered Semimetal.** *Advanced science (Weinheim, Baden-Wuerttemberg, Germany)*  
de Quesada, F. A., Muscher, P. K., Krakovsky, E. S., Sood, A., Poletayev, A. D., Sie, E. J., Nyby, C. M., Irvine, S. J., Zajac, M. E., Luo, D., Shen, X., Hoffmann, M. C., Kramer, et al  
2024: e2411344
- **3D Heisenberg universality in the van der Waals antiferromagnet NiPS<sub>3</sub>** *NPJ QUANTUM MATERIALS*  
Plumley, R., Mardanya, S., Peng, C., Nokelainen, J., Assefa, T., Shen, L., Burdet, N., Porter, Z., Petsch, A., Israelski, A., Chen, H., Lee, J., Morley, et al  
2024; 9 (1)
- **Ultrafast Symmetry Control in Photoexcited Quantum Dots.** *Advanced materials (Deerfield Beach, Fla.)*  
Guzelturk, B., Portner, J., Ondry, J., Ghanbarzadeh, S., Tarantola, M., Jeong, A., Field, T., Chandler, A. M., Wieman, E., Hopper, T. R., Watkins, N. E., Yu, J., Cheng, et al  
2024: e2414196

- **Colossal Strain Tuning of Ferroelectric Transitions in KNbO<sub>3</sub> Thin Films.** *Advanced materials (Deerfield Beach, Fla.)*  
Hazra, S., Schwaigert, T., Ross, A., Lu, H., Saha, U., Trinquet, V., Akkopru-Akgun, B., Gregory, B. Z., Mangu, A., Sarker, S., Kuznetsova, T., Sarker, S., Li, et al  
2024: e2408664
- **Coupling to octahedral tilts in halide perovskite nanocrystals induces phonon-mediated attractive interactions between excitons.** *Nature physics*  
Yazdani, N., Bodnarchuk, M. I., Bertolotti, F., Masciocchi, N., Fureraj, I., Guzelturk, B., Cotts, B. L., Zajac, M., Rainò, G., Jansen, M., Boehme, S. C., Yarema, M., Lin, et al  
2024; 20 (1): 47-53
- **Non-equilibrium pathways to emergent polar supertextures.** *Nature materials*  
Stoica, V. A., Yang, T., Das, S., Cao, Y., Wang, H. H., Kubota, Y., Dai, C., Padma, H., Sato, Y., Mangu, A., Nguyen, Q. L., Zhang, Z., Talreja, et al  
2024
- **Roadmap on low-power electronics** *APL MATERIALS*  
Ramesh, R., Salahuddin, S., Datta, S., Diaz, C. H., Nikonov, D. E., Young, I. A., Ham, D., Chang, M., Khwa, W., Lele, A., Binek, C., Huang, Y., Sun, et al  
2024; 12 (9)
- **Giant Terahertz Birefringence in an Ultrathin Anisotropic Semimetal.** *Nano letters*  
Sie, E. J., Othman, M. A., Nyby, C. M., Pemmaraju, D., Garcia, C. A., Wang, Y., Guzelturk, B., Xia, C., Xiao, J., Poletayev, A., Ofori-Okai, B. K., Hoffmann, M. C., Park, et al  
2024
- **Solution-phase sample-averaged single-particle spectroscopy of quantum emitters with femtosecond resolution.** *Nature materials*  
Shi, J., Shen, Y., Pan, F., Sun, W., Mangu, A., Shi, C., McKeown-Green, A., Moradifar, P., Bawendi, M. G., Moerner, W. E., Dionne, J. A., Liu, F., Lindenberg, et al  
2024
- **Publisher Correction: The persistence of memory in ionic conduction probed by nonlinear optics.** *Nature*  
Poletayev, A. D., Hoffmann, M. C., Dawson, J. A., Teitelbaum, S. W., Trigo, M., Islam, M. S., Lindenberg, A. M.  
2024
- **Hidden phonon highways promote photoinduced interlayer energy transfer in twisted transition metal dichalcogenide heterostructures.** *Science advances*  
Johnson, A. C., Georganas, J. D., Shen, X., Yao, H., Saunders, A. P., Zeng, H. J., Kim, H., Sood, A., Heinz, T. F., Lindenberg, A. M., Luo, D., da Jornada, F. H., Liu, et al  
2024; 10 (4): eadj8819
- **The persistence of memory in ionic conduction probed by nonlinear optics.** *Nature*  
Poletayev, A. D., Hoffmann, M. C., Dawson, J. A., Teitelbaum, S. W., Trigo, M., Islam, M. S., Lindenberg, A. M.  
2024; 625 (7996): 691-696
- **Terahertz Radiation of Plasmonic Hot Carriers**  
Taghinejad, M., Xia, C., Hrton, M., Lee, K., Kim, A. S., Li, Q., Guzelturk, B., Kalousek, R., Xu, F., Cai, W., Lindenberg, A. M., Brongersma, M. L.  
edited by Lin, S. Y., Adibi, A., Scherer, A.  
SPIE-INT SOC OPTICAL ENGINEERING.2024
- **Accelerating Quantum Materials Development with Advances in Transmission Electron Microscopy.** *Chemical reviews*  
Moradifar, P., Liu, Y., Shi, J., Siukola Thurston, M. L., Utzat, H., van Driel, T. B., Lindenberg, A. M., Dionne, J. A.  
2023
- **Coupling to octahedral tilts in halide perovskite nanocrystals induces phonon-mediated attractive interactions between excitons** *NATURE PHYSICS*  
Yazdani, N., Bodnarchuk, M. I., Bertolotti, F., Masciocchi, N., Fureraj, I., Guzelturk, B., Cotts, B. L., Zajac, M., Raino, G., Jansen, M., Boehme, S. C., Yarema, M., Lin, et al  
2023
- **Determining hot-carrier transport dynamics from terahertz emission.** *Science (New York, N.Y.)*  
Taghinejad, M., Xia, C., Hrton, M., Lee, K. T., Kim, A. S., Li, Q., Guzelturk, B., Kalousek, R., Xu, F., Cai, W., Lindenberg, A. M., Brongersma, M. L.

2023; 382 (6668): 299-305

- **Nonthermal Bonding Origin of a Novel Photoexcited Lattice Instability in SnSe.** *Physical review letters*  
Huang, Y., Teitelbaum, S., Yang, S., De la Peña, G., Sato, T., Chollet, M., Zhu, D., Niedziela, J. L., Bansal, D., May, A. F., Lindenberg, A. M., Delaire, O., Trigo, et al  
2023; 131 (15): 156902
- **Subnanosecond Reconfiguration of Ferroelectric Domains in Bismuth Ferrite.** *Advanced materials (Deerfield Beach, Fla.)*  
Guzelturk, B., Yang, T., Liu, Y. C., Wei, C. C., Orenstein, G., Trigo, M., Zhou, T., Diroll, B. T., Holt, M. V., Wen, H., Chen, L. Q., Yang, J. C., Lindenberg, et al  
2023: e2306029
- **Giant room-temperature nonlinearities in a monolayer Janus topological semiconductor.** *Nature communications*  
Shi, J., Xu, H., Heide, C., HuangFu, C., Xia, C., de Quesada, F., Shen, H., Zhang, T., Yu, L., Johnson, A., Liu, F., Shi, E., Jiao, et al  
2023; 14 (1): 4953
- **Ultrafast Wavefront Shaping via Space-Time Refraction** *ACS PHOTONICS*  
Fan, Q., Shaltout, A. M., van de Groep, J., Brongersma, M. L., Lindenberg, A. M.  
2023
- **Pulsed laser ejection of single-crystalline III-V solar cells from GaAs substrates** *CELL REPORTS PHYSICAL SCIENCE*  
Reeves, B. A., Steiner, M. A., Carver, T. E., Zhang, Z., Lindenberg, A. M., Clemens, B. M.  
2023; 4 (6)
- **Understanding and Controlling Photothermal Responses in MXenes.** *Nano letters*  
Guzelturk, B., Kamysbayev, V., Wang, D., Hu, H., Li, R., King, S. B., Reid, A. H., Lin, M., Wang, X., Walko, D. A., Zhang, X., Lindenberg, A., Talapin, et al  
2023
- **Ultrafast Optomechanical Strain in Layered GeS.** *Nano letters*  
Luo, D., Zhang, B., Sie, E. J., Nyby, C. M., Fan, Q., Shen, X., Reid, A. H., Hoffmann, M. C., Weathersby, S., Wen, J., Qian, X., Wang, X., Lindenberg, et al  
2023
- **Bidirectional phonon emission in two-dimensional heterostructures triggered by ultrafast charge transfer.** *Nature nanotechnology*  
Sood, A., Haber, J. B., Carlström, J., Peterson, E. A., Barre, E., Georganas, J. D., Reid, A. H., Shen, X., Zajac, M. E., Regan, E. C., Yang, J., Taniguchi, T., Watanabe, et al  
2022
- **Light-Driven Ultrafast Polarization Manipulation in a Relaxor Ferroelectric.** *Nano letters*  
Park, S., Wang, B., Yang, T., Kim, J., Saremi, S., Zhao, W., Guzelturk, B., Sood, A., Nyby, C., Zajac, M., Shen, X., Kozina, M., Reid, et al  
2022
- **A room-temperature polarization-sensitive CMOS terahertz camera based on quantum-dot-enhanced terahertz-to-visible photon upconversion.** *Nature nanotechnology*  
Shi, J., Yoo, D., Vidal-Codina, F., Baik, C. W., Cho, K. S., Nguyen, N. C., Utzat, H., Han, J., Lindenberg, A. M., Bulović, V., Bawendi, M. G., Peraire, J., Oh, et al  
2022
- **Thickness- and Twist-Angle-Dependent Interlayer Excitons in Metal Monochalcogenide Heterostructures.** *ACS nano*  
Zheng, W., Xiang, L., de Quesada, F. A., Augustin, M., Lu, Z., Wilson, M., Sood, A., Wu, F., Shcherbakov, D., Memaran, S., Baumbach, R. E., McCandless, G. T., Chan, et al  
2022
- **Large Exchange Coupling Between Localized Spins and Topological Bands in Magnetic Topological Insulator MnBi<sub>2</sub>Te<sub>4</sub>.** *Advanced materials (Deerfield Beach, Fla.)*  
Padmanabhan, H., Stoica, V. A., Kim, P. K., Poore, M., Yang, T., Shen, X., Reid, A. H., Lin, M., Park, S., Yang, J., Hugo Wang, H., Koocher, N. Z., Puggioni, et al  
2022: e2202841
- **Non-Equilibrium Lattice Dynamics in Photo-Excited Two-Dimensional Perovskites.** *Advanced materials (Deerfield Beach, Fla.)*

Cuthriell, S. A., Panuganti, S., Laing, C. C., Quintero, M. A., Guzelurk, B., Yazdani, N., Traore, B., Brumberg, A., Malliakas, C. D., Lindenberg, A. M., Wood, V., Katan, C., Even, et al

2022: e2202709

- **Defect-driven anomalous transport in fast-ion conducting solid electrolytes.** *Nature materials*  
Poletayev, A. D., Dawson, J. A., Islam, M. S., Lindenberg, A. M.  
2022
- **Interlayer magnetophononic coupling in MnBi<sub>2</sub>Te<sub>4</sub>.** *Nature communications*  
Padmanabhan, H., Poore, M., Kim, P. K., Koocher, N. Z., Stoica, V. A., Puggioni, D., Hugo Wang, H., Shen, X., Reid, A. H., Gu, M., Wetherington, M., Lee, S. H., Schaller, et al  
2022; 13 (1): 1929
- **Laser-induced patterning for a diffraction grating using the phase change material of Ge<sub>2</sub>Sb<sub>2</sub>Te<sub>5</sub> (GST) as a spatial light modulator in X-ray optics: a proof of concept** *OPTICAL MATERIALS EXPRESS*  
Park, J., Zalden, P., Ng, E., Johnston, S., Fong, S. W., Chang, C., Tassone, C. J., Van Campen, D., Mok, W., Mabuchi, H., Wong, H., Shen, Z., Lindenberg, et al  
2022; 12 (4): 1408-1416
- **Observation of a Novel Lattice Instability in Ultrafast Photoexcited SnSe** *PHYSICAL REVIEW X*  
Huang, Y., Yang, S., Teitelbaum, S., De la Pena, G., Sato, T., Chollet, M., Zhu, D., Niedziela, J. L., Bansal, D., May, A. F., Lindenberg, A. M., Delaire, O., Reis, et al  
2022; 12 (1)
- **Testing the data framework for an AI algorithm in preparation for high data rate X-ray facilities**  
Chen, H., Chitturi, S. R., Plumley, R., Shen, L., Drucker, N. C., Burdet, N., Peng, C., Mardanya, S., Ratner, D., Mishra, A., Yoon, C., Song, S., Chollet, et al  
IEEE.2022: 1-9
- **Dynamically Tunable Terahertz Emission Enabled by Anomalous Optical Phonon Responses in Lead Telluride** *ACS PHOTONICS*  
Guzelturk, B., Trigo, M., Delaire, O., Reis, D. A., Lindenberg, A. M.  
2021; 8 (12): 3633-3640
- **Inq, a Modern GPU-Accelerated Computational Framework for (Time-Dependent) Density Functional Theory.** *Journal of chemical theory and computation*  
Andrade, X., Pemmaraju, C. D., Kartsev, A., Xiao, J., Lindenberg, A., Rajpurohit, S., Tan, L. Z., Ogitsu, T., Correa, A. A.  
2021
- **Twist-Angle-Dependent Ultrafast Charge Transfer in MoS<sub>2</sub>-Graphene van der Waals Heterostructures.** *Nano letters*  
Luo, D., Tang, J., Shen, X., Ji, F., Yang, J., Weathersby, S., Kozina, M. E., Chen, Z., Xiao, J., Ye, Y., Cao, T., Zhang, G., Wang, et al  
2021
- **Dynamic structural views in solar energy materials by femtosecond electron diffraction** *MRS BULLETIN*  
Guzelturk, B., Lindenberg, A.  
2021
- **Direct observation of ultrafast hydrogen bond strengthening in liquid water.** *Nature*  
Yang, J., Dettori, R., Nunes, J. P., List, N. H., Biasin, E., Centurion, M., Chen, Z., Cordones, A. A., Deponte, D. P., Heinz, T. F., Kozina, M. E., Ledbetter, K., Lin, et al  
2021; 596 (7873): 531-535
- **Highly Efficient Uniaxial In-Plane Stretching of a 2D Material via Ion Insertion.** *Advanced materials (Deerfield Beach, Fla.)*  
Muscher, P. K., Rehn, D. A., Sood, A., Lim, K., Luo, D., Shen, X., Zajac, M., Lu, F., Mehta, A., Li, Y., Wang, X., Reed, E. J., Chueh, et al  
2021: e2101875
- **Universal phase dynamics in VO<sub>2</sub> switches revealed by ultrafast operando diffraction** *SCIENCE*  
Sood, A., Shen, X., Shi, Y., Kumar, S., Park, S., Zajac, M., Sun, Y., Chen, L., Ramanathan, S., Wang, X., Chueh, W. C., Lindenberg, A. M.  
2021; 373 (6552): 352-+
- **Universal phase dynamics in VO<sub>2</sub> switches revealed by ultrafast operando diffraction.** *Science (New York, N.Y.)*  
Sood, A., Shen, X., Shi, Y., Kumar, S., Park, S. J., Zajac, M., Sun, Y., Chen, L. Q., Ramanathan, S., Wang, X., Chueh, W. C., Lindenberg, A. M.

2021; 373 (6552): 352-355

- **Electrochemical ion insertion from the atomic to the device scale** *NATURE REVIEWS MATERIALS*  
Sood, A., Poletayev, A. D., Cogswell, D. A., Csernica, P. M., Mefford, J., Fraggadakis, D., Toney, M. F., Lindenberg, A. M., Bazant, M. Z., Chueh, W. C.  
2021
- **Nanoscale Disorder Generates Subdiffusive Heat Transport in Self-Assembled Nanocrystal Films.** *Nano letters*  
Utterback, J. K., Sood, A., Coropceanu, I., Guzelturk, B., Talapin, D. V., Lindenberg, A. M., Ginsberg, N. S.  
2021
- **Subterahertz collective dynamics of polar vortices.** *Nature*  
Li, Q., Stoica, V. A., Pasciak, M., Zhu, Y., Yuan, Y., Yang, T., McCarter, M. R., Das, S., Yadav, A. K., Park, S., Dai, C., Lee, H. J., Ahn, et al  
2021; 592 (7854): 376–80
- **Dynamic lattice distortions driven by surface trapping in semiconductor nanocrystals.** *Nature communications*  
Guzelturk, B., Cotts, B. L., Jasarasaria, D., Philbin, J. P., Hanifi, D. A., Koscher, B. A., Balan, A. D., Curling, E., Zajac, M., Park, S., Yazdani, N., Nyby, C., Kamysbayev, et al  
2021; 12 (1): 1860
- **Visualization of dynamic polaronic strain fields in hybrid lead halide perovskites.** *Nature materials*  
Guzelturk, B., Winkler, T., Van de Goor, T. W., Smith, M. D., Bourelle, S. A., Feldmann, S., Trigo, M., Teitelbaum, S. W., Steinruck, H., de la Pena, G. A., Alonso-Mori, R., Zhu, D., Sato, et al  
2021
- **Carrier-specific dynamics in 2H-MoTe<sub>2</sub> observed by femtosecond soft x-ray absorption spectroscopy using an x-ray free-electron laser.** *Structural dynamics (Melville, N.Y.)*  
Britz, A., Attar, A. R., Zhang, X., Chang, H., Nyby, C., Krishnamoorthy, A., Park, S. H., Kwon, S., Kim, M., Nordlund, D., Sainio, S., Heinz, T. F., Leone, et al  
2021; 8 (1): 014501
- **Steam-created grain boundaries for methane C-H activation in palladium catalysts.** *Science (New York, N.Y.)*  
Huang, W., Johnston-Peck, A. C., Wolter, T., Yang, W. D., Xu, L., Oh, J., Reeves, B. A., Zhou, C., Holtz, M. E., Herzing, A. A., Lindenberg, A. M., Mavrikakis, M., Cargnello, et al  
2021; 373 (6562): 1518-1523
- **Synthesis of Macroscopic Single Crystals of Ge<sub>2</sub>Sb<sub>2</sub>Te<sub>5</sub> via Single-Shot Femtosecond Optical Excitation** *CRYSTAL GROWTH & DESIGN*  
Zajac, M., Sood, A., Kim, T. R., Mo, M., Kozina, M., Park, S., Shen, X., Guzelturk, B., Lin, M., Yang, J., Weathersby, S., Wang, X., Lindenberg, et al  
2020; 20 (10): 6660–67
- **Acceleration of Crystallization Kinetics in Ge-Sb-Te-Based Phase-Change Materials by Substitution of Ge by Sn** *ADVANCED FUNCTIONAL MATERIALS*  
Zalden, P., Koch, C., Paulsen, M., Esters, M., Johnson, D. C., Wuttig, M., Lindenberg, A. M., Bensch, W.  
2020
- **Bulk and Nanocrystalline Cesium Lead-Halide Perovskites as Seen by Halide Magnetic Resonance.** *ACS central science*  
Piveteau, L., Aebli, M., Yazdani, N., Millen, M., Korosec, L., Krieg, F., Benin, B. M., Morad, V., Piveteau, C., Shiroka, T., Comas-Vives, A., Coperet, C., Lindenberg, et al  
2020; 6 (7): 1138–49
- **Visualizing Energy Transfer at Buried Interfaces in Layered Materials Using Picosecond X-Rays** *ADVANCED FUNCTIONAL MATERIALS*  
Nyby, C., Sood, A., Zalden, P., Gabourie, A. J., Muscher, P., Rhodes, D., Mannebach, E., Corbett, J., Mehta, A., Pop, E., Heinz, T. F., Lindenberg, A. M.  
2020
- **Berry curvature memory through electrically driven stacking transitions** *NATURE PHYSICS*  
Xiao, J., Wang, Y., Wang, H., Pemmaraju, C. D., Wang, S., Muscher, P., Sie, E. J., Nyby, C. M., Devereaux, T. P., Qian, X., Zhang, X., Lindenberg, A. M.  
2020
- **Nonequilibrium Thermodynamics of Colloidal Gold Nanocrystals Monitored by Ultrafast Electron Diffraction and Optical Scattering Microscopy.** *ACS nano*

Guzelturk, B. n., Utterback, J. K., Coropceanu, I. n., Kamysbayev, V. n., Janke, E. M., Zajac, M. n., Yazdani, N. n., Cotts, B. L., Park, S. n., Sood, A. n., Lin, M. F., Reid, A. H., Kozina, et al  
2020

- **Anisotropic structural dynamics of monolayer crystals revealed by femtosecond surface X-ray scattering** *NATURE PHOTONICS*  
Tung, I., Krishnamoorthy, A., Sadasivam, S., Zhou, H., Zhang, Q., Seyler, K. L., Clark, G., Mannebach, E. M., Nyby, C., Ernst, F., Zhu, D., Glowina, J. M., Kozina, et al  
2019; 13 (6): 425-+
- **Molecule-like trap states in halide perovskites: From solar-cell absorbers to white-light emitters**  
Smith, M., Jaffe, A., Lindenberg, A., Karunadasa, H.  
AMER CHEMICAL SOC.2019
- **Recording interfacial currents on the subnanometer length and femtosecond time scale by terahertz emission.** *Science advances*  
Ma, E. Y., Guzelturk, B., Li, G., Cao, L., Shen, Z., Lindenberg, A. M., Heinz, T. F.  
2019; 5 (2): eaau0073
- **Recording interfacial currents on the subnanometer length and femtosecond time scale by terahertz emission** *SCIENCE ADVANCES*  
Ma, E., Guzelturk, B., Li, G., Cao, L., Shen, Z., Lindenberg, A. M., Heinz, T. F.  
2019; 5 (2)
- **Femtosecond x-ray diffraction reveals a liquid-liquid phase transition in phase-change materials.** *Science (New York, N.Y.)*  
Zalden, P. n., Quirin, F. n., Schumacher, M. n., Siegel, J. n., Wei, S. n., Koc, A. n., Nicoul, M. n., Trigo, M. n., Andreasson, P. n., Enquist, H. n., Shu, M. J., Pardini, T. n., Chollet, et al  
2019; 364 (6445): 1062–67
- **An Ultrafast Symmetry Switch in a Weyl Semimetal** *Nature*  
Sie, E. J., et al  
2019; 565, 61
- **Terahertz Kerr Effect in beta-Alumina Ion Conductors**  
Poletayev, A. D., Hoffmann, M. C., Teitelbaum, S. W., Trigo, M., Chueh, W. C., Lindenberg, A. M., IEEE  
IEEE.2019
- **THz-Pump UED-Probe on a Topological Weyl Semimetal**  
Sie, E. J., Nyby, C. M., Pemmaraju, C. D., Park, S., Shen, X., Yang, J., Hoffmann, M. C., Ofori-Okai, B. K., Li, R., Reid, A. H., Weathersby, S., Mannebach, E., Finney, et al  
IEEE.2019
- **Monitoring Charge Separation Dynamics Using THz Emission Spectroscopy**  
Guzelturk, B., Ma, E., Li, G., Cao, L., Shen, Z., Heinz, T., Lindenberg, A., IEEE  
IEEE.2019
- **Light-Induced Currents at Domain Walls in Multiferroic BiFeO<sub>3</sub>.** *Nano letters*  
Guzelturk, B. n., Mei, A. B., Zhang, L. n., Tan, L. Z., Donahue, P. n., Singh, A. G., Schlom, D. G., Martin, L. W., Lindenberg, A. M.  
2019
- **An ultrafast symmetry switch in a Weyl semimetal.** *Nature*  
Sie, E. J., Nyby, C. M., Pemmaraju, C. D., Park, S. J., Shen, X. n., Yang, J. n., Hoffmann, M. C., Ofori-Okai, B. K., Li, R. n., Reid, A. H., Weathersby, S. n., Mannebach, E. n., Finney, et al  
2019; 565 (7737): 61–66
- **Atomic-scale imaging of ultrafast materials dynamics** *MRS BULLETIN*  
Flannigan, D. J., Lindenberg, A. M.  
2018; 43 (7): 485–90
- **Obtaining white light from layered perovskites**  
Smith, M., Jaffe, A., Dohner, E., Lindenberg, A., Karunadasa, H.  
AMER CHEMICAL SOC.2018

- **Terahertz Emission from Hybrid Perovskites Driven by Ultrafast Charge Separation and Strong Electron-Phonon Coupling** *ADVANCED MATERIALS*  
Guzelturk, B., Belisle, R. A., Smith, M. D., Bruening, K., Prasanna, R., Yuan, Y., Gopalan, V., Tassone, C. J., Karunadasa, H. I., McGehee, M. D., Lindenberg, A. M.  
2018; 30 (11)
- **Anharmonicity of the vibrational modes of phase-change materials: A far-infrared, terahertz, and Raman study** *VIBRATIONAL SPECTROSCOPY*  
Shportko, K., Zalden, P., Lindenberg, A. M., Rueckamp, R., Grueninger, M.  
2018; 95: 51–56
- **Ultrafast Electric Field Pulse Control of Giant Temperature Change in Ferroelectrics** *PHYSICAL REVIEW LETTERS*  
Qi, Y., Liu, S., Lindenberg, A. M., Rappe, A. M.  
2018; 120 (5): 055901
- **Dynamic Optical Tuning of Interlayer Interactions in the Transition Metal Dichalcogenides** *NANO LETTERS*  
Mannebach, E. M., Nyby, C., Ernst, F., Zhou, Y., Tolsma, J., Li, Y., Sher, M., Tung, I., Zhou, H., Zhang, Q., Seyler, K. L., Clark, G., Lin, et al  
2017; 17 (12): 7761-7766
- **Structural imaging of nanoscale phonon transport in ferroelectrics excited by metamaterial-enhanced terahertz fields** *PHYSICAL REVIEW MATERIALS*  
Zhu, Y., Chen, F., Park, J., Sasikumar, K., Hu, B., Damodaran, A. R., Jung, I., Highland, M. J., Cai, Z., Tung, I., Walko, D. A., Freeland, J. W., Martin, et al  
2017; 1 (6)
- **Structural origins of broadband emission from layered Pb-Br hybrid perovskites.** *Chemical science*  
Smith, M. D., Jaffe, A., Dohner, E. R., Lindenberg, A. M., Karunadasa, H. I.  
2017; 8 (6): 4497-4504
- **Bismuth-based double perovskites for non-toxic photovoltaics**  
Slavney, A., Hu, T., Lindenberg, A., Karunadasa, H.  
AMER CHEMICAL SOC.2017
- **Picosecond light-induced rotational disordering in the hybrid perovskites**  
Lindenberg, A.  
AMER CHEMICAL SOC.2017
- **Broadband white-light emission in two-dimensional layered lead-bromide perovskites**  
Hu, T., Smith, M., Dohner, E., Sher, M., Wu, X., Trinh, M., Fisher, A., Corbett, J., Zhu, X., Karunadasa, H., Lindenberg, A.  
AMER CHEMICAL SOC.2017
- **Engineering the Structural and Electronic Phases of MoTe<sub>2</sub> through W Substitution** *NANO LETTERS*  
Rhodes, D., Chenet, D. A., Janicek, B. E., Nyby, C., Lin, Y., Jin, W., Edelberg, D., Mannebach, E., Finney, N., Antony, A., Schiros, T., Klarr, T., Mazzoni, et al  
2017; 17 (3): 1616-1622
- **Ultrafast light-induced symmetry changes in single BaTiO<sub>3</sub> nanowires** *JOURNAL OF MATERIALS CHEMISTRY C*  
Kuo, Y., Nah, S., He, K., Hu, T., Lindenberg, A. M.  
2017; 5 (6): 1522-1528
- **Structural origins of broadband emission from layered Pb-Br hybrid perovskites** *Chemical Science*  
Smith, M. D., Jaffe, A., Dohner, E. R., Lindenberg, A. M., Karunadasa, H. I.  
2017: 4497-4504
- **Light-induced picosecond rotational disordering of the inorganic sublattice in hybrid perovskites.** *Science advances*  
Wu, X. n., Tan, L. Z., Shen, X. n., Hu, T. n., Miyata, K. n., Trinh, M. T., Li, R. n., Coffee, R. n., Liu, S. n., Egger, D. A., Makasyuk, I. n., Zheng, Q. n., Fry, et al  
2017; 3 (7): e1602388
- **Visualization of Atomic-Scale Motions in Materials via Femtosecond X-Ray Scattering Techniques** *ANNUAL REVIEW OF MATERIALS RESEARCH, VOL 47*

Lindenberg, A. M., Johnson, S. L., Reis, D. A.

edited by Clarke, D. R.

2017; 47: 425–49

- **Dynamic Optical Tuning of Interlayer Interactions in the Transition Metal Dichalcogenides.** *Nano letters*  
Mannebach, E. M., Nyby, C. n., Ernst, F. n., Zhou, Y. n., Tolsma, J. n., Li, Y. n., Sher, M. J., Tung, I. C., Zhou, H. n., Zhang, Q. n., Seyler, K. L., Clark, G. n., Lin, et al  
2017; 17 (12): 7761–66
- **2D materials advances: from large scale synthesis and controlled heterostructures to improved characterization techniques, defects and applications** *2D MATERIALS*  
Lin, Z., McCreary, A., Briggs, N., Subramanian, S., Zhang, K., Sun, Y., Li, X., Borys, N. J., Yuan, H., Fullerton-Shirey, S. K., Chernikov, A., Zhao, H., McDonnell, et al  
2016; 3 (4)
- **Ultrafast terahertz-field-driven ionic response in ferroelectric BaTiO<sub>3</sub>** *PHYSICAL REVIEW B*  
Chen, F., Zhu, Y., Liu, S., Qi, Y., Hwang, H. Y., Brandt, N. C., Lu, J., QUIRIN, F., Enquist, H., Zalden, P., Hu, T., Goodfellow, J., Sher, et al  
2016; 94 (18)
- **Picosecond Electric-Field-Induced Threshold Switching in Phase-Change Materials.** *Physical review letters*  
Zalden, P., Shu, M. J., Chen, F., Wu, X., Zhu, Y., Wen, H., Johnston, S., Shen, Z., Landreman, P., Brongersma, M., Fong, S. W., Wong, H. P., Sher, et al  
2016; 117 (6): 067601-?
- **Transient terahertz photoconductivity measurements of minority-carrier lifetime in tin sulfide thin films: Advanced metrology for an early stage photovoltaic material (vol 119, 035101, 2016)** *JOURNAL OF APPLIED PHYSICS*  
Jaramillo, R., Sher, M., Ofori-Okai, B. K., Steinmann, V., Yang, C., Hartman, K., Nelson, K. A., Lindenberg, A. M., Gordon, R. G., Buonassisi, T.  
2016; 119 (24)
- **Mechanism for Broadband White-Light Emission from Two-Dimensional (110) Hybrid Perovskites** *JOURNAL OF PHYSICAL CHEMISTRY LETTERS*  
Hu, T., Smith, M. D., Dohner, E. R., Sher, M., Wu, X., Tuan Trinh, M., Fisher, A., Corbett, J., Zhu, X., Karunadasa, H. I., Lindenberg, A. M.  
2016; 7 (12): 2258-2263
- **Time- and Temperature-Independent Local Carrier Mobility and Effects of Regioregularity in Polymer-Fullerene Organic Semiconductors** *ADVANCED ELECTRONIC MATERIALS*  
Sher, M., Bartelt, J. A., Burke, T. M., Salleo, A., McGehee, M. D., Lindenberg, A. M.  
2016; 2 (3)
- **A Bismuth-Halide Double Perovskite with Long Carrier Recombination Lifetime for Photovoltaic Applications.** *Journal of the American Chemical Society*  
Slavney, A. H., Hu, T., Lindenberg, A. M., Karunadasa, H. I.  
2016; 138 (7): 2138-2141
- **Transient terahertz photoconductivity measurements of minority-carrier lifetime in tin sulfide thin films: Advanced metrology for an early stage photovoltaic material** *JOURNAL OF APPLIED PHYSICS*  
Jaramillo, R., Sher, M., Ofori-Okai, B. K., Steinmann, V., Yang, C., Hartman, K., Nelson, K. A., Lindenberg, A. M., Gordon, R. G., Buonassisi, T.  
2016; 119 (3)
- **The origin of incipient ferroelectricity in lead telluride.** *Nature communications*  
Jiang, M. P., Trigo, M., Savic, I., Fahy, S., Murray, É. D., Bray, C., Clark, J., Henighan, T., Kozina, M., Chollet, M., Glowina, J. M., Hoffmann, M. C., Zhu, et al  
2016; 7: 12291-?
- **Ultrafast Terahertz Gating of the Polarization and Giant Nonlinear Optical Response in BiFeO<sub>3</sub> Thin Films** *ADVANCED MATERIALS*  
Chen, F., Goodfellow, J., Liu, S., Grinberg, I., Hoffmann, M. C., Damodaran, A. R., Zhu, Y., Zalden, P., Zhang, X., Takeuchi, I., Rappe, A. M., Martin, L. W., Wen, et al  
2015; 27 (41): 6371-?
- **Ultrafast Terahertz Gating of the Polarization and Giant Nonlinear Optical Response in BiFeO<sub>3</sub> Thin Films.** *Advanced materials (Deerfield Beach, Fla.)*

- Chen, F., Goodfellow, J., Liu, S., Grinberg, I., Hoffmann, M. C., Damodaran, A. R., Zhu, Y., Zalden, P., Zhang, X., Takeuchi, I., Rappe, A. M., Martin, L. W., Wen, et al  
2015; 27 (41): 6371-5
- **Dynamic Structural Response and Deformations of Monolayer MoS<sub>2</sub> Visualized by Femtosecond Electron Diffraction** *NANO LETTERS*  
Mannebach, E. M., Li, R., Duerloo, K., Nyby, C., Zalden, P., Vecchione, T., Ernst, F., Reid, A. H., Chase, T., Shen, X., Weathersby, S., Hast, C., Hettel, et al  
2015; 15 (10): 6889-6895
  - **How Supercooled Liquid Phase-Change Materials Crystallize: Snapshots after Femtosecond Optical Excitation** *CHEMISTRY OF MATERIALS*  
Zalden, P., von Hoegen, A., Landreman, P., Wuttig, M., Lindenberg, A. M.  
2015; 27 (16): 5641-5646
  - **THz-Pulse-Induced Selective Catalytic CO Oxidation on Ru.** *Physical review letters*  
Larue, J. L., Katayama, T., Lindenberg, A., Fisher, A. S., Öström, H., Nilsson, A., Ogasawara, H.  
2015; 115 (3): 036103-?
  - **THz-Pulse-Induced Selective Catalytic CO Oxidation on Ru** *PHYSICAL REVIEW LETTERS*  
Larue, J. L., Katayama, T., Lindenberg, A., Fisher, A. S., Ostrom, H., Nilsson, A., Ogasawara, H.  
2015; 115 (3)
  - **Mega-electron-volt ultrafast electron diffraction at SLAC National Accelerator Laboratory** *REVIEW OF SCIENTIFIC INSTRUMENTS*  
WEATHERSBY, S. P., Brown, G., Centurion, M., CHASE, T. F., Coffee, R., Corbett, J., Eichner, J. P., Frisch, J. C., Fry, A. R., Guehr, M., Hartmann, N., Hast, C., HETTEL, et al  
2015; 86 (7)
  - **Visualization of nanocrystal breathing modes at extreme strains** *NATURE COMMUNICATIONS*  
Szilagy, E., Wittenberg, J. S., Miller, T. A., Lutker, K., Quirin, F., Lemke, H., Zhu, D., Chollet, M., Robinson, J., Wen, H., Sokolowski-Tinten, K., Lindenberg, A. M.  
2015; 6
  - **Color Switching with Enhanced Optical Contrast in Ultrathin Phase-Change Materials and Semiconductors Induced by Femtosecond Laser Pulses** *ACS PHOTONICS*  
Schlich, F. F., Zalden, P., Lindenberg, A. M., Spolenak, R.  
2015; 2 (2): 178-182
  - **Ultrafast electronic and structural response of monolayer MoS<sub>2</sub> under intense photoexcitation conditions.** *ACS nano*  
Mannebach, E. M., Duerloo, K. N., Pellouchoud, L. A., Sher, M., Nah, S., Kuo, Y., Yu, Y., Marshall, A. F., Cao, L., Reed, E. J., Lindenberg, A. M.  
2014; 8 (10): 10734-10742
  - **Room-temperature stabilization of nanoscale superionic Ag<sub>2</sub>Se** *NANOTECHNOLOGY*  
Hu, T., Wittenberg, J. S., Lindenberg, A. M.  
2014; 25 (41)
  - **Room-temperature stabilization of nanoscale superionic Ag<sub>2</sub>Se.** *Nanotechnology*  
Hu, T., Wittenberg, J. S., Lindenberg, A. M.  
2014; 25 (41): 415705-?
  - **Ultrafast Electronic and Structural Response of Monolayer MoS<sub>2</sub> under Intense Photoexcitation Conditions** *ACS NANO*  
Mannebach, E. M., Duerloo, K. N., Pellouchoud, L. A., Sher, M., Nah, S., Kuo, Y., Yu, Y., Marshall, A. F., Cao, L., Reed, E. J., Lindenberg, A. M.  
2014; 8 (10): 10734-10742
  - **Reversible Optical Switching of Infrared Antenna Resonances with Ultrathin Phase-Change Layers Using Femtosecond Laser Pulses** *ACS PHOTONICS*  
Michel, A. U., Zalden, P., Chigrin, D. N., Wuttig, M., Lindenberg, A. M., Taubner, T.  
2014; 1 (9): 833-839
  - **Ultrafast polarization response of an optically trapped single ferroelectric nanowire.** *Nano letters*  
Nah, S., Kuo, Y., Chen, F., Park, J., Sinclair, R., Lindenberg, A. M.  
2014; 14 (8): 4322-4327

- **Picosecond carrier recombination dynamics in chalcogen-hyperdoped silicon** *APPLIED PHYSICS LETTERS*  
Sher, M., Simmons, C. B., Krich, J. J., Akey, A. J., Winkler, M. T., Recht, D., Buonassisi, T., Aziz, M. J., Lindenberg, A. M.  
2014; 105 (5)
- **Below gap optical absorption in GaAs driven by intense, single-cycle coherent transition radiation** *OPTICS EXPRESS*  
Goodfellow, J., Fuchs, M., Daranciang, D., Ghimire, S., Chen, F., Loos, H., Reis, D. A., Fisher, A. S., Lindenberg, A. M.  
2014; 22 (14): 17423-17429
- **Ultrafast terahertz-induced response of GeSbTe phase-change materials** *APPLIED PHYSICS LETTERS*  
Shu, M. J., Zalden, P., Chen, F., Weems, B., Chatzakis, I., Xiong, F., Jeyasingh, R., Hoffmann, M. C., Pop, E., Wong, H. P., Wuttig, M., Lindenberg, A. M.  
2014; 104 (25)
- **Measurement of transient atomic displacements in thin films with picosecond and femtometer resolution** *STRUCTURAL DYNAMICS-US*  
Kozina, M., Hu, T., Wittenberg, J. S., Szilagy, E., Trigo, M., Miller, T. A., Uher, C., Damodaran, A., Martin, L., Mehta, A., Corbett, J., Safraneck, J., Reis, et al  
2014; 1 (3)
- **Real-time visualization of nanocrystal solid-solid transformation pathways.** *Nano letters*  
Wittenberg, J. S., Miller, T. A., Szilagy, E., Lutker, K., Quirin, F., Lu, W., Lemke, H., Zhu, D., Chollet, M., Robinson, J., Wen, H., Sokolowski-Tinten, K., Alivisatos, et al  
2014; 14 (4): 1995-1999
- **Fourier-transform inelastic X-ray scattering from time- and momentum-dependent phonon-phonon correlations** *NATURE PHYSICS*  
Trigo, M., Fuchs, M., Chen, J., Jiang, M. P., Cammarata, M., Fahy, S., Fritz, D. M., Gaffney, K., Ghimire, S., Higginbotham, A., Johnson, S. L., Kozina, M. E., Larsson, et al  
2013; 9 (12): 790-794
- **High-pressure Raman spectroscopy of phase change materials** *APPLIED PHYSICS LETTERS*  
Hsieh, W., Zalden, P., Wuttig, M., Lindenberg, A. M., Mao, W. L.  
2013; 103 (19)
- **Ultrafast sub-threshold photo-induced response in crystalline and amorphous GeSbTe thin films** *APPLIED PHYSICS LETTERS*  
Shu, M. J., Chatzakis, I., Kuo, Y., Zalden, P., Lindenberg, A. M.  
2013; 102 (20)
- **Intense terahertz pulses from SLAC electron beams using coherent transition radiation.** *Review of scientific instruments*  
Wu, Z., Fisher, A. S., Goodfellow, J., Fuchs, M., Daranciang, D., Hogan, M., Loos, H., Lindenberg, A.  
2013; 84 (2): 022701-?
- **Intense terahertz pulses from SLAC electron beams using coherent transition radiation** *REVIEW OF SCIENTIFIC INSTRUMENTS*  
Wu, Z., Fisher, A. S., Goodfellow, J., Fuchs, M., Daranciang, D., Hogan, M., Loos, H., Lindenberg, A.  
2013; 84 (2)
- **The mechanism of ultrafast structural switching in superionic copper (I) sulphide nanocrystals** *NATURE COMMUNICATIONS*  
Miller, T. A., Wittenberg, J. S., Wen, H., Connor, S., Cui, Y., Lindenberg, A. M.  
2013; 4
- **Ultrafast laser-induced melting and ablation studied by time-resolved diffuse X-ray scattering** *18th International Conference on Ultrafast Phenomena*  
Nicoul, M., QUIRIN, F., Lindenberg, A. M., Barty, A., Fritz, D. M., Zhu, D., Lemke, H., Chollet, M., Reis, D. A., Chen, J., Ghimire, S., Trigo, M., Fuchs, et al  
E D P SCIENCES.2013
- **Photon-Counting Detectors for Pump-Probe Science** *60th IEEE Nuclear Science Symposium (NSS) / Medical Imaging Conference (MIC) / 20th International Workshop on Room-Temperature Semiconductor X-ray and Gamma-ray Detectors*  
Kenney, C. J., Dragone, A. B., Segal, J. D., Hasi, J., Mehta, A., Reis, D. A., Markovic, B., Caraguilo, P., Carini, G., Herrmann, S. C., Lindenberg, A. M., Haller, G.  
IEEE.2013
- **Fourier-transform inelastic X-ray scattering from time and momentum dependent phonon-phonon correlations** *Nat. Phys.*

Trigo, M., Fuchs, M., Chen, J., Jiang, M., P., Cammarata, M., Fahy, S., Lindenberg, A. M.  
2013

- **High-pressure Raman spectroscopy of phase change materials** *Appl. Phys. Lett.*  
Hsieh, W., Zalden, P., Wuttig, M., Lindenberg, A. M., Mao, W., L.  
2013; 103: 191108
- **Ultrafast Photovoltaic Response in Ferroelectric Nanolayers** *PHYSICAL REVIEW LETTERS*  
Daranciang, D., Highland, M. J., Wen, H., Young, S. M., Brandt, N. C., Hwang, H. Y., Vattilana, M., Nicoul, M., Quirin, F., Goodfellow, J., Qi, T., Grinberg, I., Fritz, et al  
2012; 108 (8)
- **Optical Probes of Ultrafast Electron Dynamics in Photoexcited Ferroelectrics** *Conference on Lasers and Electro-Optics (CLEO)*  
Goodfellow, J., Daranciang, D., Lindenberg, A.  
IEEE.2012
- **Ultrafast x-ray spectroscopic and scattering studies of nanoscale superionic phase transitions** *Conference on Lasers and Electro-Optics (CLEO)*  
Miller, T. A., Wittenberg, J., Wen, H., Lindenberg, A. M.  
IEEE.2012
- **Ultrafast Optical and X-ray Probes of Nanoscale Solid-Liquid Phase Transformations** *Conference on Lasers and Electro-Optics (CLEO)*  
Wittenberg, J., Miller, T. A., Wen, H., Lindenberg, A. M.  
IEEE.2012
- **Observations of laser induced magnetization dynamics in Co/Pd multilayers with coherent x-ray scattering** *APPLIED PHYSICS LETTERS*  
Wu, B., Zhu, D., Acremann, Y., Miller, T. A., Lindenberg, A. M., Hellwig, O., Stoehr, J., Scherz, A.  
2011; 99 (25)
- **Single-cycle terahertz pulses with > 0.2 V/angstrom field amplitudes via coherent transition radiation** *APPLIED PHYSICS LETTERS*  
Daranciang, D., Goodfellow, J., Fuchs, M., Wen, H., Ghimire, S., Reis, D. A., Loos, H., Fisher, A. S., Lindenberg, A. M.  
2011; 99 (14)
- **Observation of Transient Structural-Transformation Dynamics in a Cu<sub>2</sub>S Nanorod** *SCIENCE*  
Zheng, H., Rivest, J. B., Miller, T. A., Sadtler, B., Lindenberg, A., Toney, M. F., Wang, L., Kisielowski, C., Alivisatos, A. P.  
2011; 333 (6039): 206-209
- **Generation of > 100 mu J, Broadband THz Transients with > 10 MV/cm Fields via Coherent Transition Radiation at the Linac Coherent Light Source** *Conference on Lasers and Electro-Optics (CLEO)*  
Daranciang, D., Goodfellow, J., Ghimire, S., Loos, H., Reis, D., Fisher, A. S., Lindenberg, A. M.  
IEEE.2011
- **High-speed all-optical terahertz polarization switching by a transient plasma phase modulator** *APPLIED PHYSICS LETTERS*  
Wen, H., Daranciang, D., Lindenberg, A. M.  
2010; 96 (16)
- **Ultrafast Conversions of Hydrogen-Bonded Structures in Liquid Water Observed via Femtosecond Soft X-Ray Spectroscopy**  
Huse, N., Wen, H., Cho, H., Kim, T., Schoenlein, R., W., Lindenberg, A., M.  
2010
- **Spatiotemporally resolved plasma effect on two-color laser pumped terahertz generation**  
Wen, H., Daranciang, D., Lindenberg, A., IEEE  
IEEE.2010
- **High-intensity THz interactions with materials: New aspects and applications** *International Symposium on High Power Laser Ablation 2010*  
Daranciang, D., Wen, H., Lindenberg, A. M.  
AMER INST PHYSICS.2010: 17–25
- **Light-Induced Modulation of Ferroelectric Polarization Probed Using Time-Resolved X-Ray Scattering**  
Daranciang, D., Wen, H., Highland, M., Perkins, B., Brandt, N., Nelson, K., Lindenberg, A. M.  
2010

- **Ultrafast conversions between hydrogen bonded structures in liquid water observed by femtosecond x-ray spectroscopy** *JOURNAL OF CHEMICAL PHYSICS*  
Wen, H., Huse, N., Schoenlein, R. W., Lindenberg, A. M.  
2009; 131 (23)
- **Coherent Terahertz Polarization Control through Manipulation of Electron Trajectories** *PHYSICAL REVIEW LETTERS*  
Wen, H., Lindenberg, A. M.  
2009; 103 (2)
- **Probing the hydrogen-bond network of water via time-resolved soft X-ray spectroscopy** *PHYSICAL CHEMISTRY CHEMICAL PHYSICS*  
Huse, N., Wen, H., Nordlund, D., Szilagyí, E., Daranciang, D., Miller, T. A., Nilsson, A., Schoenlein, R. W., Lindenberg, A. M.  
2009; 11 (20): 3951-3957
- **Ultrafast Electron Cascades Driven by Intense Femtosecond THz Pulses** *16th International Conference on Ultrafast Phenomena*  
Wen, H., Wiczler, M., Lindenberg, A.  
SPRINGER-VERLAG BERLIN.2009: 654–656
- **Coherent Control of the Polarization of Ultrafast Terahertz Pulses** *Conference on Lasers and Electro-Optics/Quantum Electronics and Laser Science Conference (CLEO/QELS 2009)*  
Wen, H., Lindenberg, A.  
IEEE.2009: 640–641
- **Ultrafast electron cascades in semiconductors driven by intense femtosecond terahertz pulses** *PHYSICAL REVIEW B*  
Wen, H., Wiczler, M., Lindenberg, A. M.  
2008; 78 (12)
- **X-ray diffuse scattering measurements of nucleation dynamics at femtosecond resolution** *PHYSICAL REVIEW LETTERS*  
Lindenberg, A. M., Engemann, S., Gaffney, K. J., Sokolowski-Tinten, K., Larsson, J., Hillyard, P. B., Reis, D. A., Fritz, D. M., ARTHUR, J., Akre, R. A., George, M. J., Deb, A., Bucksbaum, et al  
2008; 100 (13)
- **Formation of secondary electron cascades in single-crystalline plasma-deposited diamond upon exposure to femtosecond x-ray pulses** *JOURNAL OF APPLIED PHYSICS*  
Gabrysch, M., Marklund, E., Hajdu, J., Twitchen, D. J., Rudati, J., Lindenberg, A. M., Caleman, C., Falcone, R. W., Tschentscher, T., Moffat, K., Bucksbaum, P. H., Als-Nielsen, J., Nelson, et al  
2008; 103 (6)
- **Femtosecond x-ray diffuse scattering measurements of semiconductor ablation dynamics** *Conference on High-Power Laser Ablation VII*  
Lindenberg, A. M., Engemann, S., Gaffney, K. J., Sokolowski-Tinten, K., Larsson, J., Reis, D., Lorazo, P., Hastings, J. B.  
SPIE-INT SOC OPTICAL ENGINEERING.2008
- **Measurement of high-field THz-induced photocurrents in semiconductors** *Journal of Undergraduate Research*  
Wiczler, M., Lindenberg, A., M.  
2008; 8
- **Nonlinear THz-pump/THz-probe measurements of semiconductor carrier dynamics** *Conference on Lasers and Electro-Optics/Quantum Electronics and Laser Science Conference (CLEO/QELS 2008)*  
Lindenberg, A. M., Wen, H., Szilagyí, E.  
IEEE.2008: 322–323
- **Large acoustic transients induced by nonthermal melting of InSb** *PHYSICAL REVIEW LETTERS*  
Enquist, H., Navirian, H., Hansen, T. N., Lindenberg, A. M., Sondhaus, P., Synnergren, O., Wark, J. S., Larsson, J.  
2007; 98 (22)
- **Carrier-density-dependent lattice stability in InSb** *PHYSICAL REVIEW LETTERS*  
Hillyard, P. B., Gaffney, K. J., Lindenberg, A. M., Engemann, S., Akre, R. A., ARTHUR, J., Blome, C., Bucksbaum, P. H., Cavalieri, A. L., Deb, A., Falcone, R. W., Fritz, D. M., Fuoss, et al  
2007; 98 (12)
- **Ultrafast bond softening in bismuth: Mapping a solid's interatomic potential with X-rays** *SCIENCE*

- Fritz, D. M., Reis, D. A., Adams, B., Akre, R. A., ARTHUR, J., Blome, C., Bucksbaum, P. H., Cavalieri, A. L., Engemann, S., Fahy, S., Falcone, R. W., Fuoss, P. H., Gaffney, et al  
2007; 315 (5812): 633-636
- **Ultrafast X-ray scattering in solids** *LIGHT SCATTERING IN SOLIDS IX*  
Reis, D. A., Lindenberg, A. M.  
2007; 108: 371-422
  - **Carrier dependent stability of a semiconductor lattice measured with femtosecond X-ray diffraction** *15th International Conference on Ultrafast Phenomena*  
Gaffney, K. J., Hillyard, P. B., Lindenberg, A. M., Engemann, S., Deb, A., Meyer, D. A.  
SPRINGER-VERLAG BERLIN.2007: 710-712
  - **Ultrafast optical and x-ray measurements of femtosecond lattice dynamics in photoexcited Bismuth**  
Fritz, D. M., Adams, B., Blome, C., Bucksbaum, P., H., Cavalieri, A., L., Engemann et al., S.  
edited by Corkum, P., Weiner, A., M., Miller, R., J.  
2006
  - **Observation of structural anisotropy and the onset of liquidlike motion during the nonthermal melting of InSb** *PHYSICAL REVIEW LETTERS*  
Gaffney, K. J., Lindenberg, A. M., Larsson, J., Sokolowski-Tinten, K., Blome, C., Synnergren, O., Sheppard, J., Caleman, C., MacPhee, A. G., Weinstein, D., Lowney, D. P., Allison, T., Matthews, et al  
2005; 95 (12)
  - **Time-resolved measurements of the structure of water at constant density** *JOURNAL OF CHEMICAL PHYSICS*  
Lindenberg, A. M., Acremann, Y., Lowney, D. P., Heimann, P. A., Allison, T. K., Matthews, T., Falcone, R. W.  
2005; 122 (20)
  - **Atomic-scale visualization of inertial dynamics** *SCIENCE*  
Lindenberg, A. M., Larsson, J., Sokolowski-Tinten, K., Gaffney, K. J., Blome, C., Synnergren, O., Sheppard, J., Caleman, C., MacPhee, A. G., Weinstein, D., Lowney, D. P., Allison, T. K., Matthews, et al  
2005; 308 (5720): 392-395
  - **Clocking femtosecond x rays** *PHYSICAL REVIEW LETTERS*  
Cavalieri, A. L., Fritz, D. M., Lee, S. H., Bucksbaum, P. H., Reis, D. A., Rudati, J., Mills, D. M., Fuoss, P. H., Stephenson, G. B., Kao, C. C., Siddons, D. P., Lowney, D. P., MacPhee, et al  
2005; 94 (11)
  - **Bonding in liquid carbon studied by time-resolved x-ray absorption spectroscopy** *PHYSICAL REVIEW LETTERS*  
Johnson, S. L., Heimann, P. A., MacPhee, A. G., Lindenberg, A. M., Monteiro, O. R., Chang, Z., Lee, R. W., Falcone, R. W.  
2005; 94 (5)
  - **Opportunities and challenges using short-pulse X-ray sources.** *2nd International Conference on Photo-Induced Phase Transitions*  
Larsson, J., Synnergren, O., Hansen, T. N., Sokolowski-Tinten, K., Werin, S., Caleman, C., Hajdu, J., Shepherd, J., Wark, J. S., Lindenberg, A. M., Gaffney, K. J., Hastings, J. B.  
IOP PUBLISHING LTD.2005: 87-94
  - **Bonding in liquid Carbon studied by time-resolved x-ray absorption spectroscopy** *Phys. Rev. Lett.*  
Johnson, S., L., Heimann, P., A., MacPhee, A., G., Lindenberg, A., M., Monteiro, O., R., Chang et al., Z.  
2005; 94: 57407
  - **Time-resolved X-ray diffraction study of the ferroelectric phase-transition in DKDP** *CHEMICAL PHYSICS*  
Larsson, J., Sondhauss, P., Synnergren, O., Harbst, M., Heimann, P. A., Lindenberg, A. M., Wark, J. S.  
2004; 299 (2-3): 157-161
  - **A setup for ultrafast time-resolved x-ray absorption spectroscopy** *Rev. Sci. Instr.*  
Saes, M., Bressler, C., Mourik, F., van, Gawelda, W., Kaiser, M., Chergui et al., M.  
2004; 75: 24
  - **A setup for ultrafast time-resolved x-ray absorption spectroscopy** *REVIEW OF SCIENTIFIC INSTRUMENTS*

- Saes, M., Bressler, C., van Mourik, F., Gawelda, W., Kaiser, M., Chergui, M., Bressler, C., Grolimund, D., Abela, R., Glover, T. E., Heimann, P. A., Schoenlein, R. W., Johnson, et al  
2004; 75 (1): 24-30
- **Time-resolved x-ray diffraction study of the ferroelectric phase transition in DKDP** *Chem. Phys.*  
Larsson, J., Sondhauss, P., Synnnergren, O., Harbst, M., Heimann, P., A., Lindenberg et al., A., M.  
2004; 299: 157
  - **Transient strain driven by a dense electron-hole plasma** *PHYSICAL REVIEW LETTERS*  
DeCamp, M. F., Reis, D. A., Cavalieri, A., Bucksbaum, P. H., Clarke, R., Merlin, R., Dufresne, E. M., Arms, D. A., Lindenberg, A. M., MacPhee, A. G., Chang, Z., Lings, B., Wark, et al  
2003; 91 (16)
  - **Properties of liquid silicon observed by time-resolved x-ray absorption spectroscopy** *PHYSICAL REVIEW LETTERS*  
Johnson, S. L., Heimann, P. A., Lindenberg, A. M., Jeschke, H. O., Garcia, M. E., Chang, Z., Lee, R. W., Rehr, J. J., Falcone, R. W.  
2003; 91 (15)
  - **Properties of liquid Silicon observed by time-resolved x-ray absorption spectroscopy** *Phys. Rev. Lett.*  
Johnson, S., L., Heimann, P., A., Lindenberg, A., M., Heschke, H., O., Garcia, M., E., Chang, Z.  
2003; 91: 157403
  - **Properties of liquid silicon and carbon studied by ultrafast time-resolved x-ray absorption spectroscopy** *13th International Conference on Ultrafast Phenomena*  
Johnson, S. L., Heimann, P. A., Lindenberg, A. M., MacPhee, A. G., Falcone, R. W., Jeschke, H. O., Garcia, M., Rehr, J. J., Lee, R. W., Chang, Z.  
SPRINGER-VERLAG BERLIN.2003: 39–41
  - **Transient strain driven by a dense, electron-hole plasma** *Phys. Rev. Lett.*  
Lindenberg, A., M., DeCamp, M., F., Reis, D., A., Cavalieri, A., Bucksbaum, P., H., Clarke, R.  
2003; 91: 165502
  - **Picosecond X-ray diffraction studies of laser-excited acoustic phonons in InSb** *APPLIED PHYSICS A-MATERIALS SCIENCE & PROCESSING*  
Larsson, J., Allen, A., Bucksbaum, P. H., Falcone, R. W., Lindenberg, A., Naylor, G., Missalla, T., Reis, D. A., Scheidt, K., Sjogren, A., Sondhauss, P., WULFF, M., Wark, et al  
2002; 75 (4): 467-478
  - **Coherent control of phonons probed by time-resolved x-ray diffraction** *OPTICS LETTERS*  
Lindenberg, A. M., Kang, I., Johnson, S. L., Falcone, R. W., Heimann, P. A., Chang, Z., Lee, R. W., Wark, J. S.  
2002; 27 (10): 869-871
  - **Coherent control of phonons probed by picosecond time-resolved x-ray diffraction** *Opt. Lett.*  
Lindenberg, A., M., Kang, I., Johnson, S., L., Falcone, R., W., Heimann, P., A., Chang, Z.  
2002; 27: 869
  - **Ultrafast X-ray diffraction of laser-irradiated crystals** *7th International Conference on Synchrotron Radiation Instrumentation (SRI 2000)*  
Heimann, P. A., Lindenberg, A. M., Kang, I., JOHNSON, S., Missalla, T., Chang, Z., Falcone, R. W., Schoenlein, R. W., Glover, T. E., Padmore, H. A.  
ELSEVIER SCIENCE BV.2001: 986–989
  - **Ultrafast x-ray diffraction of laser-irradiated crystals** *Nucl. Inst. Meth. A*  
Heimann, P., A., Lindenberg, A., M., Kang, I., Johnson, S., L., Missalla, T., Heimann, P., A.  
2001: 467-468,986-989
  - **Femtosecond X-ray diffraction: Experiments and limits** *Conference on X-Ray FEL Optics and Instrumentation*  
Wark, J. S., Allen, A. M., Ansbro, P. C., Bucksbaum, P. H., Chang, Z., DeCamp, M., Falcone, R. W., Heimann, P. A., Johnson, S. L., Kang, I., Kapteyn, H. C., Larsson, J., Lee, et al  
SPIE-INT SOCIETY OPTICAL ENGINEERING.2001: 26–37
  - **Time-resolved x-ray measurements of polaron dynamics of charge-ordered Nd<sub>1</sub>/2Sr<sub>1</sub>/2MnO<sub>3</sub>** *12th International Conference on Ultrafast Phenomena*  
Kang, I., JOHNSON, S., Lindenberg, A., Falcone, R., Missalla, T., Heimann, P., Kim, K. H., Katsufuji, T., Cheong, S. W.  
SPRINGER-VERLAG BERLIN.2001: 287–289

● **Femtosecond x-ray diffraction: experiments and limits**

Wark, J., S., Allen, A., M., Ansbro et al., P., C.  
2001

● **Time-resolved X-ray diffraction from coherent phonons during a laser-induced phase transition** *PHYSICAL REVIEW LETTERS*

Lindenberg, A. M., Kang, I., Johnson, S. L., Missalla, T., Heimann, P. A., Chang, Z., Larsson, J., Bucksbaum, P. H., Kapteyn, H. C., Padmore, H. A., Lee, R. W., Wark, J. S., Falcone, et al  
2000; 84 (1): 111-114

● **Time-resolved x-ray diffraction from coherent phonons during a laser-induced phase transition** *Phys. Rev. Lett.*

Lindenberg, A., M., Kang, I., Johnson, S., L., Missalla, T., Heimann, P., A., Chang et al., Z.  
2000; 84: 111

● **Time-resolved x-ray photoabsorption and diffraction on timescales from ns to fs** *11th US National Conference on Synchrotron Radiation Instrumentation*

Heimann, P. A., Missalla, T., Lindenberg, A., Kang, I., JOHNSON, S., Chang, Z., Kapteyn, H. C., Lee, R. W., Falcone, R. W., Schoenlein, R. W., Glover, T. E., Zholents, A. A., Zolotarev, et al  
AMER INST PHYSICS.2000: 156–160

● **Time-resolved x-ray photoabsorption and diffraction on timescales from ns to fs** *18th International Conference on X-ray and Inner-Shell Processes*

Heimann, P. A., Missalla, T., Lindenberg, A., Kang, I., JOHNSON, S., Chang, Z., Kapteyn, H. C., Lee, R. W., Falcone, R. W., Schoenlein, R. W., Glover, T. E., Zholents, A. A., Zolotarev, et al  
AMER INST PHYSICS.2000: 664–668

● **Ultrafast Lattice Dynamics** *Nonlinear Optics, Quantum Optics, and Ultrafast Phenomena with X-rays*

Lindenberg, A., M.  
edited by Adams, B., W.  
Kluwer.2000

● **Ultrafast structural changes measured by time-resolved X-ray diffraction** *APPLIED PHYSICS A-MATERIALS SCIENCE & PROCESSING*

Larsson, J., Heimann, P. A., Lindenberg, A. M., Schuck, P. J., Bucksbaum, P. H., Lee, R. W., Padmore, H. A., Wark, J. S., Falcone, R. W.  
1998; 66 (6): 587-591

● **Ultrafast structural changes measured by time-resolved x-ray diffraction** *Appl. Phys. A*

Larsson, J., Heimann, P., A., Lindenberg, A., M., Schuck, P., J., Bucksbaum, P., H., Lee, R., W.  
1998; 66: 587

● **Ultra-fast time-resolved x-ray diffraction detected by an averaging mode streak camera** *7th Optical-Society-of-America Conference on Applications of High Fields and Short Wavelength Sources*

Larsson, J., Chang, Z. H., Judd, E., Heimann, P. A., Lindenberg, A. M., Kapteyn, H. C., Murnane, M. M., Lee, R. W., Machacek, A., Wark, J. S., Padmore, H. A., Falcone, R. W.  
PLENUM PRESS DIV PLENUM PUBLISHING CORP.1998: 267–270

● **Melting of a semiconductor crystal (InSb) with a short laser pulse (100 fs)** *4th High Heat Flux Engineering Conference, as part of the SPIE International Symposium on Optical Science, Engineering, and Instrumentation*

Heimann, P. A., Larsson, J., Lindenberg, A., Schuck, P. J., Judd, E., Bucksbaum, P. H., Lee, R. W., Padmore, H. A., Wark, J. S., Falcone, R. W.  
SPIE - INT SOC OPTICAL ENGINEERING.1997: 102–106