Nicholas Sirica
Center for Integrated Nanotechnologies
Bikini Atoll Road, K771
Los Alamos, NM 87545 (USA)
+1 (505) 667-9706
nsirica@lanl.gov

Curriculum Vitae

Professional Experience:
Technical Staff Member
Center for Integrated Nanotechnologies, Los Alamos National Laboratory 2019-Present

Postdoctoral Research Associate, Seaborg Fellow,
Center for Integrated Nanotechnologies, Los Alamos National Laboratory
Advisors: Dr. Rohit Prasankumar and Dr. Dmitry Yarotski 2017-2019

Technical Expertise:
Photoelectron spectroscopy (ARPES, XPS, ResPES, AES), X-ray absorption spectroscopy (XANES, EXAFS), Ultrafast x-ray diffraction, Ultrafast optical and terahertz spectroscopy, Nonlinear optics, Coherent X-ray diffractive imaging

Education:
B. S. in Physics and Chemistry, Bridgewater College (2010)
Advisors: Dr. Richard Bowman and Dr. Eric Brumbaugh

Ph.D in Physics, The University of Tennessee (2017)
Thesis Title: Local Moments and Itinerant Electrons: Gaining New Insights through Investigating Electronic and Dynamical Properties.
http://trace.tennessee.edu/utk_graddiss/4652/

Awards:
2013: Paul H. Stelson Fellowship for Beginning Research – University of Tennessee
2016: Chancellor's Citation for Extraordinary Professional Promise – University of Tennessee
2021: Large Team Distinguished Performance Award – blackBEAR – Los Alamos National Laboratory
2022: Los Alamos Awards Program Distinguished Performance Award – Los Alamos National Laboratory

Service:
Journal Referee: *Physical Review X, Physical Review Letters, Nature Communications, NPJ Quantum Materials, Physical Review Research, Physical Review B, Physical Review Applied, Optics Letters, Review of Scientific Instruments*

Review Committees: NSF CAREER – Electronic and Photonic Materials Program (2020)
LANL Distinguished Postdoctoral Scholar Selection Committee (2022-5)

LANL Point of Contact: Linear Coherent Light Source (LCLS) and National Synchrotron Light Source – II (NSLS – II)

Invited Talks:

"Probing the Ultrafast Nonlinear Response in the Transition Metal Monopnictide Family of Weyl Semimetals"

APS March Meeting Focus Session on Dirac and Weyl Semimetals (2020)

"Tracking Ultrafast Photocurrents in the Weyl Semimetal TaAs"

SPIE Defense and Commercial Sensing (2019)
SPIE Optics and Photonics (2019)

"Photocurrent driven transient symmetry breaking in the Weyl Semimetal TaAs"

CATS EFRC Workshop on Nonlinear Electronic and Magnetic Dynamics in Topological Semimetals (2021)
MURI Focus Group on Topological Semimetals (2021)

"Using ultrafast photocurrents to manipulate electronic symmetry in the Weyl semimetal TaAs"

Photoinduced Phase Transitions and Cooperative Phenomena (2021)
Brigham Young University Physics Colloquium (2022)
47th International Conference on Infrared, Millimeter and Terahertz Waves (2022)
4th International Workshop on Ultrafast Dynamics and Metastability (2022)
Iowa State University Physics Colloquium (2022)

Publications:

Ultrafast x-ray scattering from collective modes of the charge density wave in $(TaSe_4)_2I$

Q. L. Nguyen, R. A. Duncan, G. Orenstein, Y. Huang, V. Krapivin, G. del la Pena, C. Ornelas-Skarin, D. A. Reis, P. Abbamonte, S. Bettler, M. Chollet, M. C. Hoffmann, M. Hurley, S. Kim, P. S. Kirchmann, Y. Kubota, F. Mahmood, A. Miller, T. Osaka, K. Qu, T. Sato, D. P. Shoemaker, **N. Sirica**, S. Song, J. Stanton, S. W. Teitelbaum, S. E. Tilton, T. Togashi, D. Zhu, and M. Trigo

arXiv:2210.17483 (2022)

Ultrafast signatures of spin and orbital order in antiferromagnetic Sr_2CrO_4

M.-C. Lee, C. Occhialini, J. Li, Z. Zhu, **N. S. Sirica**, L. T. Mix, D. A. Yarotski, R. Comin, and R. P. Prasankumar.

Communications Physics **5**, 335 (2022)

Ultrafast Suppression of the Ferroelectric Instability in $KTaO_3$

V. Krapivin, M. -Q. Gu, D. Hickox-Young, S.W. Teitelbaum, Y. Huang, G. de la Pena, D. Zhu, **N. Sirica**, M.-C. Lee, R. P. Prasankumar, A. Maznev, K. A. Nelson, M. Chollet, J. M. Rondinelli, D. A. Reis, and M. Trigo

Physical Review Letters **129**, 127601 (2022)

Direct Observation of Coherent Longitudinal and Shear Acoustic Phonons in TaAs Using Ultrafast X-ray Diffraction

M.-C. Lee, **N. Sirica**, S. W. Teitelbaum, A. Maznev, T. Pezeril, R. Tutchton V. Krapivin, G. A. de la Pena, Y. Huang, L. X. Zhao, G. F. Chen, B. Xu, R. Yang, J. Shi, J.-X. Zhu, D. A. Yarotski, X.G. Qiu, K. A. Nelson, M. Trigo, D. A. Reis, and R. P. Prasankumar

Physical Review Letters **128**, 155301 (2022)

Photocurrent-driven transient symmetry breaking in the Weyl Semimetal TaAs

N. Sirica, P. P. Orth, M.S. Sheurer, Y.M. Dai, M.-C. Lee, P. Padmanabhan, L. T. Mix, S.W. Teitelbaum, M. Trigo, L.X. Zhao, G.F. Chen, B. Xu, R. Yang, C. Hu, B. Shen, C.-C. Lee, H. Lin, T.A. Cochran, S.A. Trugman, J.-X. Zhu, M.Z. Hasan, N. Ni, X.G. Qiu, A.J. Taylor, D.A. Yarotski, and R.P. Prasankumar

Nature Materials **21**, 62 – 66 (2022)

Disentangling Electronic, Lattice, and Spin Dynamics in the Chiral Helimagnet $Cr_{1/3}NbS_2$

N. Sirica, H. Hedayat, D. Bugini, M. R. Koehler, L. Li, D. S. Parker, D. G. Mandrus, C. Dallera, E. Carpene, and N. Mannella

Physical Review B **104**, 174426 (2021) – Editors' Suggestion

Shaking up topology with light

N.S. Sirica and R.P. Prasankumar

Nature Materials **20**, 283 (2021)

The Nature of Ferromagnetism in the Chiral Helimagnet $Cr_{1/3}NbS_2$

N. Sirica, P. Vilmercati, F. Bondino, I. Pis, S. Nappini, S.-K. Mo, A. V. Fedorov, P. K. Das, I. Vobornik, J. Fujii, L. Li, D. Sapkota, D. S. Parker, D. G. Mandrus and N. Mannella

Communications Physics **3,** 65 (2020)

Strain dependence of Auger recombination in 3 μm GaInAsSb/GaSb type-I active regions

K. J. Underwood, A. F. Briggs, S. D. Sifferman, V. Verma, **N. Sirica**, R. Prasankumar, S. W. Nam, K. L. Silverman, S. Bank, and J. T. Gopinath

Applied Physics Letters **116**, 262103 (2020)

Hot Carrier Cooling and Recombination Dynamics of Chlorine Doped Hybrid Perovskite Single Crystals

L. T. Mix, D. Ghosh, J. Tisdale, M. C-. Lee, K. O'Neal, **N. Sirica**, A. Neukirch, W. Nie, A. J. Taylor, R. P. Prasankumar, S. Tretiak, D. A. Yarotski

Journal of Physical Chemistry Letters **11**, 8340 (2020)

Multi-beam X-ray ptychography for high-throughput coherent diffraction imaging

Y. Yao, Y. Jiang, J. A. Klug, M. Wojcik, E. R. Maxey, **N. Sirica**, C. Roehrig, Z. Cai, S. Vogt, B. Lai, and J. Deng

Scientific Reports **10**, 19550 (2020)

Tracking Ultrafast Photocurrents in the Weyl semimetal TaAs using THz Emission Spectroscopy

N. Sirica, R.I. Tobey, L.X. Zhao, G.F. Chen, B. Xu, R. Yang, B. Shen, D.A. Yarotski, P. Bowlan, S.A. Trugman, J.X. Zhu, Y.M. Dai, A. K. Azad, N. Ni, X.G. Qiu, A.J. Taylor, and R.P. Prasankumar

Physical Review Letters **122**, 197401 (2019)

Electronic structure of the chiral helimagnet and 3d intercalated transition metal dichalcogenide $Cr_{1/3}NbS_2$

N. Sirica, S. –K. Mo, F. Bondino, I. Pis, S. Nappini, P. Vilmercati, J. Yi, Z. Gai, P.C. Snijders, P. Das, I. Vobornik, N. Ghimire, M. R. Koehler, L. Li, D. Sapkota, D. Parker, D. G. Mandrus and N. Mannella

Physical Review B **94**, 075141 (2016)

Spectroscopic Evidence for Strong Quantum Spin Fluctuations with Itinerant Character in YFe_2Ge_2

N. Sirica, F. Bondino, S. Nappini, I. Píš, L. Poudel, A. D. Christianson, D. G. Mandrus, D. J. Singh and N. Mannella

Physical Review B **91**, 121102(R) (2015)