Stanford



# Rajan Plumley

Research Associate - LCLS Material Sciences, LCLS - Linac Coherent Light Source

## Bio

### BIO

My research focuses on using state-of-the-art x-ray facilities such as the Linac Coherent Light Source (LCLS) at SLAC to study ultrafast dynamics in materials with atomic detail. I am especially interested in how x-ray speckle phenomena can be used to understand the role fluctuations play in the emergence of unique phases that result from the interplay of competing interactions in the electronic, magnetic, and structural degrees of freedom within materials.

### EDUCATION AND CERTIFICATIONS

- PhD, Carnegie Mellon University , Physics (2026)
- MS, Carnegie Mellon University , Physics (2022)
- BA, Washington & Jefferson College , Physics (2017)

## Publications

### PUBLICATIONS

- **Multi-resolution enhancement for full-spectrum neural representations** *NATURE MACHINE INTELLIGENCE*
  Ni, Y., Chen, Z., Xu, S., Peng, C., Plumley, R., Yoon, C., Thayer, J. B., Turner, J. J.
  2026
- **An agentic artificially intelligent X-ray scientist** *NATURE MACHINE INTELLIGENCE*
  Chen, Z., Petsch, A. N., Israelski, A. J., Plumley, R., Shen, L., Wang, C., Peng, C., Bansil, A., Ni, Y., Chowdhury, S., Li, M., Thayer, J. B., Thampy, et al
  2026
- **Measurement of turbulent velocity and bounds for thermal diffusivity in laser shock compressed foams by x-ray photon correlation spectroscopy.** *Physical review. E*
  Heaton, C., Yin, H., Khaghani, D., Lee, H. J., Poole, H., Blackman, E., Boiadjieva, N., Chen, X. M., Crepisson, C., Collins, G. W., Descamps, A., Gleason, A. E., Gutt, et al
  2025; 112 (4-2): 045218
- **femto-PIXAR: a self-supervised neural network method for reconstructing femtosecond X-ray free electron laser pulses** *OPTICS EXPRESS*
  Goetzke, G., Plumley, R., Hartmann, G., Maxwell, T., Decker, F., Lutman, A., Dunne, M., Ratner, D., Turner, J.
  2025; 33 (15): 31235-31243
- **On ultrafast x-ray scattering methods for magnetism** *ADVANCES IN PHYSICS-X*
  Plumley, R., Chitturi, S. R., Peng, C., Assefa, T. A., Burdet, N., Shen, L., Chen, Z., Reid, A. H., Dakovski, G. L., Seaberg, M. H., O'Dowd, F., Montoya, S. A., Chen, et al
  2024; 9 (1)

- **Understanding the superconductivity and charge density wave interaction through quasi-static lattice fluctuations.** *Proceedings of the National Academy of Sciences of the United States of America*

  Porter, Z., Shen, L., Plumley, R., Burdet, N. G., Petsch, A. N., Wen, J., Drucker, N. C., Peng, C., Chen, X. M., Fluerasu, A., Blackburn, E., Coslovich, G., Hawthorn, et al

  2024; 121 (50): e2412182121

- **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)

- **Capturing dynamical correlations using implicit neural representations.** *Nature communications*

  Chitturi, S. R., Ji, Z., Petsch, A. N., Peng, C., Chen, Z., Plumley, R., Dunne, M., Mardanya, S., Chowdhury, S., Chen, H., Bansil, A., Feiguin, A., Kolesnikov, et al

  2023; 14 (1): 5852

- **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

- **Speckle correlation as a monitor of X-ray free-electron laser induced crystal lattice deformation.** *Journal of synchrotron radiation*

  Plumley, R. n., Sun, Y. n., Teitelbaum, S. n., Song, S. n., Sato, T. n., Chollet, M. n., Nelson, S. n., Wang, N. n., Sun, P. n., Robert, A. n., Fuoss, P. n., Sutton, M. n., Zhu, et al

  2020; 27 (Pt 6): 1470–76

- **Compact hard x-ray split-delay system based on variable-gap channel-cut crystals** *OPTICS LETTERS*

  Sun, Y., Wang, N., Song, S., Sun, P., Chollet, M., Sato, T., van Driel, T. B., Nelson, S., Plumley, R., Montana-Lopez, J., Teitelbaum, S. W., Haber, J., Hastings, et al

  2019; 44 (10): 2582–85