Shu Yang Frank Zhao

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PROFESSIONAL APPOINTMENTS

2025 – Present	Assistant Professor, Department of Physics and Quantum Materials Center University of Maryland
2021 – 2025	Postdoctoral Associate, Dept. of Physics, Massachusetts Inst. of Technology Research Advisor: Professor Joseph G. Checkelsky
2014 – 2021	Ph.D. Candidate, Department of Physics, Harvard University. Research Advisor: Professor Philip Kim
2012 – 2014	Ph.D. Candidate, Department of Physics, Columbia University. Research Advisor: Professor Philip Kim
2009 – 2012	Undergraduate Research Student, Dept. of Physics, University of Toronto. Research Advisor: Professor Kenneth S. Burch.
2008 – 2009	Summer Student, Dept. of Medical Biophysics, University of Toronto. Research Advisor: Professor Rajiv Chopra.

EDUCATION

2014 – 2021	*Ph.D.*, Expt. Condensed Matter Physics, *Harvard University*.
2012 – 2014	*M.A.*, Physics, *Columbia University.*
2008 – 2012	*B.Sc. (Honors) with High Distinction*. Cumulative GPA: 3.97. Mathematics and Physics Specialist, *University of Toronto*.

PUBLICATIONS

1. **S.Y.F. Zhao**, P.M. Neves, J.P. Wakefield, S. Fang, A. Chen, J.C. Palmstrom, D.E. Graf, A. Auslender, D.C. Bell, P.A. Volkov, T. Suzuki & J.G. Checkelsky.
   Field-Induced Triplet Superconductivity in a Transition Metal Dichalcogenide Superlattice.
   Submitted.

2. P.A. Volkov, **S.Y.F. Zhao**, N. Poccia, X. Cui, P. Kim & J.H. Pixley.
   Josephson Effects in Twisted Nodal Superconductors.
   Phys. Rev. B **111**, 014514 (2025).

3. L. Ye, S. Fang, M. Kang, J. Kaufmann, Y. Lee, C. John, P.M. Neves, **S.Y.F. Zhao**, J. Denlinger, C. Jozwiak, A. Bostwick, E. Rotenberg, E. Kaxiras, D.C. Bell, O. Janson, R. Comin & J.G. Checkelsky.
   Hopping Frustration-Induced Flat Band and Strange Metallicity in a Kagome Metal.
   Nat. Phys. **20**, 610 (2024).

4. **S.Y.F. Zhao***, X. Cui*, P.A. Volkov, H. Yoo, S. Lee, J.A. Gardener, A.J. Akey, R. Engelke, Y. Ronen, R. Zhong, G.D. Gu, S. Plugge, T. Tummuru, M. Kim, M. Franz, J.H. Pixley, N. Poccia & P. Kim.
Time-Reversal Symmetry Breaking Superconductivity between Twisted Cuprate Superconductors.
Science **382**, 1422 (2023).

5. J.P. Wakefield, M. Kang, P.M. Neves, D. Oh, S. Fang, R. McTigue, **S.Y.F. Zhao**, T.N. Lamichhane, A. Chen, S. Lee, S. Park, J.-H. Park, C. Jozwiak, A. Bostwick, E. Rotenberg, A. Rajapitamahuni, E. Vescovo, J.L. McChesney, D.E. Graf, J.C. Palmstrom, T. Suzuki, M. Li, R. Comin & J.G. Checkelsky.
Three-Dimensional Flat Bands in Pyrochlore Metal $CaNi_2$
Nature **623**, 301 (2023).

6. N. Poccia, **S.Y.F. Zhao**, H. Yoo, X. Huang, H. Yan, Y. S. Chu, R. Zhong, G. Gu, C. Mazzoli, K. Watanabe, T. Taniguchi, G. Campi, V. M. Vinokur & P. Kim.
Spatially correlated incommensurate lattice modulations in an atomically thin high-temperature $Bi_{2.1}Sr_{1.9}CaCu_{2.0}O_{8+\delta}$ superconductors.
Phys. Rev. Materials **4**, 114007 (2020).

7. MJ. Gray, J. Freudenstein, **S.Y.F. Zhao**, R. O'Connor, S. Jenkins, N. Kumar, M. Hoek, A. Kopec, S. Huh, T. Taniguchi, K. Watanabe, R. Zhong, C. Kim, G.D. Gu, & K.S. Burch
Evidence for Helical Hinge Zero Modes in an Fe-Based Superconductor.
Nano Lett. **19**, 4890 (2019).

8. **S.Y.F. Zhao**, N. Poccia, M.G. Panetta, C. Yu, J.W. Johnson, H. Yoo, R. Zhong, G.D. Gu, K. Watanabe, T. Taniguchi, S.V. Postolova, V.M. Vinokur & P. Kim,
Sign Reversing Hall Effect in Atomically Thin High-Temperature $Bi_{2.1}Sr_{1.9}CaCu_{2.0}O_{8+\delta}$ Superconductors.
Phys. Rev. Lett. **122**, 247001 (2019).

9. D.K. Bediako, M. Rezaee, H. Yoo, D.T. Larson, **S.Y.F. Zhao**, T. Taniguchi, K. Watanabe, T.L. Brower-Thomas, E. Kaxiras & P. Kim,
Heterointerface Effects in the Electrointercalation of van der Waals Heterostructures.
Nature **558**, 425 (2018).

10. **S.Y.F. Zhao**, G.A. Elbaz, D.K. Bediako, C. Yu, D.K. Efetov, Y. Guo, J. Ravichandran, K.A. Min, S. Hong, T. Taniguchi, K. Watanabe, L.E. Brus, X. Roy & P. Kim,
Controlled Electrochemical Intercalation of Graphene/h-BN van der Waals Heterostructures.
Nano Letters **18**, 1, 460 (2018)

11. B.Y. Jiang, G.X. Ni, Z. Addison, J.K. Shi, X. Liu, **S.Y.F. Zhao**, P. Kim, E.J. Mele, D.N. Basov & M.M. Fogler,
Plasmon reflections by topological electronic boundaries in bilayer graphene,
Nano Letters 17, 11, 7080 (2017).

12. P. Zareapour, A. Hayat, **S.Y.F. Zhao**, M. Kreshchuk, Z. Xu, T.S. Liu, G.D. Gu, S. Jia, R.J. Cava, H.Y. Yang, Y. Ran & K.S. Burch,
Andreev reflection without Fermi surface alignment in high-Tc van der Waals heterostructures,
New J. of Phys. **19**, 4, 043026 (2017)

13. P. Zareapour, J. Xu, **S.Y.F. Zhao**, A. Jain, Z. Xu, T.S. Liu, G.D. Gu & K.S. Burch,
Modeling Tunneling for the Unconventional Superconducting Proximity Effect,
Supercond. Sci. Technol. **29**, 12, 125006 (2016).

14. X.X. Zhang, Y. You, **S.Y.F. Zhao** & T.F. Heinz,
Experimental Evidence for Dark Excitons in Monolayer WSe_2,
Phys. Rev. Lett. **115**, 25, 257403 (2015).

15. P. Zareapour, A. Hayat, **S.Y.F. Zhao**, M. Kreshchuk, Y.K. Lee, A.A. Reijnders, A. Jain, Z. Xu, T.S. Liu, G.D. Gu, S. Jia, R.J. Cava & K.S. Burch,
Evidence for a New Excitation at the Interface between a High-T_C Superconductor and a Topological Insulator,
Phys. Rev. B **90**, 24, 241106 (2014).

16. A.A. Reijnders, Y. Tian, L.J. Sandilands, G. Pohl, I.D. Kivlichan, **S.Y.F. Zhao**, S. Jia, M.E. Charles, R.J. Cava, Nasser Alidoust, S. Xu, M. Neupane, M.Z. Hasan, X.Wang, S.W. Cheong & K.S. Burch,
Optical Evidence of Surface State Suppression in Bi-Based Topological Insulators,
Phys. Rev. B, **89**, 075138 (2014).

17. P. Zareapour, A. Hayat, **S.Y.F. Zhao**, M. Kreshchuk, A. Jain, D.C. Kwok, N. Lee, S.W. Cheong, Z. Xu, A. Yang, G.D. Gu, S. Jia, R.J. Cava & K.S. Burch,
Proximity-Induced High-Temperature Superconductivity in the Topological Insulators Bi_2Se_3 and Bi_2Te_3, Nat. Commun. **3**, 1056 (2012).

18. A. Hayat, P. Zareapour, **S.Y.F. Zhao**, A. Jain, I.G. Savelyev, M. Blumin, Z. Xu, A. Yang, G.D. Gu, H.E. Ruda, S. Jia, R.J. Cava, A.M. Steinberg & K.S. Burch,
Hybrid High-Temperature Superconductor-Semiconductor Tunnel Diode,
Phys. Rev. X, **2**, 041019 (2012)

19. **S.Y.F. Zhao**, C. Beekman, L.J. Sandilands, J.E.J. Bashucky, D. Kwok, N. Lee, A.D. LaForge, S.W. Cheong & K.S. Burch,
Fabrication and Characterization of Topological Insulator Bi_2Se_3 Nanocrystals.
Appl. Phys. Lett. **98**, 141911 (2011)

20. L.J. Sandilands, J.X. Shen, G.M. Chugunov, **S.Y.F. Zhao**, S. Ono, Y. Ando & K.S. Burch,
Stability of Exfoliated $Bi_2Sr_2Dy_xCa_{1-x}Cu_2O_{8+\delta}$ Studied by Raman Microscopy,
Phys. Rev. B **82**, 064503 (2010)

21. **F. Zhao**, A. Arani, D. Plewes & R. Chopra,
Tissue Stiffness Estimation using Gaussian Filters for Prostate MR Elastography,
Proceedings of the 2010 Annual Meeting of the ISMRM 1057 (2010)

* These authors contributed equally.

INVITED TALKS AND CONFERENCES

Aug. 2025	Cornell University – **Condensed Matter Seminar**
Feb. 2025	Boston College – **Condensed Matter Seminar**
May 2024	Salt Lake City, Utah – **EPiQS Postdoctoral Symposium**
Feb. 2024	University of Maryland – **Condensed Matter Colloquium**
May 2023	Fethiye, Turkey – **Intl. Conf. on Superconductivity and Magnetism**
Dec. 2020	University of British Columbia, Vancouver, BC – **Special CM Seminar**
Mar. 2019	Harvard University, Cambridge, MA – **CNS Seminar**
Oct. 2018	MIT, Cambridge, MA – **BACON+ Seminar**
Jan. 2017	Tokai, Japan – **Reimei Workshop**
Oct 2014	Tokyo, Japan – **FET 2014**

TEACHING

Fall 2016 **Teaching Fellow -** *Physics 143A: Quantum Mechanics I*
Prof. John Townsend. Mean student evaluation score for TF: 4.8 / 5.
Certificate of Distinction in Teaching

AWARDS

2012 – 2016	NSERC A.G. Bell Canada Graduate Scholarship (Masters & Doctorate)
2012	Charles H. Townes Research Award, Columbia University
2012 – 2014	Dean's Fellow, Columbia University
2010 – 2011	NSERC Undergraduate Student Research Award
2010	Bryan Statt Award for Experimental Physics
2009 – 2012	Dean's List Scholar – University of Toronto
2008 – 2012	University of Toronto Scholar