

Curriculum Vitae – Hanghui Chen

Contact Information

NYU Shanghai

Address: 567 Yangsi West Road, Pudong, Shanghai, China, 200122

Office Phone: 86-21-20595152

Email: hanghui.chen@nyu.edu

Research Interests

I use state-of-the-art first principles calculations to study electronic, magnetic, structural and topological properties of quantum materials, with a particular emphasis on complex oxides and oxide heterostructures. In addition, I also design new materials and predict their novel physical properties with the aid of first-principles calculations.

Education

- Ph.D in Physics (2012), Yale University, New Haven, Connecticut USA.
Thesis: First-principles Study of Complex Oxide Interfaces.
Advisor: Professor Sohrab Ismail-Beigi.
- B.S. in Physics (2004), Peking University, Beijing, China.

Working Experience

- NYU-ECNU Institute of Physics, NYU Shanghai, Shanghai China. Associate Professor of Physics, September 2024 – current.
- Department of Physics, New York University, New York, NY, USA. Global Network Associate Professor, September 2024 – current.
- NYU-ECNU Institute of Physics, NYU Shanghai, Shanghai China. Assistant Professor of Physics, September 2016 – August 2024.
- Department of Physics, New York University, New York, NY, USA. Global Network Assistant Professor, September 2016 – August 2024.
- Department of Physics, Columbia University, New York, New York USA. Postdoc fellow, collaborating with Professor Andrew Millis on correlated transition metal oxides in both bulk and nanostructured forms, July 2012 – August 2016.

Publications (* indicates corresponding author)

- C. Xia, H. Liu, S. Zhou, **H. Chen***, “Sensitive dependence of pairing symmetry on Ni_{e_g} crystal field splitting in the nickelate superconductor $La_3Ni_2O_7$ ”, *Nature Communications* 16, 1054 (2025).
- W. Sun, Z. Jiang, C. Xia, B. Hao, Y. Li, S. Yan, M. Wang, H. Liu, J. Ding, J. Liu, Z. Liu, J. Liu, **H. Chen***, D. Shen*, Y. Nie*, “Electronic Structure of Superconducting Infinite-Layer Lanthanum Nickelates”, *Science Advances* 11, eadr5116 (2025).
- W. Xia, J. Wu, Z. Li, J. Yuan, C. An, X. Wang, N. Yu, Z. Zou, G. Liu, C. Zhou, J. Feng, L. Zhang, Z. Dong, B. Chen, Z. Yang, Z. Yu*, **H. Chen***, Y. Guo*, “Pressure-induced superconductivity reentrant in transition metal dichalcogenide $TiSe_2$ ”, *Small* 20, 2402749 (2024).
- Z. Liu, Q. Li and **H. Chen***, “Ferromagnetic polar metals via epitaxial strain: a case study of $SrCoO_3$ ”, *Phys. Rev. B* 110, 024105 (2024).
- Y. Hao, X. Chen, L. Zhang, M. Han, Y. Fang, **H. Chen**, Y. Zhu, and X. Hong*, “Record high room temperature resistance switching in ferroelectric-gated Mott transistors unlocked by interfacial charge engineering”, *Nature Communications* 14, 8247 (2023).

- **H. Chen**^{*}, Y. Yang^{*}, G. Zhang^{*}, H. Liu, “An electronic origin of charge order in infinite-layer nickelates”, *Nature Communications* 14, 5477 (2023).
- S. Chen, J. Chang, Q. Zhang, Q. Li, T. Lin, F. Meng, H. Huang, S. Zeng, X. Yin, M. Duong, Y. Lu, L. Chen, E. Guo, **H. Chen**, C. Chang, C. Kuo^{*}, Z. Chen^{*}, “Spin State Disproportionation in Insulating Ferromagnetic LaCoO₃ Epitaxial Thin Films”, *Advanced Science* 10, 2303630 (2023).
- Z. Liu, H. Liu, J. Ma, X. Wang, G. Li^{*} and **H. Chen**^{*}, “Emergent topological states via digital (001) oxide superlattices”, *npj Computational Materials* 8, 208 (2022).
- Z. Cui, Y. Zhang, X. Zhai, **H. Chen**, Y.-D. Chuang, J. Guo, Z. Fu, Z. Li and Y. Lu^{*}, “Interface engineering of phase separation in SrRuO₃/SrTiO₃ hybrid superlattices”, *Phys. Rev. B* 106, 024424 (2022).
- H. Peng, N. Lu, S. Yang, Y. Lyu, Z. Liu, Y. Bu, S. Shen, M. Li, Z. Li, L. Gao, S. Lu, M. Wang, H. Cao, H. Zhou, P. Gao, **H. Chen** and Pu Yu^{*}, “A Generic Sacrificial Layer for Wide-Range Freestanding Oxides with Modulated Magnetic Anisotropy” *Adv. Funct. Mater.* 32, 2111907 (2022).
- Q. Lu, Z. Liu, Q. Yang, H. Cao, P. Balakrishnan, Q. Wang, L. Cheng, Y. Lu, J.-M. Zuo, H. Zhou, P. Quarterman, S. Muramoto, A. J. Grutter, **H. Chen**^{*} and X. Zhai^{*}, “Engineering Magnetic Anisotropy and Emergent Multidirectional Soft Ferromagnetism in Ultrathin Freestanding LaMnO₃ Films”, *ACS Nano* 16, 7580 (2022).
- C. Xia, J. Wu, Y. Chen and **H. Chen**^{*}, “Dynamical structural instability and its implications for the physical properties of infinite-layer nickelates”, *Phys. Rev. B* 105, 115134 (2022).
- **H. Chen**^{*}, A. Hampel, J. Karp, F. Lechermann and A. Millis, “Dynamical Mean Field Studies of Infinite Layer Nickelates: Physics Results and Methodological Implications”, *Frontiers in Physics* 10, 835942 (2022).
 - An invited review.
- C. Xia, Y. Chen and **H. Chen**^{*}, “Pressure-induced metal-insulator transition in oxygen-deficient LiNbO₃-type ferroelectrics”, *Journal of Physics: Condensed Matter* 34, 025501 (2021).
- J. Ma, R. Yang and **H. Chen**^{*}, “Emergence of superconductivity around polar quantum critical point in doped ferroelectrics”, *Nature Communications* 12, 2314 (2021).
- D. Tian, Z. Liu, S. Shen, Z. Li, Y. Zhou, H. Liu, **H. Chen**^{*} and P. Yu^{*}, “Manipulating Berry curvature of SrRuO₃ thin films via epitaxial strain”, *PNAS* 118, e2101946118 (2021).
- Y. Jiao, Y. Fang, J. Sun, P. Shan, Z. Yu, H. Feng, B. Wang, H. Ma, Y. Uwatoko, K. Yamaura, Y. Guo^{*}, **H. Chen**^{*}, J. Cheng^{*}, “Coupled magnetic and structural phase transitions in the antiferromagnetic polar metal Pb₂CoOsO₆ under pressure”, *Physical Review B* 102, 144418 (2020).
- W. Zhang, Y. J. Hu, C. N. Kuo, S. T. Kuo, Y. Fang, K. Lai, X. Y. Liu, K. Y. Yip, D. Sun, F. F. Balakirev, C. S. Lue, **H. Chen**^{*}, Swee K. Goh^{*}, “Linear magnetoresistance with a universal energy scale in a strong-coupling superconductor”, *Physical Review B* 102, 241113 (2020).
- Y. Gu, S. Zhu, X. Wang, J. Hu and **H. Chen**^{*}, “A substantial hybridization between correlated Ni-*d* orbital and itinerant electrons in infinite-layer nickelates”, *Communications Physics* 3, 84 (2020).
 - This paper is selected as “Editorial Board and Editors favorites” in the Five Years of Communications Physics collection.
- Z. Cui, A. J. Grutter, H. Zhou, H. Cao, Y. Dong, D. A. Gilbert, Y. Liu, J. Ma, Z. Hu, J. Guo, E. Arenholz, **H. Chen**^{*}, X. Zhai^{*} and Y. Lu, “Correlation-driven eightfold

magnetic anisotropy in a two-dimensional ferromagnetic monolayer”, *Sciences Advances* 6, eaay0114 (2020).

- Y. Fang* and **H. Chen***, “Prediction of a multifunctional polar metal via first-principles high-throughput structure screening”, *Communications Materials* 1, 1 (2020).
- Y. Fang, R. Yang and **H. Chen***, “The complex non-collinear magnetic orderings in Ba₂YOsO₆: a new approach to tuning spin-lattice interactions and controlling magnetic orderings in frustrated complex oxides”, *Journal of Physics: Condensed Matter* 31, 44 (2019).
- C. Xia, Y. Chen, and **H. Chen***, “Coexistence of polar displacements and conduction in doped ferroelectrics: An ab initio comparative study”, *Physical Review Materials* 3, 054405 (2019).
- **H. Chen***, “Magnetically driven orbital-selective insulator-to-metal transition in double perovskite oxides”, *npj Quantum Materials* 3, 57 (2018).
- E. I. P. Aulestia, Y. W. Cheung, Y.-W. Fang, J. He, K. Yamaura, K.T. Lai, S. K. Goh* and **H. Chen***, “Pressure-induced enhancement of non-polar to polar transition temperature in metallic LiOsO₃”, *Applied Physical Letters* 113, 012902 (2018).
- K. Ahmadi-Majlan, T. Chen, Z. H. Lim, P. Conlin, R. Hensley, M. Chrysler, D. Su, **H. Chen**, D. P. Kumah, J. H Ngai*, “Tuning metal-insulator behavior in LaTiO₃/SrTiO₃ heterostructures integrated directly on Si(100) through control of atomic layer thickness”, *Applied Physical Letters* 112, 193104 (2018).
- **H. Chen*** and A. J. Millis, “Design of new Mott multiferroics via complete charge transfer: promising candidates for bulk photovoltaics”, *Scientific Report* 7, 6142 (2017).
- X. Chen, X. Zhang, M. A. Koten, **H. Chen**, Z. Xiao, L. Zhang, J. E. Shield, P. A. Dowben and X. Hong*, “Interfacial Charge Engineering in Ferroelectric-Controlled Mott Transistors”, *Advanced Materials* 29, 31 (2017).
- **H. Chen*** and A. J. Millis, “Charge transfer driven emergent phenomena in oxide heterostructures”, *Journal of Physics: Condensed Matter* 29, 243001 (2017).
 - An invited review.
- **H. Chen*** and A. J. Millis, “Phase diagram of Sr_{1-x}Ba_xMnO₃ as a function of chemical doping, epitaxial strain, and external pressure”, *Physical Review B* 94, 165106 (2016).
- **H. Chen*** and A. J. Millis, “Comparative study of exchange-correlation functionals for accurate predictions of structural and magnetic properties of multiferroic oxides”, *Physical Review B* 93, 205110 (2016).
- **H. Chen*** and A. J. Millis, “Antisite defects at oxide interfaces”, *Physical Review B* 93, 104111 (2016).
- **H. Chen*** and A. J. Millis, “Spin-density functional theories and their +*U* and +*J* extensions: A comparative study of transition metals and transition metal oxides”, *Physical Review B* 93, 045133 (2016).
- S. Disa, D. P. Kumah, A. Malashevich, **H. Chen**, D. A. Arena, E. D. Specht, S. Ismail-Beigi, F. J. Walker and C. H. Ahn*, “Inter-elemental orbital tuning in oxides”, *Physical Review Letters* 114, 026801 (2015).
- **H. Chen***, H. Park, A. J. Millis and C. A. Marianetti, “Charge transfer across transition metal oxide interfaces: emergent conductance and electronic structure”, *Physical Review B* 90, 245138 (2014).
- M. S. J. Marshall, A. Malashevich, A. S. Disa, M. G. Han, **H. Chen**, Y. Zhu, S. Ismail-Beigi, F. J. Walker and C. H. Ahn*, “Conduction at a Ferroelectric Interface”, *Physical Review Applied* 2, 051001 (2014).
- **H. Chen***, Q. Qiao, M. S. J. Marshall, A. B. Georgescu, A. Gulec, P. J. Phillips, R. F. Klie, F. J. Walker, C. H. Ahn and S. Ismail-Beigi, “Reversible modulation of orbital

occupations via an interface-induced polar state in metallic manganites”, *Nano Letters* 14, 4965 (2014).

- D. P. Kumah, A. S. Disa, J. H. Ngai, **H. Chen**, A. Malashevich, J. W. Reiner, S. Ismail-Beigi, F. J. Walker and C. H. Ahn*, “Tuning the structure of nickelates to achieve two-dimensional electron conduction”, *Advanced Materials* 26, 1935 (2014).
- **H. Chen***, A. J. Millis, and C. A. Marianetti, “Engineering Correlation Effects via Artificially Designed Oxide Superlattices”, *Physical Review Letters* 111, 116403 (2013).
- **H. Chen***, D. Kumah, A. Disa, F. Walker, C. Ahn and S. Ismail-Beigi, “Modifying the electronic orbitals of nickelate heterostructures via structural distortions”, *Physical Review Letters* 110, 186402 (2013).
- **H. Chen*** and S. Ismail-Beigi, “Ferroelectric control of magnetization in the manganites”, *Physical Review B* 86, 024433 (2012).
- **H. Chen***, A.M. Kolpak and S. Ismail-Beigi, “First-principles study of electronic reconstructions of LaAlO₃/SrTiO₃ heterointerfaces and their variants”, *Physical Review B* 82, 085430 (2010).
- **H. Chen***, A.M. Kolpak and S. Ismail-Beigi, “Electronic and Magnetic Properties of SrTiO₃/LaAlO₃ Interfaces from First Principles”, *Advanced Materials* 22, 2281 (2010).
 - An invited review.
- **H. Chen***, A.M. Kolpak and S. Ismail-Beigi, “Fundamental asymmetry in interfacial electronic reconstruction between insulating oxides: An *ab initio* study”, *Physical Review B* 79, 161402(R) (2009).

Papers Submitted (* indicates corresponding author)

- L. Miao, N. Schreiber, B. Goodge, Z. Liu, L. Kourkoutis, H. Chen, D. Schlom and K. Shen*, “Engineering magnetic anisotropy and Berry curvature in ruthenate thin films”, *under review*.
- Z. Fan, J. Chen, Q. Sui, H. Ling, Z. Wang, L. Kong, D. Li, F. Yang, R. Zhao, S. Pan, **H. Chen**, P. Chen*, Y. Lang*, J. Zhang*, “Interplay between Kondo and Weak Antilocalization Effect in Spin-Polarized 2DEGs”, *under review*.

Invited Talks (conference/colloquium/seminar)

- Conference – “22nd International Conference on Ternary and Multinary Compounds” (September 2024; Beijing, China)
- Conference – “Conference of condensed matter physics” (August 2024; Liyang, China)
- Seminar – Department of Mechanical Engineering, the University of Hong Kong (January 2024; Hong Kong, China)
- Seminar – Department of Physics, the Chinese University of Hong Kong (January 2024; Hong Kong, China)
- Seminar – Department of Physics, City University of Hong Kong (January 2024; Hong Kong, China)
- Seminar – Department of Physics, Shanghai Jiaotong University (December 2023; Beijing, China)
- Conference – “19th Conference on Dielectrics and Ferroelectrics” (December 2023; Nanjing, China)
- Conference – “International Conference on Nickelate Superconductors” (November 2023; Guangzhou, China)
- Conference – “9th Forum on Heavy Fermion Systems” (November 2023; Wuhan, China)

- Conference – “International Conference on Frontier Materials 2023” (October 2023; Qingdao, China)
- Conference – “Conference on Oxides and Nitrides” (March 2023; Liyang, China)
- Conference – “2023 Forum on Oxide Thin Films” (January 2023; Online)
- Conference – “2022 Chinese Physical Society Fall Meeting” (November 2022; Shenzhen, China)
- Conference – “The 13th APCTP Workshop on Multiferroics” (October 2022; Online)
- Conference – “2022 International Conference on Frontier Materials” (May 2022; Online)
- Conference – “2022 Forum on Oxide Thin Films” (January 2022; Online)
- Conference – “2021 Forum on Materials Design and Intelligent Manufacturing” (September 2021; Shanghai, China)
- Conference – “Chinese Materials Conference 2021” (July 2021; Xiamen, China)
- Seminar – Department of Physics, Westlake University (July 2021; Hangzhou, China)
- Seminar – Department of Physics, Tsinghua University (June 2021; Beijing, China)
- Conference – “2021 International Workshop for Surfaces and Interfaces of Quantum Materials” (June 2021; Beijing, China)
- Colloquium – Department of Physics, Temple University (April 2021; Online)
- Seminar – Department of Physics, Tsinghua University (January 2021; Online)
- Conference – “Electronic Materials and Applications 2021” (January 2021; Online)
- Conference – “7th Forum on Heavy Fermion Systems” (October 2020; Hefei, China)
- Conference – “Kavli Institute for Theoretical Sciences mini-workshop on nickelate superconductivity” (June 2020; Beijing, China)
- Seminar – Department of Physics, ShanghaiTech University (December 2019; Beijing, China)
- Conference – “The 13th Pacific Rim Conference of Ceramic Societies” (October 2019; Okinawa, Japan)
- Conference – “International Focus Workshop Computational Approaches to Magnetic Systems” (August 2019; Daejeon, South Korea)
- Conference – “XXXI IUPAP Conference on Computational Physics” (July 2019; Hong Kong, China)
- Seminar – Institute of Physics, Chinese Academy of Science (June 2019; Beijing, China)
- Seminar – Department of Physics, Southeast University (June 2019; Nanjing, China)
- Seminar – Department of Physics, University of Science and Technology of China (December 2018; Anhui, China)
- Conference – “8th Chinese Forum for Young Scientists in Condensed Matter Physics” (November 2018; Shanghai, China)
- Seminar – Institute of Physics, Chinese Academy of Science (June 2018; Beijing, China)
- Seminar – College of Engineering and Applied Sciences, Nanjing University (June 2018; Nanjing, China)
- Conference – “2nd Fudan International Workshop on Complex Quantum Materials” (April 2018; Shanghai, China)
- Seminar – Department of Physics, Fudan University (December 2017; Shanghai, China)
- Conference – “2017 Conference of Computational Physics of Shanghai Physical Society” (December 2017; Shanghai, China)
- Seminar – Department of Physics, The Chinese University of Hong Kong (August 2017; Shanghai, China)

- Seminar – Center for High Pressure Science & Technology Advanced Research (October 2016; Shanghai, China)
- Seminar – Key Laboratory of Polar Materials and Devices of Ministry of Education, East China Normal University (October 2016; Shanghai, China)

Teaching Experience

- Fall of 2024, General Physics I (PHYS-SHU 11)
- Spring of 2024, Foundations of Physics II Honors (PHYS-SHU 93)
- Fall of 2023, Foundations of Physics I Honors (PHYS-SHU 91)
- Spring of 2023, Foundations of Physics II Honors (PHYS-SHU 93)
- Fall of 2022, Foundations of Physics I Honors (PHYS-SHU 91)
- Fall of 2021, Foundations of Physics I Honors (PHYS-SHU 91)
- Spring of 2021, Solid-State Physics Honors (PHYS-SHU 135)
- Fall of 2020, Foundations of Physics I Honors (PHYS-SHU 91)
- Spring of 2020, Foundations of Physics II Honors (PHYS-SHU 93)
- Fall of 2019, Foundations of Physics I Honors (PHYS-SHU 91)
- Spring of 2019, Foundations of Physics II Honors (PHYS-SHU 93)
- Fall of 2018, Foundations of Physics I Honors (PHYS-SHU 91)
- Spring of 2018, Foundations of Physics II Honors (PHYS-SHU 93)
- Fall of 2017, Foundations of Physics I Honors (PHYS-SHU 91)
- Spring of 2023, supervisor of Independent Study-Physics (PHYS-SHU 997)
- Fall of 2021, supervisor of Independent Study-Physics (PHYS-SHU 997)
- Spring of 2021, supervisor of Independent Study-Physics (PHYS-SHU 997)
- Fall of 2020, supervisor of Independent Study-Physics (PHYS-SHU 997)
- Spring of 2018, supervisor of Independent Study-Multidisciplinary (IDIS-SHU 997)

Honors

- 2019 American Physical Society Outstanding Referee
- 2022 Reviewer of the Year for *npj Quantum Materials* journal

Service

- Serve on Library Advisory Committee of NYU Shanghai (2017-now).
- Serve on High-Performance-Supercomputing Committee of NYU Shanghai (2021-now).
- Serve on N.E.T. Faculty Advisory Committee of NYU Shanghai (2021-now).
- Serve on Thesis Committee of NYU Shanghai graduate students (2019-now).
- Served on Faculty Searching Committee of NYU Shanghai (2018).
- Organize Physics Seminars of NYU Shanghai (2017-now).
- Participated in the launching of a new course “Advanced physics experiment” of NYU Shanghai (2017).
- Organized “2018 International Conference on Emergent Phenomena in Quantum Materials” of NYU Shanghai (2018).
- Served on Thesis Committee of graduate students of other universities/institutes (2021-2022).
- Organized the focus session “Oxide interfaces and heterostructure” of 2019 APS March Meeting (2019).
- Serve as a referee for scientific journals: Nature Physics, Nature Nanotechnology, Nature Communications, Communications Physics, npj Quantum Materials, Physical Review Letters, Physical Review X, Physical Review B (2010-now).