

Stanford



Aaron Lindenberg

Professor of Materials Science and Engineering and of Photon Science

CONTACT INFORMATION

- **Administrator**

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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

2023-24

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

2022-23

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

2021-22

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

2020-21

- Quantum Mechanics of Nanoscale Materials: MATSCI 142 (Spr)
- X-Ray Science and Techniques: MATSCI 326, PHOTON 326 (Aut)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Pooja Reddy, Nan Wang

Postdoctoral Faculty Sponsor

Kieran Orr, Benjamin Reeves, Jiaojian Shi

Doctoral Dissertation Advisor (AC)

Qingyuan Fan, Anudeep Mangu, Yuejun Shen, Chenyi Xia, Felipe de Quesada

Doctoral Dissertation Co-Advisor (AC)

Amalya Johnson, Samuel Lai

Doctoral (Program)

Qingyuan Fan, Yufei Yang

Postdoctoral Research Mentor

Claudia Gollner, Sheikh Rubaiat Ul Haque

Publications

PUBLICATIONS

- **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., Furera, J., Guzelturk, B., Cotts, B. L., Zajac, M., Rainò, G., Jansen, M., Boehme, S. C., Yarema, M., Lin, et al

2024; 20 (1): 47-53

- **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., Lin, et al
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., Furera, J., 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., Bulovi#, V., Bawendi, M. G., Paire, 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 MnBi₂Te₄.** *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., Guzelturk, 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 MnBi₂Te₄.** *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 Ge₂Sb₂Te₅ (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 MoS₂-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 VO₂ 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 VO₂ 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., Fraggedakis, 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-MoTe₂ 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 Ge₂Sb₂Te₅ via Single-Shot Femtosecond Optical Excitation** *CRYSTAL GROWTH & DESIGN*
Zajac, M., Sood, A., Kim, T. R., Mo, M., Kozina, M., Park, S., Shen, X., Guzelurk, 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*
Guzelurk, 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., Glowonia, 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., Guzelurk, 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., Guzelurk, B., Li, G., Cao, L., Shen, Z., Lindenberg, A. M., Heinz, T. F.
2019; 5 (2)
- **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
- **Light-Induced Currents at Domain Walls in Multiferroic BiFeO₃.** *Nano letters*
Guzelurk, 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
- **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
- **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
- **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 MoTe₂ 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
- **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.
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