

Lyi, Churlhi

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RESEARCH INTEREST

First-principles calculation. Condensed matter physics. Topological materials. Optical response. Strongly correlated electrons. Molecular Dynamics. Machine Learning

CURRENT POSITION

Oct.2025~ Present Currently affiliated with **KAIST**, seconded to **KRICT**(InnoCORE Fellow)

EDUCATION

Sep.2025~ Sep.2025 **Sungkyunkwan University**
Department of Physics
Advisor: Prof. Kim, Youngkuk
Postdoctoral researcher

Mar.2020~ Aug.2025 **Sungkyunkwan University**
Department of Physics
Ph.D. in Physics
Advisor: Prof. Kim, Youngkuk

Mar. 2019 ~ Feb. 2020 **Seoul National University**
Department of Physics and Astronomy
Major: Physics
Combined master's and doctoral program (withdrawal)

Mar. 2012 ~ Aug. 2018 **Kyung Hee University**
Department of Applied Science
B.S. in Applied Physics & Applied Mathematics (dual major)
Advisor: Prof. Lee, Sung-Hoon

PUBLICATIONS

- Hanoh Lee*, **Churlhi Lyi***, Taehee Lee, Hyeonhui Na, . . . , Ji Seop Oh, Bo Gyu Jang,[†]Youngkuk Kim,[†]Byungmin Shon,[†] and Tuson Park.^{††}"Coexisting Kagome and Heavy Fermion Flat Bands in YbCr₆Ge₆" Nature Communications (2026)
- **Churlhi Lyi** and Youngkuk Kim.[†]"Strain-Driven Higher-order Topological Dirac Semimetal in Noncentrosymmetric γ -GeSe." Nano Letters 2025, 25, 16, 6592–6598
- Inkyou Lee*, **Churlhi Lyi*** and Youngkuk Kim.[†]"Normal Dirac Semimetal and Zeeman-Induced Weyl Transition in PtSr₅" Current Applied Physics 81, 38–44 (2026)
- Hong-Guk Min, **Churlhi Lyi**, Moon Jip Park,[†] and Youngkuk Kim.[†]"Hosohedral nodal-line superconductivity in hexagonal ABC Dirac Semimetals" Communications Physics 7, 11 (2024)
- Hong-Guk Min*, **Churlhi Lyi***, and Youngkuk Kim.^{††}"Tunable bulk photovoltaic effect in strained γ -GeSe." Physical Review B 106.20 (2022): 205153.
- K. Boya, K. Nam, A. K. Manna, J. Kang, **C. Lyi**, A. Jain, S. M. Yusuf, P. Khuntia, B. Sana, V. Kumar, A. V. Mahajan, Deepak R. Patil, Kee Hoon Kim, S. K. Panda,[†] and B. Koteswararao.^{††}"Magnetic properties of the S= 5/2 anisotropic triangular chain compound Bi₃FeMo₂O₁₂." Physical Review B 104.18 (2021): 184402.

* Co-first author; † Corresponding author.

OVERSEAS RESEARCH EXPERIENCE

Oct. 2023 ~ **University of Pennsylvania**
Jun. 2024 Department of Chemistry
Research collaboration with Prof. Andrew M. Rappe

POSTER PRESENTATION

2024.10 “Noncentrosymmetric Topological Semimetals in Strained γ -GeSe. Noncentrosymmetric Topological Semimetals in Strained γ -GeSe.” The 25th Asian Workshop on First-Principles Electronic Structure Calculations (ASIAN-25)

2022.10 “First-principles study on topological nodal lines induced by strain in γ -GeSe.” KPS 70th Anniversary and 2022 Fall Meeting

2022.08 “First-principles calculations of topological nodal line semimetals and coexisting higher-order insulating states in γ -GeSe under strains.” APPC15(The 15th Asia Pacific Physics Conference)

2022.06 “First principles calculations of topological nodal line semimetals and coexisting higher order insulating states in γ GeSe under strains.” NT22(The 22nd International Conference on the Science and Applications of Nanotubes and Low-Dimensional Materials)

2021.12 “First principles calculations of topological nodal line semimetals and coexisting higher order insulating states in γ GeSe under strains.” ICAMD2021(The 12th International Conference on Advanced Materials and Devices)

AWARDS AND HONORS

2023 SKKU BK21 Innovation Research Scholarship (Sungkyunkwan University)

2019 Brain Korea Excellent TA Award (Physics Lab. 1, Seoul National University)

2016 Excellence in Learning (Kyung Hee University)

LABORATORY EXPERIENCE

- **Computer simulation tool:**
First-principles calculation: VASP, Quantum Espresso, WIEN2K
Tight-binding model: PythTB, Wannier90
Molecular Dynamics(using ML-IAP): Lammmps(Mace)
Post processing: WannierTools, WannierBerri and self-developed code
- **Programming language:** Fortran, Python
- Equipment: PPMS, Panalytical XRD, box furnace, glove box
- Measurement: resistivity, MH loop, PE loop, pyro-current, converse ME
- Be in charge of liquid nitrogen transfer at Low-Temperature Facility, Seoul National University, Fall 2019

TEACHING ASSISTANT

Fall 2022 Statistical Mechanics (PHY7004), Sungkyunkwan University

Spring 2022 Classical Mechanics - exercise 1 (PHY2002), Sungkyunkwan University

Spring 2022 General Physics Lab 1 (GEDB009), Sungkyunkwan University
Fall 2021 Solid State Physics 1 (PHY4019), Sungkyunkwan University
Spring 2021 General Physics Lab 1 (GEDB009), Sungkyunkwan University
Fall 2020 Solid State Physics 1 (PHY3036), Sungkyunkwan University
Spring 2020 General Physics 1 (GEDB008), Sungkyunkwan University
Spring 2019 034.009 Physics Lab. 1, Seoul National University

STUDENT VOLUNTEER EXPERIENCE

Aug. 2019 11th International Conference on Magnetic and Superconducting Materials (MSM19)

MILITARY SERVICE

Dec. 2013 ~ Republic of Korea, Marine Corps 1st Force Recon Battalion, Yeonpyeongdo & Pohang
Sep. 2015