

Hyeok Yoon

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RESEARCH INTERESTS

Condensed matter physics. Synthesis and fabrication of quantum materials. Superconductivity.

EDUCATION

Ph.D. Stanford University, Applied Physics (2020)

B.S. KAIST, Physics (2012)

PROFESSIONAL EXPERIENCE

Innocore Postdoctoral Fellow, KAIST 09/2025 - Current

Advisor: Prof. Seunghwa Ryu, Prof. Chanho Yang

Postdoctoral Researcher, University of Maryland, College Park 08/2020 – 08/2025

Advisor: Prof. Johnpierre Paglione

Postdoctoral Researcher, Stanford University 01/2020 – 07/2020

Graduate research assistant, Stanford University 03/2013 – 01/2020

Advisor: Prof. Harold Y. Hwang

Undergraduate research assistant, KAIST 02/2011 – 12/2011

Advisor: Prof. YongKeun Park

PUBLICATIONS

1. **H. Yoon**, Y. Eo, J. Park, J. A. Horn, R. G. Dorman, S. R. Saha, I. M. Hayes, I. Takeuchi, P. M. R. Brydon, J. Paglione,
Probing p -wave superconductivity in UTe_2 via point-contact junctions, *npj Quantum Mater.* 9, 91 (2024). \diamond
2. **H. Yoon**, A. G. Swartz, S. P. Harvey, H. Inoue, Y. Hikita, Y. Yu, S. B. Chung, S. Raghu and H. Y. Hwang,
Low density superconductivity of SrTiO_3 bounded by the adiabatic criterion, arXiv:2106.10802, (2021).
(under review; *Proc. Natl. Acad. Sci. U.S.A*) \diamond
3. J. Park*, **H. Yoon***, T. Wong, R. Pant, S. Baek, S. Saha, X. Zhang, J. Paglione, S. Lee, I. Takeuchi,
Topological $\text{YB}_6/\text{SmB}_6/\text{YB}_6$ trilayer Josephson junctions, in preparation \diamond
4. **H. Yoon***, S. Baek*, J. Horn, S. Saha, R. E. Butera, J. Paglione,
Submicron-thick UTe_2 flake achieved by mechanical exfoliation, submitted
5. S. K. Lewin, P. Czajka, C. E. Frank, G. S. Salas, **H. Yoon**, Y. S. Eo, J. Paglione, A. H. Nevidomskyy, J. Singleton, N. P. Butch,
High-Field superconducting Halo in UTe_2 , *Science* 389, 512 (2025) \diamond
6. K. E. Avers, Y. S. Eo, **H. Yoon**, J. A. Horn, S. R. Saha, A. Suarez, P. Zavalij, J. Paglione,
Disordered two-dimensional ferromagnetism at the surface of FeSi , *Phys. Rev. B* 110, 134416 (2024). \diamond
7. J. Park, J. A. Horn, D. J. Kirsch, R. K. Pant, **H. Yoon**, S. Baek, S. Sarker, A. Mehta, X. Zhang, S. Lee, R. Greene, J. Paglione, I. Takeuchi,
Superconducting phase diagram in $\text{Bi}_x\text{Ni}_{1-x}$ thin films: The effects of Bi stoichiometry on superconductivity, *Phys. Rev. Mater.* 8, 074805 (2024). \diamond

8. C. E. Frank, S. K. Lewin, G. S. Salas, P. Czajka, I. M. Hayes, **H. Yoon**, T. Metz, J. Paglione, J. Singleton, N. P. Butch,
Orphan high field superconductivity in non-superconducting uranium ditelluride, *Nat. Commun.* 15, 3378 (2024). \diamond
9. Y. S. Eo, K. Avers, J. A. Horn, **H. Yoon**, S. R. Saha, A. Suarez, M. S. Fuhrer, J. Paglione,
Extraordinary bulk-insulating behavior in the strongly correlated materials FeSi and FeSb₂, *Appl. Phys. Lett.* 122, 233102 (2023). \diamond
10. B. Fauque, C. Collignon, **H. Yoon**, Ravi, X. Lin, I. I. Mazin, H. Y. Hwang, K. Behnia,
Electronic band sculpted by oxygen vacancies and indispensable for dilute superconductivity, *Phys. Rev. Research* 5, 033080 (2023). \diamond
11. E. Persky, **H. Yoon**, Y. Xie, H. Y. Hwang, J. Ruhman, B. Kalisky,
Electrostatic modulation of lateral carrier density profile in field effect devices with nonlinear dielectrics, *Phys. Rev. B* 107, 195427 (2023). \diamond
12. L. Zhu, H. Liu, M. Somayazulu, Y. Meng, P. A. Gunka, T. B. Shiell, C. Kenney-Benson, S. Chariton, V. B. Prakapenka, **H. Yoon**, J. A. Horn, J. Paglione, R. Hoffmann, R. E. Cohen, T. A. Strobel,
Superconductivity in SrB₃C₃ clathrate, *Phys. Rev. Research* 5, 013012 (2023). \diamond
13. R. S. Bisht, M. Mograbi, P. K. Rout, G. Tuvia, **H. Yoon**, A. G. Swartz, H. Y. Hwang, and Y. Dagan,
Concomitant appearance of conductivity and superconductivity in (111) LaAlO₃/SrTiO₃ interface with metal capping, *Phys. Rev. Mater.* 6, 044802 (2022). \diamond
14. D. Li, C. Adamo, B. Y. Wang, **H. Yoon**, Z. Chen, S. S. Hong, D. Lu, Y. Cui, Y. Hikita, and H. Y. Hwang,
Stabilization of Sr₃Al₂O₆ growth templates for ex situ synthesis of freestanding crystalline oxide membranes, *Nano Lett.* 21, 4454 (2021). \diamond
15. Z. Chen, B. Y. Wang, A. G. Swartz, **H. Yoon**, Y. Hikita, S. Raghu, and H. Y. Hwang,
Universal behavior of the bosonic metallic ground state in a two-dimensional superconductor, *npj Quantum Mater.* 6, 15 (2021). \diamond
16. E. Persky, N. Vardi, A. M. R. V. L. Monteiro, T. C. van Thiel, **H. Yoon**, Y. Xie, B. Fauqué, A. D. Caviglia, H. Y. Hwang, K. Behnia, J. Ruhman, and B. Kalisky,
Non-Universal current flow near the metal-insulator transition in an oxide interface, *Nat. Commun.* 12, 3311 (2021). \diamond
17. M. Osada, B. Y. Wang, B. H. Goodge, K. Lee, **H. Yoon**, K. Sakuma, D. Li, M. Miura, L. F. Kourkoutis, and H. Y. Hwang,
A Superconducting praseodymium nickelate with infinite layer structure, *Nano Lett.* 20, 5735 (2020). \diamond
18. H. Inoue, **H. Yoon**, T. Merz, A. G. Swartz, S. S. Hong, Y. Hikita, and H. Y. Hwang,
High-mobility δ -doped field effect transistor, *Appl. Phys. Lett.* 114, 231605 (2019). Editor's pick \diamond
19. Z. Chen, A. G. Swartz, **H. Yoon**, H. Inoue, T. Merz, D. Lu, Y. Xie, H. Yuan, Y. Hikita, S. Raghu, and H. Y. Hwang,
Carrier density and disorder tuned superconductor-metal transition in a two-dimensional electron system, *Nat. Commun.* 9, 1 (2018). \diamond
20. A. G. Swartz, A. K. C. Cheung, **H. Yoon**, Z. Chen, Y. Hikita, and H. Y. Hwang,
Superconducting tunneling spectroscopy of spin-orbit coupling and orbital depairing in Nb:SrTiO₃, *Phys. Rev. Lett.* 121, 167003 (2018). \diamond
21. K. Kim*, **H. Yoon***, M. Diez-Silva, M. Dao, RR. Dasari, and YK. Park,
High-resolution three-dimensional imaging of red blood cells parasitized by plasmodium falciparum and in situ hemozoin crystals using optical diffraction tomography, *J. of Biomedical Optics* 19(1), 011005 (2013). \diamond

PRESENTATIONS

1. Poster Presentation, International Workshop on Oxide Electronics (iWOE-21), Bolton Landing, NY (Sep. 2014)
2. Poster Presentation, Physics and Chemistry of Surfaces and Interfaces (PCSI), Palm Springs, CA (Jan. 2016)
3. Oral Presentation, American Physics Society (APS) March Meeting, Baltimore, MD (Mar. 2016)

4. Poster Presentation, Canadian Institute for Advanced Research (CIFAR) Quantum Materials Meetings, Vancouver, BC (Apr. 2017)
5. Poster Presentation, International Workshop on Oxide Electronics (iWOE-24), Chicago, IL (Sep. 2017)
6. Oral Presentation, International Conference on Magnetism (ICM), San Francisco, CA (Jul. 2018)
7. Oral Presentation, American Physics Society (APS) March Meeting, Boston, MA (Mar. 2019)
8. Oral and Poster Presentation, Strongly Correlated Electron Systems (SCES), Okayama, Japan (Sep. 2019)
9. Oral Presentation, Emergent Phenomena in Quantum Systems Initiative (EPiQS) Postdoctoral Symposium, Beverly, MA (May. 2022)
10. Oral Presentation (Invited), Gordon Research Seminar (GRS): Correlated Electron Systems, South Hadley, MA (June. 2022)
Poster Presentation, Gordon Research Conference (GRC): Correlated Electron Systems, South Hadley, MA (June. 2022)
11. Poster Presentation, Materials and Mechanisms of Superconductivity (M2S), Vancouver, BC (July. 2022)
12. Oral Presentation, Strongly Correlated Electron Systems (SCES), Incheon, Korea (Aug. 2023)
13. Oral Presentation (Invited), Canadian Institute for Advanced Research (CIFAR), New York, NY (Nov. 2023)
14. Oral Presentation, American Physics Society (APS) March Meeting, Minneapolis, MN (Mar. 2024)
15. Poster Presentation, International Conference on Advanced Materials and Devices (ICAMD), Busan, Korea (Dec. 2025)

SEMINARS

1. Center for Correlated Electron Systems, Institute of Basic Science (IBS), Seoul, Korea (Aug. 2019)
2. Department of Physics, Korea Institute of Advanced Science and Technology (KAIST), Daejeon, Korea (Aug. 2019)
3. Department of Physics, Chung-Ang University, Seoul, Korea (Sep. 2024)
4. Korea Atomic Energy Research Institute, Daejeon, Korea (Sep. 2024)
5. Department of Physics, Korea Institute of Advanced Science and Technology (KAIST), Daejeon, Korea (Sep. 2025)
6. Department of Nano-semiconductor Engineering, Ulsan University, Daejeon, Korea (Dec. 2025)

AWARDS AND HONORS

- ICAMD Young Researcher Award (2025)
- Accelnet Quantum Materials Exchange Award (2024, 2023)
- Kwanjeong Graduate Fellowship (09/2012 – 08/2016)
- National Science and Engineering Undergraduate Scholarship, Korea Student Aid Foundation, (2008-2011)
- Undergraduate Student Scholarship, Korea Foundation for Advanced Studies, (2009-2011)

OUTREACH AND EXPERIENCES

- I served as a reviewer for funding proposals in Gordon and Betty Moore Foundation and Air Force Office of Scientific Research.
- I served as a reviewer in Physical Review X and Physical Review B.
- I served as a synthesis module runner for the workshop on Fundamentals of Quantum Materials School 2025.
- I mentored 3 undergraduate students and 2 graduate students.