

Dr. Xin Gui

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EDUCATION

- Ph.D. Chemistry* 2016.8 – 2020.8
- **Louisiana State University (LSU)**, Baton Rouge, LA., USA
 - Advisor: Prof. Weiwei Xie
- B.S. Chemistry* 2012.8 – 2016.7
- **Nankai University (NKU)**, Tianjin, China
 - Advisor: Prof. Shoufei Zhu

RESEARCH EXPERIENCE

- Assistant Professor*, Department of Chemistry, University of Pittsburgh, USA 2022.9 – present
- Design, synthesis and characterization of quantum materials (superconductors, topological materials and frustrated magnets).
 - New material platforms for superconducting qubits and spintronic devices.
- Postdoctoral Research Associate*, Department of Chemistry, Princeton University, USA 2020.8 – 2022.8
- New materials platform for quantum information hosts.
 - Advisor: Prof. Robert J. Cava
- Visiting Scholar*, High Flux Isotope Reactor (HFIR), Oak Ridge National Laboratory, USA 2018.9 – 2018.11
- Analysis of powder/single crystal neutron diffraction data.
 - Advisor: Dr. Huibo Cao
- Graduate Student*, Department of Chemistry, Louisiana State University, USA 2017.1 – 2020.8
- Design, synthesis and characterization of novel intermetallic superconductors.
 - Crystal structures and physical properties emerged under high pressure *via* diamond anvil cell.
 - Advisor: Prof. Weiwei Xie
- Visiting Student*, Department of Chemistry, Georgia State University, USA 2015.11 – 2016.3
- Iron-catalyzed direct diazidation for olefins.
 - Advisor: Prof. Hao Xu
- Undergraduate Student*, the State Key Laboratory of Element-Organic Chemistry, Department of Chemistry, Nankai University, China 2014.2 – 2015.10
- Nickel-catalyzed intramolecular hydroalkenylation.
 - Advisor: Prof. Shoufei Zhu

TEACHING

- Teaching Assistant, Chem1212 (general chemistry lab), Louisiana State University, USA 2017 & 2019

HONORS & AWARDS

- Ludo Frevel Crystallography Scholarship Award of ICDD (International Centre for Diffraction Data) 2020
- Mary Jo Pribble Inorganic Chemistry Award of LSU Chemistry 2020
- Graduate Student Association Travel Award of LSU 2019
- Coates Conference Travel Award of LSU 2019
- “Pujing Chemical Industry” Progress Scholarship of Nankai University 2015
- “Gong Neng” Scholarship of Nankai University 2014

ACADEMIC PRESENTATIONS

- Poster, Gordon Research Conference-Solid State Chemistry, New London, NH, USA, 7/2022.
- Oral Talk, American Physical Society, Spring Meeting, Chicago, IL, USA, 3/2022.
- Oral Talk, American Crystallographic Association Meeting, 8/2021.
- Oral Talk, Materials Research Society, Fall Meeting, Boston, MA, USA, 12/2019.

- Poster, 2019 North American Solid-State Chemistry Conference, Golden, CO, USA, 8/2019.
- Oral Talk, American Physical Society, Spring Meeting, Boston, MA, USA, 3/2019.
- Oral Talk, American Chemistry Society, Spring Meeting, New Orleans, LA, USA, 3/2018.
- Oral Talk, Inorganic Chemistry Seminar, Department of Chemistry, LSU, USA, 4 & 11/2017, 3/2018, 2 & 11/2019.

WEBSITES

- Faculty page at Pitt: [Xin Gui-Pitt Chemistry](#)
- Google scholar: [Xin Gui](#)
- Research group website: [The Quantum-Gui Lab](#)

PUBLICATIONS (* Corresponding author)

1. **Gui, X.**; Cava, R. J. “Metal-Insulator Transition and Anomalous Lattice Parameters Changes in Ru-doped VO₂” *Phys. Rev. Mater.* **2022**, 6, 075005.
2. **Gui, X.**; Cava, R. J. “LaIr₃Ga₂: A Superconductor based on a Kagome Lattice of Ir” *Chem. Mater.* **2022**, 34, 2824-2832.
3. **Gui, X.**; Feng, E.; Cao, H.; Cava, R. J. “Ferromagnetic Cr₄PtGa₁₇: A Half-Heusler-Type Compound with a Breathing Pyrochlore Lattice” *J. Am. Chem. Soc.* **2021**, 143, 14342-14351.
4. **Gui, X.**; Cava, R. J. “Magnetic transitions in the 1-D chain compounds NdPd₅Ge₃ and NdPt₅Ge₃” *J. Phys. Condens. Matter* **2021**, 33, 435801.
5. **Gui, X.**; Cava, R. J. “Crystal Structure, Magnetic Properties and Bonding Analysis of M₃Pt₂₃Ge₁₁ (M=Ca, Sr, Ba and Eu)” *J. Solid State Chem.* **2021**, 303, 122486.
6. **Gui, X.**; Marshall, M.; Dissanayaka Mudiyanse, R.S.; Klein, R.A.; Chen, Q.; Zhang, Q.; Shelton, W.; Zhou, H.; Brown, C.M.; Cao, H.; Greenblatt, M.; Xie, W. “Spin Reorientation in Antiferromagnetic Layered FePt₅P” *ACS Appl. Electron. Mater.* **2021**, 3, 3501-3508.
7. **Gui, X.***; Lv, B. *; Xie, W. * “Chemistry in Superconductivity” *Chem. Rev.* **2021**, 121, 2966-2991.
8. **Gui, X.**; Klein, R.; Brown, C. M.; Xie, W. “Chemical Bonding Governs Complex Magnetism in MnPt₅P” *Inorg. Chem.* **2021**, 60, 87-96.
9. **Gui, X.**; Chang, T.-R.; Wei, K.; Daum, M. J.; Graf, D. E.; Baumbach, R. E.; Mourigal, M.; Xie, W. “A Novel Magnetic Material by Design: Observation of Yb³⁺ with Spin-1/2 in Yb_xPt₅P” *ACS Cent. Sci.* **2020**, 6, 2023-2030.
10. **Gui, X.**; Xie, W. “Design and Synthesis of a New Layered Rare-Earth-Free Ferromagnet: MnPt₅As” *Chem. Mater.* **2020**, 32, 3922-3929.
11. **Gui, X.**; Górnicka, K.; Klimczuk, T.; Xie, W. “Superconductivity in Metal-Rich Chalcogenide Ta₂Se” *Inorg. Chem.* **2020**, 59, 5798-5802.
12. **Gui, X.**; Finkelstein, G. J.; Chen, K.; Yong, T.; Dera, P.; Cheng, J.; Xie, W. “Pressure-Induced plane-to-chain, insulator to metal transition in CaMn₂Bi₂” *Inorg. Chem.*, **2019**, 58, 8933-8937.
13. **Gui, X.***; Sobczak, Z.; Klimczuk, T.; Xie, W.* “Pt-rich Intermetallic APt₈P₂ (A = Ca and La)” *J. Alloy Compd.*, **2019**, 798, 53-58.
14. **Gui, X.**; Pletikosic, I.; Cao, H.; Tien, H.J.; Xu, X.; Zhong, R.; Wang, G.; Chang, T.R.; Jia, S.; Valla, T.; Xie, W.; Cava, R. J. “A New Magnetic Topological Quantum Material Candidate by Design” *ACS Cent. Sci.*, **2019**, 5, 900-910.
15. **Gui, X.**; Finkelstein, G. J.; Graf, D. E.; Wei, K.; Zhang D.; Baumbach, R. E.; Dera, P.; Xie, W. “Enhanced Néel Temperature in EuSnP under Pressure” *Dalton Trans.* **2019**, 48, 5327-5334.
16. **Gui, X.**; Calder, S.; Cao, H.; Yu, T.; Xie, W. “Geometric and Magnetic Structure of K₂ReI₆ as an Antiferromagnetic Insulator with Ferromagnetic Spin-Canting” *J. Phys. Chem. C.* **2019**, 123, 1645-1652.
17. **Gui, X.**; Sobczak, Z.; Chang, T.R.; Xu, X.; Huang, A.; Jia, S.; Jeng, H.T.; Klimczuk, T.; Xie, W. “Superconducting SrSnP with Strong Sn–P Antibonding Interaction: Is the Sn Atom Single or Mixed Valent?” *Chem. Mater.* **2018**, 30, 6005-6013.

18. **Gui, X.**; Zhao, X.; Sobczak, Z.; Wang, C. Z.; Klimczuk, T.; Ho, K. M.; Xie W. “Ternary Bismuthide SrPtBi₂: Computation and Experiment in Synergism to Explore Solid-State Materials” *J. Phys. Chem. C* **2018**, *122*, 5057-5063
19. **Gui, X.**; Xing, L.; Wang, X.; Bian, G.; Jin, R.; Xie, W. “Pt–Bi Antibonding Interaction: The Key Factor for Superconductivity in Monoclinic BaPt₂Bi₂” *Inorg. Chem.* **2018**, *57*, 1698-1701
20. **Gui, X.**; Chang, T. R.; Kong, T.; Pan, M. T.; Cava, R. J.; Xie W. “Monoclinic 122-Type BaIr₂Ge₂ with a Channel Framework: A Structural Connection between Clathrate and Layered Compounds” *Materials* **2017**, *10*, 818.
21. Zhang, Z.; Zuber, J. A.; Rodgers, L. V. H.; **Gui, X.**; Stevenson, P.; Li, M.; Batzer, M.; Grimau, M.; Shields, B.; Edmonds, A. M.; Palmer, N.; Markham, M. L.; Cava, R. J.; Maletinsky, P.; de Leon, N. P. “Neutral silicon vacancy centers in undoped diamond via surface control” **2022**. (*submitted*)
22. Lee, T.; Straus, D.B.; Devlin, K.P.; **Gui, X.**; Louka, P.; Xie, W.; Cava, R.J. “Antiferromagnetic to Ferromagnetic Coupling Crossover in Hybrid Nickel Chain Perovskites.” *Inorg. Chem.* **2022**, *61*, 10486-10492.
23. Jin, L.; Ni, D.; **Gui, X.**; Kong, T.; Moseley, D.H.; Hermann, R.P.; Cava, R.J. “Structure and properties of the Sr₂In_{1-x}Sn_xSbO₆ double perovskite.” *J. Solid State Chem.* **2022**, *314*, 123355.
24. Pierantozzi, G. M.; De Vita, A.; Bigi, C.; **Gui, X.**; Tien, H- J.; Mondal, D.; Mazzola, F.; Fujii, J.; Vobornik, I.; Vinai, G.; Sala, A.; Africh, C.; Lee, T. -L.; Rossi, G.; Chang, T. -R.; Xie, W.; Cava, R. J.; Panaccione, G. “Evidence of magnetism-induced topological protection in the axion insulator candidate EuSn₂P₂” *Proc. Natl. Acad. Sci.* **2022**, *119*, e2116575119.
25. Ma, J.Z.; Nie, S.M.; **Gui, X.**; Naamneh, M.; Jandke, J.; Xi, C.Y.; Zhang, J.L.; Shang, T.; Xiong, Y.M.; Kapon, I.; Kumar, N.; Soh, Y.; Gosalbezmartinez, D.; Yazyev, O.; Fan, W. H.; Plumb, N.; Radovic, M.; Hubener, H.; Giovannini, U. D.; Sentef, M.; Song, W. -W.; Wang, Z.; Mudry, C.; Muller, M.; Shi, M. “Multiple mobile excitons manifested as sidebands in metallic phase of TaSe₃.” *Nat. Mater.* **2022**, *21*, 423-429.
26. Ni, D.; Devlin, K.P.; Cheng, G.; **Gui, X.**; Xie, W.; Yao, N.; Cava, R.J. “The honeycomb and hyperhoneycomb polymorphs of IrI₃” *J. Solid State Chem.* **2022**, *312*, 123240.
27. Jin, L.; Ni, D.; **Gui, X.**; Straus, D.; Zhang, Q.; Cava, R. J. “Ferromagnetic Double Perovskite Semiconductors with Tunable Properties” *Adv. Sci.* **2022**, *9*, 2104319.
28. Jin, L.; Ni, D.; **Gui, X.**; Straus, D.; Zhang, Q.; Cava, R. J. “Magnetic cations doped into a Double Perovskite Semiconductor” *J. Mater. Chem. C* **2022**, *10*, 3232-3240.
29. Ni, D.; **Gui, X.**; Powderly, K. M.; Cava, R. J. “Honeycomb-structure RuI₃, a new quantum material related to α -RuCl₃” *Adv. Mater.* **2021**, *34*, 2106831.
30. Li, Y.; **Gui, X.**; Khan, M.A.; Xie, W.; Young, D.P.; DiTusa, J.F. “Topological Hall effect and magnetic states in the Nowotny chimney ladder compound Cr₁₁Ge₁₉” *Phys. Rev. B*, **2021**, *103*, 024445.
31. Nguyen, L.T.; **Gui, X.**; Warden, H.M.; Cava, R.J. “Structure, electronic and magnetic characterization, and calculated electronic structures of two oxyhalide hexagonal perovskites” *Phys. Rev. Mater.* **2021**, *5*, 104408.
32. Scheie, A.; Sanders, M.; **Gui, X.**; Qiu, Y.; Prisk, T.R.; Cava, R.J.; Broholm, C. “Beyond magnons in Nd₂ScNbO₇: An Ising pyrochlore antiferromagnet with all-in–all-out order and random fields” *Phys. Rev. B* **2021**, *104*, 134418.
33. Ni, D.; Hu, Z.; Cheng, G.; **Gui, X.**; Yu, W.; Jia, C.; Wang, X.; Herrero-Martín, J.; Yao, N.; Tjeng, L. H.; Cava, R. J. “Magnetic Frustration in a Zeolite” *Chem. Mater.* **2021**, *33*, 9725-9731.
34. Yi, H., Huang, Z., Shi, W., Min, L., Wu, R., Polley, C.M., Zhang, R., Zhao, Y.F., Zhou, L.J., Adell, J.; **Gui, X.**; Xie, W.; Chan, M. H. W.; Mao, Z.; Wang, Z.; Wu, W.; Chang, C. -Z. “Surface charge induced Dirac band splitting in a charge density wave material (TaSe₄)₂I” *Phys. Rev. Res.* **2021**, *3*, 013271.
35. Zhu, Y.; Hu, J.; Graf, D.; **Gui, X.**; Xie, W.; Mao, Z. “Quasi-two-dimensional relativistic fermions probed by de Haas–van Alphen quantum oscillations in LuSn₂” *Phys. Rev. B* **2021**, *103*, 125109.
36. Speer, S.; Marshall, M.; Chang, H.; Nepal, R.; Blawat, J.; Chapai, R.; **Gui, X.**; Xie, W.; Jin, R. “Mn-induced spin glass behavior in metallic Ir₃Sn_{7-x}Mn_x” *J. Phys. Condens. Matter* **2021**, *33*, 135701.
37. Decocq, V.; **Gui, X.**; Neeson, A.; Xie, W.; Heitmann, T.; Wang, F. “Crystal Structures, Superconducting Properties, and the Coloring Problem in ReAlSi and ReGaSi” *Inorg. Chem.* **2020**, *59*, 17310-17319.

38. Górnicka, K.; **Gui, X.**; Wiendlocha, B.; Nguyen, L.T.; Xie, W.; Cava, R.J.; Klimczuk, T. “NbIr₂B₂ and TaIr₂B₂—New Low Symmetry Noncentrosymmetric Superconductors with Strong Spin–Orbit Coupling” *Adv. Func. Mater.* **2020**, 2007960.
39. Zhu, Y.; **Gui, X.**; Wang, Y.; Graf, D.; Xie, W.; Hu, J.; Mao, Z. “Evidence from transport measurements for YRh₆Ge₄ being a triply degenerate nodal semimetal” *Phys. Rev. B* **2020**, *101*, 035133.
40. Shen, B.; Hu, C.; Cao, H.; **Gui, X.**; Emmanouilidou, E.; Xie, W.; Ni, N. “Structural Distortion and Incommensurate Noncollinear Magnetism in EuAg₄As₂” *Phys. Rev. Mater.* **2020**, *4*, 064419.
41. Zhou, H.; Chang, G.; Wang, G.; **Gui, X.**; Xu, X.; Yin, J.X.; Guguchia, Z.; Zhang, S.S.; Chang, T.R.; Lin, H.; Xie, W.; Hasan, M. Z.; Jia, S. “Enhanced anomalous Hall effect in the magnetic topological semimetal Co₃Sn_{2-x}In_xS₂” *Phys. Rev. B* **2020**, *101*, 125121.
42. Saleheen, A. U.; Chapai, R.; Xing, L.; Nepal, R.; Gong, D.; **Gui, X.**; Xie, W.; Young, D. P.; Jin, R. “Evidence for topological semimetallicity in a chain–compound TaSe₃” *npj Quantum Mater.* **2020**, *5*, 1-8.
43. Liu, Y.; Liu, Y.-F.; **Gui, X.**; Xiang, C.; Zhou, H.-B.; Hsu, C.-H.; Lin, H.; Chang, T.-R.; Xie, W.; Jia, S. “Bond-breaking Induced Lifshitz Transition in Robust Type-II Dirac Semimetal VAl₃” *Proc. Natl. Acad. Sci.* **2020**, *117*, 15517-15523.
44. Gong, D.; Huang, S.; Ye, F.; **Gui, X.**; Zhang, J.; Xie, W.; Jin, R. “Canted magnetic structure of EuMnSb₂” *Phys. Rev. B* **2020**, *101*, 224422.
45. Chang, H.; **Gui, X.**; Huang, S.; Nepal, R. K.; Chapai, R.; Xing, L.; Xie, W.; Jin, R. “Mn-induced Ferromagnetism and Enhanced Thermoelectric Properties in Ru_{1-x}Mn_xSb_{2+δ}” *New J. Phys.* **2019**, *21*, 0338.
46. Wang, Z.; Cheng, S.; Chang, T.R.; Ma, W.; Xu, X.; Zhou, H.; Wang, G.; **Gui, X.**; Zhu, H.; Zhu, Z.; Zheng, H.; Jia, J.; Wang, J.; Xie, W. and Jia, S. “Highly Mobile Carriers in a Candidate of Quasi-Two-Dimensional Topological Semimetal AuTe₂Br” *APL Materials* **2019**, *7*, 101110.
47. Xu, X.; Wang, X.; Cochran, T.A.; Sanchez, D.S.; Belopolski, I.; Wang, G.; Liu, Y.; Tien, H.J.; **Gui, X.**; Xie, W.; Hasan, M.Z.; Chang, T. -R.; Jia, S. “Crystal Growth and Quantum Oscillations in the Topological Chiral Semimetal CoSi” *Phys. Rev. B*, **2019**, *100*, 045104.
48. Blawat, J.; Swatek, P.; **Gui, X.**; Jin, R. and Xie, W. “Antiferromagnetic Semiconductor Eu₃Sn₂P₄ with Sn–Sn Dimer and Crown-Wrapped Eu” *J. Mater. Chem. C* **2019**, *7*, 12650-12656.
49. Xing, L.; **Gui, X.**; Xie, W.; Cao, H.; Yan, J.; Sales, B.C.; Jin, R. “Mn-induced Ferromagnetic Semiconducting Behavior with Linear Negative Magnetoresistance in Sr₄(Ru_{1-x}Mn_x)₃O₁₀ Single Crystals” *Sci. Rep.* **2018**, *8*, 13330.
50. Zhou, Y.; Xing, L.; Finkelstein, G.J.; **Gui, X.**; Marshall, M.G.; Dera, P.; Jin, R.; Xie, W. “Cr_{2.37}Ga₃Se₈: A Quasi-Two-Dimensional Magnetic Semiconductor” *Inorg. Chem.* **2018**, *57*, 14298-14303.
51. Hu, J.; Zhu, Y.; **Gui, X.**; Graf, D.; Tang, Z.; Xie, W.; Mao, Z. “Quantum Oscillation Evidence for a Topological Semimetal Phase in ZrSnTe” *Phys. Rev. B* **2018**, *97*, 155101
52. Zhu, Y.; Zhang, T.; Hu, J.; Kidd, J.; Graf, D.; **Gui, X.**; Xie, W.; Zhu, M.; Ke, X.; Cao, H.; Fang, Z. “Multiple Topologically Nontrivial Bands in Noncentrosymmetric YSn₂” *Phys. Rev. B* **2018**, *98*, 035117.
53. Emmanouilidou, E.; Cao, H.; Tang, P.; **Gui, X.**; Hu, C.; Shen, B.; Wu, J.; Zhang, S.-C.; Xie, W.; Ni, N. “Magnetic Order Induces Symmetry Breaking in the Single-Crystalline Orthorhombic CuMnAs Semimetal” *Phys. Rev. B*, **2017**, *96*, 224405.