Stanford

Young Lee

Professor of Applied Physics and of Photon Science

Bio

ACADEMIC APPOINTMENTS

- Professor, Applied Physics
- Professor, Photon Science Directorate
- Principal Investigator, Stanford Institute for Materials and Energy Sciences

Teaching

COURSES

2025-26

- Condensed Matter Seminar: APPPHYS 470 (Aut, Win, Spr)
- Quantum and Thermal Physics: PHYSICS 71 (Win)

2024-25

- Electricity and Magnetism: PHYSICS 43 (Win)

2023-24

- Electricity and Magnetism: PHYSICS 43 (Win)

2022-23

- Electricity and Magnetism: PHYSICS 43 (Win)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Jay Qu, Sijia Zhao

Doctoral Dissertation Advisor (AC)

Arthur Campello

Doctoral (Program)

Aarushi Khandelwal, Olivia Long, Joshua Reynolds, Abigail Stein, Sijia Zhao

Publications

PUBLICATIONS

- **Isolation of Diamond Spin Chains in a Layered Halide Perovskite Heterostructure.** *Journal of the American Chemical Society*
  Caniglia, C. D., Li, Y., Wen, J., Brueggemeyer, M. T., Lee, Y. S., Solomon, E. I., Fisher, I. R., Karunadasa, H. I.
  2025

- **Phonon dynamics in quantum spin liquid and valence bond crystal states in the barlowite family of kagome magnets** *PHYSICAL REVIEW B*

Campello, A. C., Wen, J., Cai, Y. Q., Breidenbach, A. T., Smaha, R. W., Jiang, H., Lee, Y. S.
2025; 111 (9)

- **Correction to "Chemical Design of Spin Frustration to Realize Topological Spin Glasses".** *Journal of the American Chemical Society*
  Amtry, S. M., Campello, A. C., Tong, C. L., Puggioni, D., Rondinelli, J. M., Lee, Y. S., Freedman, D. E.
  2025
- **Thickness-dependent transport in epitaxial CaIrO₃ perovskite thin films** *MRS COMMUNICATIONS*
  Lindgren, E. R., Zheng, X. Y., Channa, S., Jiang, J. M., Lee, Y. S., Suzuki, Y.
  2024
- **Chemical Design of Spin Frustration to Realize Topological Spin Glasses.** *Journal of the American Chemical Society*
  Amtry, S. M., Campello, A. C., Tong, C. L., Puggioni, D. S., Rondinelli, J. M., Lee, Y. S., Freedman, D. E.
  2024
- **Anomalous normal-state gap in an electron-doped cuprate.** *Science (New York, N.Y.)*
  Xu, K. J., He, J., Chen, S. D., He, Y., Abadi, S. N., Rotundu, C. R., Lee, Y. S., Lu, D. H., Guo, Q., Tjernberg, O., Devereaux, T. P., Lee, D. H., Hashimoto, et al
  2024; 385 (6710): 796-800
- **Tilted stripes origin in La_{1.88}Sr_{0.12}CuO₄ revealed by anisotropic next-nearest neighbor hopping** *COMMUNICATIONS PHYSICS*
  He, W., Wen, J., Jiang, H., Xu, G., Tian, W., Taniguchi, T., Ikeda, Y., Fujita, M., Lee, Y. S.
  2024; 7 (1)
- **Halide Perovskites Breathe Too: The Iodide-Iodine Equilibrium and Self-Doping in Cs2SnI6.** *ACS central science*
  Vigil, J. A., Wolf, N. R., Slavney, A. H., Matheu, R., Saldivar Valdes, A., Breidenbach, A., Lee, Y. S., Karunadasa, H. I.
  2024; 10 (4): 907-919
- **Halide Perovskites Breathe Too: The Iodide-Iodine Equilibrium and Self-Doping in Cs₂SnI₆** *ACS CENTRAL SCIENCE*
  Vigil, J. A., Wolf, N. R., Slavney, A. H., Matheu, R., Saldivar Valdes, A., Breidenbach, A., Lee, Y. S., Karunadasa, H. I.
  2024
- **Influence of the Rare Earth Cation on the Magnetic Properties of Layered 12R-Ba4M4+Mn3O12 (M = Ce, Pr) Perovskites.** *Chemistry of materials : a publication of the American Chemical Society*
  Dzara, M. J., Campello, A. C., Breidenbach, A. T., Strange, N. A., Park, J. E., Ambrosini, A., Coker, E. N., Ginley, D. S., Lee, Y. S., Bell, R. T., Smaha, R. W.
  2024; 36 (6): 2810-2818
- **Influence of the Rare Earth Cation on the Magnetic Properties of Layered 12R-Ba₄M⁴⁺Mn₃O₁₂ (M = Ce, Pr) Perovskites** *CHEMISTRY OF MATERIALS*
  Dzara, M. J., Campello, A. C., Breidenbach, A. T., Strange, N. A., Park, J., Ambrosini, A., Coker, E. N., Ginley, D. S., Lee, Y. S., Bell, R. T., Smaha, R. W.
  2024
- **Dynamic magnetic phase transition induced by parametric magnon pumping** *PHYSICAL REVIEW B*
  Shan, J., Curtis, J. B., Guo, M., Roh, C., Rotundu, C. R., Lee, Y. S., Narang, P., Noh, T., Demler, E., Hsieh, D.
  2024; 109 (5)
- **Electrostatic Gating of Spin Dynamics of a Quasi-2D Kagome Magnet.** *Nano letters*
  Li, Z., Zhang, R., Shan, J., Alahmed, L., Xu, A., Chen, Y., Yuan, J., Cheng, X., Miao, X., Wen, J., Mokrousov, Y., Lee, Y. S., Zhang, et al
  2024
- **Local probe investigation of the spin dynamics in the kagome and interlayers of orthorhombic barlowite Cu₄(OD)₆FBr: ⁷⁹Br and ⁶³Cu NQR study** *PHYSICAL REVIEW MATERIALS*
  Imai, T., Wang, J., Smaha, R. W., He, W., Wen, J., Lee, Y. S.
  2024; 8 (1)
- **Bogoliubov quasiparticle on the gossamer Fermi surface in electron-doped cuprates** *NATURE PHYSICS*
  Xu, K., Guo, Q., Hashimoto, M., Li, Z., Chen, S., He, J., He, Y., Li, C., Berntsen, M. H., Rotundu, C. R., Lee, Y. S., Devereaux, T. P., Rydh, et al

2023; 19 (12): 1834-+

- **Bogoliubov quasiparticle on the gossamer Fermi surface in electron-doped cuprates** *NATURE PHYSICS*
  Xu, K., Guo, Q., Hashimoto, M., Li, Z., Chen, S., He, J., He, Y., Li, C., Berntsen, M. H., Rotundu, C. R., Lee, Y. S., Devereaux, T. P., Rydh, et al
  2023
- **Stabilizing Au2+ in a mixed-valence 3D halide perovskite** *NATURE CHEMISTRY*
  Lindquist, K. P., Eghdami, A., Deschene, C. R., Heyer, A. J., Wen, J., Smith, A. G., Solomon, E. I., Lee, Y. S., Neaton, J. B., Ryan, D. H., Karunadasa, H. I.
  2023
- **Stabilizing Au2+ in a mixed-valence 3D halide perovskite.** *Nature chemistry*
  Lindquist, K. P., Eghdami, A., Deschene, C. R., Heyer, A. J., Wen, J., Smith, A. G., Solomon, E. I., Lee, Y. S., Neaton, J. B., Ryan, D. H., Karunadasa, H. I.
  2023
- **Enhanced superconductivity by near-neighbor attraction in the doped extended Hubbard model** *PHYSICAL REVIEW B*
  Peng, C., Wang, Y., Wen, J., Lee, Y. S., Devereaux, T. P., Jiang, H.
  2023; 107 (20)
- **High-energy spin excitations in the quantum spin liquid candidate Zn-substituted barlowite probed by resonant inelastic x-ray scattering** *PHYSICAL REVIEW B*
  Smaha, R. W., Pelliciari, J., Jarrige, I., Bisogni, V., Breidenbach, A. T., Jiang, J., Wen, J., Jiang, H., Lee, Y. S.
  2023; 107 (6)
- **Emergence of the spin polarized domains in the kagome lattice Heisenberg antiferromagnet Zn-barlowite (Zn0.95Cu0.05)Cu-3(OD)(6)FBr** *NPJ QUANTUM MATERIALS*
  Yuan, W., Wang, J., Singer, P. M. M., Smaha, R. W. W., Wen, J., Lee, Y. S. S., Imai, T.
  2022; 7 (1)
- **Quasi-One-Dimensional Metallicity in Compressed CsSnI3.** *Journal of the American Chemical Society*
  Ke, F., Yan, J., Matheu, R., Niu, S., Wolf, N. R., Yang, H., Yin, K., Wen, J., Lee, Y. S., Karunadasa, H. I., Mao, W. L., Lin, Y.
  2022
- **Cesium-mediated electron redistribution and electron-electron interaction in high-pressure metallic CsPbI3.** *Nature communications*
  Ke, F., Yan, J., Niu, S., Wen, J., Yin, K., Yang, H., Wolf, N. R., Tzeng, Y., Karunadasa, H. I., Lee, Y. S., Mao, W. L., Lin, Y.
  2022; 13 (1): 7067
- **Field-tuned ferroquadrupolar quantum phase transition in the insulator TmVO4.** *Proceedings of the National Academy of Sciences of the United States of America*
  Massat, P., Wen, J., Jiang, J. M., Hristov, A. T., Liu, Y., Smaha, R. W., Feigelson, R. S., Lee, Y. S., Fernandes, R. M., Fisher, I. R.
  2022; 119 (28): e2119942119
- **Evidence of Magnon-Mediated Orbital Magnetism in a Quasi-2D Topological Magnon Insulator.** *Nano letters*
  Alahmed, L., Zhang, X., Wen, J., Xiong, Y., Li, Y., Zhang, L., Lux, F., Freimuth, F., Mahdi, M., Mokrousov, Y., Novosad, V., Kwok, W., Yu, et al
  2022
- **Freezing of the Lattice in the Kagome Lattice Heisenberg Antiferromagnet Zn-Barlowite ZnCu_{3}(OD)_{6}FBr.** *Physical review letters*
  Wang, J., Yuan, W., Singer, P. M., Smaha, R. W., He, W., Wen, J., Lee, Y. S., Imai, T.
  2022; 128 (15): 157202
- **Charge Reservoirs in an Expanded Halide Perovskite Analog: Enhancing High-Pressure Conductivity through Redox-Active Molecules.** *Angewandte Chemie (International ed. in English)*
  Matheu, R., Ke, F., Breidenbach, A., Wolf, N., Lee, Y., Liu, Z., Leppert, L., Lin, Y., Karunadasa, H.
  2022
- **Emergence of spin singlets with inhomogeneous gaps in the kagome lattice Heisenberg antiferromagnets Zn-barlowite and herbertsmithite** *NATURE PHYSICS*
  Wang, J., Yuan, W., Singer, P. M., Smaha, R. W., He, W., Wen, J., Lee, Y. S., Imai, T.
  2021

- **Alloying a single and a double perovskite: a Cu+/2+ mixed-valence layered halide perovskite with strong optical absorption.** *Chemical science*
  Connor, B. A., Smaha, R. W., Li, J., Gold-Parker, A., Heyer, A. J., Toney, M. F., Lee, Y. S., Karunadasa, H. I.
  2021; 12 (25): 8689-8697

- **Alloying a single and a double perovskite: a Cu+/2+ mixed-valence layered halide perovskite with strong optical absorption** *CHEMICAL SCIENCE*
  Connor, B. A., Smaha, R. W., Li, J., Gold-Parker, A., Heyer, A. J., Toney, M. F., Lee, Y. S., Karunadasa, H. I.
  2021

- **Site-specific structure at multiple length scales in kagome quantum spin liquid candidates** *PHYSICAL REVIEW MATERIALS*
  Smaha, R. W., Boukahil, I., Titus, C. J., Jiang, J., Sheckelton, J. P., He, W., Wen, J., Vinson, J., Wang, S., Chen, Y., Teat, S. J., Devereaux, T. P., Das Pemmaraju, et al
  2020; 4 (12)

- **Materializing rival ground states in the barlowite family of kagome magnets: quantum spin liquid, spin ordered, and valence bond crystal states** *NPJ QUANTUM MATERIALS*
  Smaha, R. W., He, W., Jiang, J., Wen, J., Jiang, Y., Sheckelton, J. P., Titus, C. J., Wang, S., Chen, Y., Teat, S. J., Aczel, A. A., Zhao, Y., Xu, et al
  2020; 5 (1)

- **High resolution time- and angle-resolved photoemission spectroscopy with 11 eV laser pulses.** *The Review of scientific instruments*
  Lee, C., Rohwer, T., Sie, E. J., Zong, A., Baldini, E., Straquadine, J., Walmsley, P., Gardner, D., Lee, Y. S., Fisher, I. R., Gedik, N.
  2020; 91 (4): 043102

- **High resolution time- and angle-resolved photoemission spectroscopy with 11 eV laser pulses** *REVIEW OF SCIENTIFIC INSTRUMENTS*
  Lee, C., Rohwer, T., Sie, E. J., Zong, A., Baldini, E., Straquadine, J., Walmsley, P., Gardner, D., Lee, Y. S., Fisher, I. R., Gedik, N.
  2020; 91 (4)

- **Materializing rival ground states in the barlowite family of kagome magnets: quantum spin liquid, spin ordered, and valence bond crystal states.** *npj quantum materials*
  Smaha, R. W., He, W., Jiang, J. M., Wen, J., Jiang, Y., Sheckelton, J. P., Titus, C. J., Wang, S. G., Chen, Y., Teat, S. J., Aczel, A. A., Zhao, Y., Xu, et al
  2020; 5 (1)

- **Site-Specific Structure at Multiple Length Scales in Kagome Quantum Spin Liquid Candidates.** *Physical review materials*
  Smaha, R. W., Boukahil, I., Titus, C. J., Jiang, J. M., Sheckelton, J. P., He, W., Wen, J., Vinson, J., Wang, S. G., Chen, Y. S., Teat, S. J., Devereaux, T. P., Pemmaraju, et al
  2020; 4 (12)

- **Quantum magnetism enabled by chemistry: From quantum spin liquids to topological spin waves**
  Lee, Y.
  AMER CHEMICAL SOC.2019

- **Fermi surface reconstruction in electron-doped cuprates without antiferromagnetic long-range order.** *Proceedings of the National Academy of Sciences of the United States of America*
  He, J., Rotundu, C. R., Scheurer, M. S., He, Y., Hashimoto, M., Xu, K., Wang, Y., Huang, E. W., Jia, T., Chen, S., Moritz, B., Lu, D., Lee, et al
  2019; 116 (9): 3449–53

- **Fermi surface reconstruction in electron-doped cuprates without antiferromagnetic long-range order** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
  He, J., Rotundu, C. R., Scheurer, M. S., He, Y., Hashimoto, M., Xu, K., Wang, Y., Huang, E. W., Jia, T., Chen, S., Moritz, B., Lu, D., Lee, et al
  2019; 116 (9): 3449–53

- **Interconnected Signatures of Quantum Spin Liquid Physics Across the Barlowite Family of Quantum Magnets**
  Smaha, R., He, W., Jiang, J., Titus, C., Wen, J., Lee, Y.
  INT UNION CRYSTALLOGRAPHY.2019: A122

- **Enhancement and destruction of spin-Peierls physics in a one-dimensional quantum magnet under pressure** *PHYSICAL REVIEW B*
  Rotundu, C. R., Wen, J., He, W., Choi, Y., Haskel, D., Lee, Y. S.
  2018; 97 (5)

- **Synthesis dependent properties of barlowite and Zn-substituted barlowite** *Journal of Solid State Chemistry*
  Smaha, R. W., He, W., Sheckelton, J. P., Wen, J., Lee, Y. S.
  2018; 268: 123-129
- **Infrared phonons as a probe of spin-liquid states in herbertsmithite ZnCu3(OH)(6)Cl-2** *JOURNAL OF PHYSICS-CONDENSED MATTER*
  Sushkov, A. B., Jenkins, G. S., Han, T., Lee, Y. S., Drew, H. D.
  2017; 29 (9)
- **Correlated impurities and intrinsic spin-liquid physics in the kagome material herbertsmithite** *PHYSICAL REVIEW B*
  Han, T., Norman, M. R., Wen, J., Rodriguez-Rivera, J. A., Helton, J. S., Broholm, C., Lee, Y. S.
  2016; 94 (6)
- **Do quantum spin liquids exist?** *PHYSICS TODAY*
  Imai, T., Lee, Y. S.
  2016; 69 (8): 30-36
- **Evidence for a gapped spin-liquid ground state in a kagome Heisenberg antiferromagnet** *SCIENCE*
  Fu, M., Imai, T., Han, T., Lee, Y. S.
  2015; 350 (6261): 655-658
- **Thermal Hall Effect of Spin Excitations in a Kagome Magnet** *PHYSICAL REVIEW LETTERS*
  Hirschberger, M., Chisnell, R., Lee, Y. S., Ong, N. P.
  2015; 115 (10)