

# 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

<b>Innocore Postdoctoral Fellow</b> , KAIST	09/2025 - Current
Advisor: Prof. Seunghwa Ryu, Prof. Chanho Yang	
<b>Postdoctoral Researcher</b> , University of Maryland, College Park	08/2020 – 08/2025
Advisor: Prof. Johnpierre Paglione	
<b>Postdoctoral Researcher</b> , Stanford University	01/2020 – 07/2020
<b>Graduate research assistant</b> , Stanford University	03/2013 – 01/2020
Advisor: Prof. Harold Y. Hwang	
<b>Undergraduate research assistant</b> , 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<sub>2</sub> via point-contact junctions, *npj Quantum Mater.* 9, 91 (2024). ◊
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<sub>3</sub> bounded by the adiabatic criterion, arXiv:2106.10802, (2021). (under review; *Proc. Natl. Acad. Sci. U.S.A.*) ◊
3. J. Park\*, **H. Yoon**\*, T. Wong, R. Pant, S. Baek, S. Saha, X. Zhang, J. Paglione, S. Lee, I. Takeuchi, Topological YB<sub>6</sub>/SmB<sub>6</sub>/YB<sub>6</sub> trilayer Josephson junctions, in preparation ◊
4. **H. Yoon**\*, S. Baek\*, J. Horn, S. Saha, R. E. Butera, J. Paglione, Submicron-thick UTe<sub>2</sub> 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<sub>2</sub>, *Science* 389, 512 (2025) ◊
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). ◊
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 Bi<sub>x</sub>Ni<sub>1-x</sub> thin films: The effects of Bi stoichiometry on superconductivity, *Phys. Rev. Mater.* 8, 074805 (2024). ◊

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). ◊
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 FeSb<sub>2</sub>, *Appl. Phys. Lett.* 122, 233102 (2023). ◊
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). ◊
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). ◊
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 SrB<sub>3</sub>C<sub>3</sub> clathrate, *Phys. Rev. Research* 5, 013012 (2023). ◊
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) LaAlO<sub>3</sub>/SrTiO<sub>3</sub> interface with metal capping, *Phys. Rev. Mater.* 6, 044802 (2022). ◊
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 Sr<sub>3</sub>Al<sub>2</sub>O<sub>6</sub> growth templates for ex situ synthesis of freestanding crystalline oxide membranes, *Nano Lett.* 21, 4454 (2021). ◊
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). ◊
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). ◊
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). ◊
18. H. Inoue, **H. Yoon**, T. Merz, A. G. Swartz, S. S. Hong, Y. Hikita, and H. Y. Hwang, High-mobility  $\delta$ -doped field effect transistor, *Appl. Phys. Lett.* 114, 231605 (2019). Editor's pick ◊
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). ◊
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:SrTiO<sub>3</sub>, *Phys. Rev. Lett.* 121, 167003 (2018). ◊
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). ◊

## 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)

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## 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)

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## 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)

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## 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.