



Jake D Koralek

Staff Scientist, SLAC National Accelerator Laboratory

Bio

BIO

I am a condensed matter physicist with research interests in quantum materials, ultrafast optics and X-ray science. I grew up in the Stanford neighborhood where I attended Palo Alto High School. I went on to the College of Creative Studies at UCSB where I worked in the lab of David Awschalom studying semiconductor spintronics. I got my PhD in physics from the University of Colorado, Boulder, working with Dan Dessau, where we developed the first system to perform angle-resolved photoemission spectroscopy (ARPES) using a table-top laser rather than a large synchrotron facility. I moved to Lawrence Berkeley National Lab for my postdoctoral research with Joe Orenstein where we applied a wide variety of ultrafast optical techniques to study emergent properties in quantum materials and semiconductor devices. I stayed in Berkeley to work with Bob Schoenlein developing ultrafast X-ray techniques to study quantum materials. In 2014 I moved to SLAC where I am now a staff scientist in the Materials Science Department at the Linac Coherent Light Source (LCLS), the world's first X-ray free-electron laser.

EDUCATION AND CERTIFICATIONS

- BS, University of California, Santa Barbara, College of Creative Studies , Physics (1999)
- PhD, University of Colorado, Boulder , Physics (2006)

Publications

PUBLICATIONS

- **Liquid Heterostructures: Generation of Liquid-Liquid Interfaces in Free-Flowing Liquid Sheets.** *Langmuir : the ACS journal of surfaces and colloids*
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- **From a Single-Band Metal to a High-Temperature Superconductor via Two Thermal Phase Transitions** *SCIENCE*
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- **Laser based angle-resolved photoemission, the sudden approximation, and quasiparticle-like spectral peaks in Bi₂Sr₂CaCu₂O₈+ δ** *PHYSICAL REVIEW LETTERS*
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- **Enhanced charge density wave coherence in a light-quenched, high-temperature superconductor.** *Science (New York, N.Y.)*
Wandel, S., Boschini, F., da Silva Neto, E. H., Shen, L., Na, M. X., Zohar, S., Wang, Y., Welch, S. B., Seaberg, M. H., Koralek, J. D., Dakovski, G. L., Hettel, W., Lin, et al
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- **Microfluidic liquid sheets as large-area targets for high repetition XFELs.** *Frontiers in molecular biosciences*
Hoffman, D. J., Van Driel, T. B., Kroll, T., Crissman, C. J., Ryland, E. S., Nelson, K. J., Cordones, A. A., Koralek, J. D., DePonte, D. P.
2022; 9: 1048932
- **Spontaneous fluctuations in a magnetic Fe/Gd skyrmion lattice** *PHYSICAL REVIEW RESEARCH*
Seaberg, M. H., Holladay, B., Montoya, S. A., Zheng, X. Y., Lee, J. T., Reid, A. H., Koralek, J. D., Shen, L., Esposito, Coslovich, G., Walter, P., Zohar, S., Thampy, Lin, et al
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- **Observation of a highly conductive warm dense state of water with ultrafast pump-probe free-electron-laser measurements** *MATTER AND RADIATION AT EXTREMES*
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- **Observation of Seeded Mn K beta Stimulated X-Ray Emission Using Two-Color X-Ray Free-Electron Laser Pulses** *PHYSICAL REVIEW LETTERS*
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- **Coherent X-rays reveal the influence of cage effects on ultrafast water dynamics** *NATURE COMMUNICATIONS*
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- **Stimulated X-Ray Emission Spectroscopy in Transition Metal Complexes** *PHYSICAL REVIEW LETTERS*
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- **Time-Resolved Optical Reflectivity of the Electron-Doped Nd_{2-x}Ce_xCuO₄+delta Cuprate Superconductor: Evidence for an Interplay between Competing Orders** *PHYSICAL REVIEW LETTERS*
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- **Doppler velocimetry of spin and charge currents in the 2D Fermi gas**
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- **Coherent Propagation of Spin Helices in a Quantum-Well Confined Electron Gas** *PHYSICAL REVIEW LETTERS*
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