

PROMOTION RECOMMENDATION
The University of Michigan
College of Literature, Science, and the Arts

Liuyan Zhao, assistant professor of physics, College of Literature, Science, and the Arts, is recommended for promotion to associate professor of physics, with tenure, College of Literature, Science, and the Arts.

Academic Degrees:

Ph.D. 2013 Columbia University
B.S. 2008 University of Science and Technology of China (USTC)

Professional Record:

2017-present Assistant Professor of Physics, University of Michigan
2013-2016 Prize Post-doctoral Fellow in Physics, California Institute of Technology

Summary of Evaluation:

Teaching: Professor Zhao has taught three different courses, all undergraduate core curriculum courses. One is a laboratory course and two are lecture courses. Her various quantitative teaching scores indicate that students value her as an excellent teacher who advanced their understanding of the subject matter. She has been very cognizant of both the challenges and opportunities presented by each course, has used each teaching experience to learn and improve, and has shown great willingness to listen to her students and to be responsive to them. In sum, she is a very effective teacher. Professor Zhao's mentoring has also been extremely strong. In her relatively short time at UM, she has mentored sixteen undergraduates, of whom five have gone on to graduate school, five Ph.D. students, of whom three have graduated, and three post-doctoral scholars, of whom one now has a faculty position. Her unusually thoughtful and analytical discussion of mentoring at each level and of the methods that she has developed to bring about these good results for her group is impressive.

Research: Professor Zhao's research is focused on the experimental optical investigation of quantum materials, one of the most exciting fields of condensed matter physics. Her research explores the wide range of emergent phenomena of the very large number (typically 10^{23} !) of electrons and atoms in a solid, resulting from the tuning of their four quantum degrees of freedom, lattice, charge, spin, and orbital. She has established a highly visible, cutting-edge, vigorous, and well-funded research program. Professor Zhao has accumulated an impressive research record and is a rising star in the field.

Recent and Significant Publications:

Xie, H., Luo, X., Ye, G., Ye, Z., Ge, H., Sung, S. H., Rennich, E., Yan, S., Fu, Y., Tian, S., Lei, H., Hovden, R., Sun, K., Yan, J. A., He, R., Zhao, L. (2021). Twist engineering of the two-dimensional magnetism in double bilayer chromium triiodide homostructures. *Nature Physics*. <https://doi.org/10.1038/s41567-021-01408-8>
Luo, X., Obeysekera, D., Won, C., Sung, S. H., Schnitzer, N., Hovden, R., Cheong, S. W., Yang, J., Sun, K., Zhao, L. (2021). Ultrafast modulations and detection of a ferro-rotational

charge density wave using time-resolved electric quadrupole second harmonic generation. *Physical Review Letters*, 127(12).

<https://doi.org/10.1103/PhysRevLett.127.126401>

- Li, S., Ye, Z., Luo, X., Ye, G., Kim, H., Yang, B., Tian, S., Li, C., Lei, H., Tsen, A. W., Sun, K., He, R., Zhao, L. (2020). Magnetic-field-induced quantum phase transitions in a van Der Waals magnet. *Physical Review X*, 10(1). <https://doi.org/10.1103/PhysRevX.10.011075>
- Jin, W., Druke, E., Li, S., Adamasu, A., Owen, R., Day, M., Sun, K., Cheong, S. W., Zhao, L. (2020). Observation of a ferro-rotational order coupled with second-order nonlinear optical fields. *Nature Physics*, 16(1), 42-46. <https://doi.org/10.1038/s41567-019-0695-1>

Service: At the department and university level, Professor Zhao has served as an undergraduate concentration counselor, an advisor to the Society for Women in Physics, a host for the NSF Research Experience for Undergraduates, and a member of the CM/AMO seminar committee. She also served on the Faculty Search Committee during 2018-2019. The list of Professor Zhao's UM outreach activities includes membership in the Science Forum and the Research Station, UM Museum of Natural History. She was also a science communication fellow and a spotlight scientist for the UM Museum of Natural History. Professor Zhao's national service includes reviewing proposals for various national and international funding agencies and papers for publication in leading journals. As a recognized leader in her research area, she has served on the organizing committee of several conferences, including the APS March Meeting, where she served as a focused session organizer. At the prestigious CLEO, Professor Zhao was asked to serve as subcommittee chair, a recognition of her expertise in the optical properties of correlated systems.

External Reviewers:

Reviewer A: "...with respect to her scholarly accomplishments and her scientific acumen, she rises easily to the level of excellence that would be appropriate for promotion and tenure at the University of Michigan..."

Reviewer B: "...In record time, she has built a very capable laboratory...[Professor Zhao] has been able to achieve in a few months what other successful [junior] researchers accomplish in years!...Her accomplishments are more than sufficient for a positive tenure decision at a major research university."

Reviewer C: "...It is clear to me that [Professor Zhao] is running a very productive group that is addressing forefront topics in condensed matter physics. Her trajectory is on a steep upturn and I anticipate her rising to even higher levels of leadership in the field in the years ahead..."

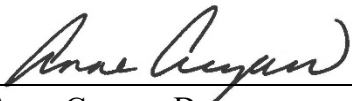
Reviewer D: "...Prof. Zhao has established herself as an expert in the field of light-matter interaction in low-dimensional and correlated materials..."

Reviewer E: "...Professor Zhao is an outstanding [of her generation] condensed matter experimentalist. She has performed ground breaking research using novel spectroscopy measurements to study 2D and 3D symmetry breaking phases in quantum materials during the time she has been at U-M...Her work is innovative, has intellectual depth, and is broad in scope..."

Reviewer F: "...[Professor Zhao] shows great taste in selecting the problems to attack...opens up a new chapter in the investigation of ferro-rotational order in novel magnets...I strongly support her promotion to associate professor with tenure."

Summary of Recommendation:

Professor Liuyan Zhao has shown outstanding intellectual quality, productivity, and leadership in creating and disseminating knowledge in physics. The Executive Committee of the College of Literature, Science, and the Arts and I recommend that Assistant Professor Liuyan Zhao be promoted to the rank of associate professor of physics, with tenure, College of Literature, Science, and the Arts.



Anne Curzan, Dean
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