Dr. Chetan Dhital
Assistant Professor
Kennesaw State University
Department of Physics
1100 S Marietta Pkwy, Marietta, GA, 30060
Academic building H260 F
Email: cdhital@kennesaw.edu
Google Scholar:https://scholar.google.com/citations?user=hEbr_o4AAAAJ&hl=en
Faculty Webpage: http://facultyweb.kennesaw.edu/cdhital/index.php
Ph: 4705784209

Research Interests

- Experimental Condensed Matter Physics
- Topological quantum materials and multifunctional materials

Education

2014 Boston College, Boston, USA

PhD in Physics

Supervisor: (Dr. Stephen D. Wilson)

Dissertation Title: *Combined Transport, Magnetization and Neutron Scattering Study of Correlated Iridates and Iron Pnictide Superconductors*

2005 Tribhuvan University, Kathmandu, Nepal

M.S in Physics

Supervisor (Devendra Raj Mishra)

Dissertation Title: *An experimental study of dielectric properties of thermacol-aniline binary solution.*

Appointments

2018-Present	Assistant Professor, Department of Physics, Kennesaw State University (KSU)
2015-2018	Postdoctoral Associate, Department of Physics and Astronomy, Louisiana State University,
2014-2015	Postdoctoral Associate, Oak Ridge National Laboratory

2010-2014	Research Assistant, Boston College, Boston, USA
2008-2014	Teaching Assistant, Boston College, Boston, USA
2005-2008	Physics Lecturer, Damak Multiple Campus, Damak, Jhapa, Nepal

Teaching and mentoring Experience

- **Kennesaw State University**
  - Introductory Physics (PHY2212) Fall 2020
  - Thermal Physics (PHY 4230) Fall 2020
  - Introductory Physics (PHY 2212) Spring 2020
  - Directed Method (PHY 3110) Spring 2020
  - Introductory Physics (PHY 2212) Fall 2019
  - Thermal Physics (PHY 4230) Fall 2019
  - Directed Method (PHY 3110) Fall 2019
  - Physics Laboratory (PHY 2212L) Summer 2019
  - Introductory Physics (PHY 2211) Spring 2019
  - Physics Laboratory (PHY 2211L) Spring 2019
  - Introductory Physics (PHY 2211) Fall 2018
- **Louisiana State University (2015-2018)**
  - Instruct new undergraduate and graduate students and REU students
  - Guest lectures about neutron scattering techniques to graduate level students
  - Multiple presentation in workshops and professional meetings and weekly meetings
- **Boston College (2008-2014)**
  - Instruct new undergraduate, graduate and REU students
  - Teaching assistant for introductory and upper level physics courses
- **Damak Multiple Campus, Damak, Nepal (2005-2008)**
  - Teach multiple introductory and senior level undergraduate courses

Service

- Physics Department Student Award Committee
- Faculty selection committee (2019)

Awards & Honors

- GMAG outstanding graduate dissertation award (APS March Meeting 2014)
- DMP postdoctoral travel award (APS March Meeting 2018)

Publications

(Publications 33, citations 1351, h-index 18, i10-index 26)

(Undergraduate Students are Underlined)

After Joining KSU

(* corresponding author)

1. Karna, S.K., Tristant, D., Hebert, J.K., Cao, G., Chapai, R., Phelan, W.A., Zhang, Q., Wu, Y., **Dhital, C**., Li, Y. and Cao, H.B., 2020. Helical magnetic order and Fermi surface nesting in non-centrosymmetric ScFeGe. *arXiv preprint arXiv:2009.14387*. (Submitted)
2. **Dhital, C***. and DiTusa, J.F., 2020. Entropic signatures of the skyrmion lattice phase in $Mn\ Si_{1-x}\ Al_x$ and $Fe_{1-y}\ Co_y\ Si$. *Physical Review B*, ***102***(22), p.224408.
3. **Dhital, C***.; Pham, D.; Lawal, T.; Bucholz, C.; Poyraz, A.; Zhang, Q.; Nepal, R.; Jin, R.; Rai, R. Crystal and magnetic structure of polar oxide $HoCrWO_6$. *J Magn Magn Mater* **2020**, 167219.
4. **Dhital, C***.; DeBeer-Schmitt, L.; Young, D. P.; DiTusa, J. F. Unpinning the skyrmion lattice in MnSi: Effect of substitutional disorder. *Physical Review B* **2019**, *99*, 024428.
5. Wang, Z.; Okada, Y.; O'Neal, J.; Zhou, W.; Walkup, D.; **Dhital, C**.; Hogan, T.; Clancy, P.; Kim, Y.; Hu, Y. F. Disorder induced power-law gaps in an insulator–metal Mott transition. *Proceedings of the National Academy of Sciences* **2018**, *115*, 11198-11202.

Before Joining KSU

6. **Dhital, C***.; DeBeer-Schmitt, L.; Zhang, Q.; Xie, W.; Young, D. P.; DiTusa, J. F. Exploring the origins of the Dzyaloshinskii-Moriya interaction in MnSi. *Physical Review B* **2017**, *96*, 214425.
7. **Dhital, C***.; Khan, M. A.; Saghayezhian, M.; Phelan, W. A.; Young, D. P.; Jin, R. Y.; DiTusa, J. F. Effect of negative chemical pressure on the prototypical itinerant magnet MnSi. *Physical Review B* **2017**, *95*, 024407.

8. Abreu-Sepulveda, M. A.; **Dhital, C**.; Huq, A.; Li, L.; Bridges, C. A.; Paranthaman, M. P.; Narayanan, S. R.; Quesnel, D. J.; Tryk, D. A.; Manivannan, A. The influence of Fe substitution in lanthanum calcium cobalt oxide on the oxygen evolution reaction in alkaline media. *J. Electrochem. Soc.* **2016**, *163*, F1124.
9. Abreu-Sepúlveda, M.; Williams, D. E.; Huq, A.; **Dhital, C**.; Li, Y.; Paranthaman, M. P.; Zaghib, K.; Manivannan, A. Synthesis and characterization of substituted garnet and perovskite-based lithium-ion conducting solid electrolytes. *Ionics* **2016**, *22*, 317-325.
10. Torres-Castro, L.; Shojan, J.; Julien, C. M.; Huq, A.; **Dhital, C**.; Paranthaman, M. P.; Katiyar, R. S.; Manivannan, A. Synthesis, characterization and electrochemical performance of Al-substituted Li_2MnO_3. *Materials Science and Engineering: B* **2015**, *201*, 13-22.
11. Ruther, R. E.; Zhou, H.; **Dhital, C**.; Saravanan, K.; Kercher, A. K.; Chen, G.; Huq, A.; Delnick, F. M.; Nanda, J. Synthesis, structure, and electrochemical performance of high capacity $Li_2Cu_{0.5}Ni_{0.5}O_2$ cathodes. *Chemistry of Materials* **2015**, *27*, 6746-6754.
12. He, J.; Hogan, T.; Mion, T. R.; Hafiz, H.; He, Y.; Denlinger, J. D.; Mo, S. K.; **Dhital, C**.; Chen, X.; Lin, Q. Spectroscopic evidence for negative electronic compressibility in a quasi-three-dimensional spin–orbit correlated metal. *Nature materials* **2015**, *14*, 577-582.
13. He, J.; Hafiz, H.; Mion, T. R.; Hogan, T.; **Dhital, C**.; Chen, X.; Lin, Q.; Hashimoto, M.; Lu, D. H.; Zhang, Y. Fermi arcs vs. fermi pockets in electron-doped perovskite iridates. *Scientific reports* **2015**, *5*, 8533.
14. Graf, M. J.; Disseler, S. M.; **Dhital, C**.; Hogan, T.; Bojko, M.; Amato, A.; Luetkens, H.; Baines, C.; Margineda, D.; Giblin, S. R. In *In Magnetism and magnetic order in the pyrochlore iridates in the insulator-to-metal crossover region;* Journal of Physics: Conference Series; 2014; Vol. 551, pp 012020.
15. Liu, C.; Xu, S.; Alidoust, N.; Chang, T.; Lin, H.; **Dhital, C**.; Khadka, S.; Neupane, M.; Belopolski, I.; Landolt, G. Spin-correlated electronic state on the surface of a spin-orbit Mott system. *Physical Review B* **2014**, *90*, 045127.
16. **Dhital, C.;** Hogan, T.; Yamani, Z.; Birgeneau, R. J.; Tian, W.; Matsuda, M.; Sefat, A. S.; Wang, Z.; Wilson, S. D. Evolution of antiferromagnetic susceptibility under uniaxial pressure in $Ba(Fe_{1-x}Co_x)_2As_2$. *Physical Review B* **2014**, *89*, 214404.
17. DeMeo, D.; Shemelya, C.; Downs, C.; Licht, A.; Magden, E. S.; Rotter, T.; **Dhital, C**.; Wilson, S.; Balakrishnan, G.; Vandervelde, T. E. GaSb thermophotovoltaic cells grown on GaAs substrate using the interfacial misfit array method. *J Electron Mater* **2014**, *43*, 902-908.

18. **Dhital, C**.; Hogan, T.; Zhou, W.; Chen, X.; Ren, Z.; Pokharel, M.; Okada, Y.; Heine, M.; Tian, W.; Yamani, Z. Carrier localization and electronic phase separation in a doped spin-orbit-driven Mott phase in Sr 3 (Ir $_{1-x}$ Ru $_{x}$) $_{2}$ O $_{7}$. *Nature communications* **2014**, *5*, 1-7.

19. Okada, Y.; Serbyn, M.; Lin, H.; Walkup, D.; Zhou, W.; **Dhital, C**.; Neupane, M.; Xu, S.; Wang, Y. J.; Sankar, R. Observation of Dirac node formation and mass acquisition in a topological crystalline insulator. *Science* **2013**, *341*, 1496-1499.

20. Okada, Y.; Walkup, D.; Lin, H.; **Dhital, C**.; Chang, T.; Khadka, S.; Zhou, W.; Jeng, H.; Paranjape, M.; Bansil, A. Imaging the evolution of metallic states in a correlated iridate. *Nature materials* **2013**, *12*, 707-713.

21. **Dhital, C**.; Hogan, T.; Yamani, Z.; de la Cruz, C.; Chen, X.; Khadka, S.; Ren, Z.; Wilson, S. D. Neutron scattering study of correlated phase behavior in Sr $_{2}$ IrO $_{4}$. *Physical Review B* **2013**, *87*, 144405.

22. 20.Disseler, S. M.; Giblin, S. R.; **Dhital, C**.; Lukas, K. C.; Wilson, S. D.; Graf, M. J. Magnetization and Hall effect studies on the pyrochlore iridate Nd $_{2}$ Ir $_{2}$ O $_{7}$. *Physical Review B* **2013**, *87*, 060403.

23. **Dhital, C**.; Abernathy, D. L.; Zhu, G.; Ren, Z.; Broido, D.; Wilson, S. D. Inelastic neutron scattering study of phonon density of states in nanostructured Si $_{1-x}$ Ge $_{x}$ thermoelectrics. *Physical Review B* **2012**, *86*, 214303.

24. Okada, Y.; Zhou, W.; Walkup, D.; **Dhital, C**.; Wilson, S. D.; Madhavan, V. Ripple-modulated electronic structure of a 3D topological insulator. *Nature communications* **2012**, *3*, 1-6.

25. Okada, Y.; Zhou, W.; **Dhital, C.**; Walkup, D.; Ran, Y.; Wang, Z.; Wilson, S. D.; Madhavan, V. Visualizing Landau levels of Dirac electrons in a one-dimensional potential. *Phys. Rev. Lett.* **2012**, *109*, 166407.

26. **Dhital, C**.; Khadka, S.; Yamani, Z.; de la Cruz, C.; Hogan, T. C.; Disseler, S. M.; Pokharel, M.; Lukas, K. C.; Tian, W.; Opeil, C. P. Spin ordering and electronic texture in the bilayer iridate Sr $_{3}$ Ir $_{2}$ O $_{7}$. *Physical Review B* **2012**, *86*, 100401.

27. Disseler, S. M.; **Dhital, C.**; Amato, A.; Giblin, S. R.; de la Cruz, C.; Wilson, S. D.; Graf, M. J. Magnetic order in the pyrochlore iridates A $_{2}$ Ir $_{2}$ O $_{7}$ (A= Y, Yb). *Physical Review B* **2012**, *86*, 014428.

28. Disseler, S. M.; **Dhital, C**.; Hogan, T. C.; Amato, A.; Giblin, S. R.; de la Cruz, C.; Daoud-Aladine, A.; Wilson, S. D.; Graf, M. J. Magnetic order and the

electronic ground state in the pyrochlore iridate $Nd_2Ir_2O_7$. *Physical Review B* **2012**, *85*, 174441.

29. **Dhital, C.**; Yamani, Z.; Tian, W.; Zeretsky, J.; Sefat, A. S.; Wang, Z.; Birgeneau, R. J.; Wilson, S. D. Effect of uniaxial strain on the structural and magnetic phase transitions in $BaFe_2As_2$. *Phys. Rev. Lett.* **2012**, *108*, 087001.

30. Wilson, S. D.; Yamani, Z.; **Dhital, C**.; Freelon, B.; Freeman, P. G.; Fernandez-Baca, J. A.; Yamada, K.; Wakimoto, S.; Buyers, W.; Birgeneau, R. J. Zn-induced spin dynamics in overdoped $La_{2-x}Sr_xCu_{1-y}Zn_yO_4$. *Physical Review B* **2012**, *85*, 014507.

31. **Dhital, C**.; de La Cruz, C.; Opeil, C.; Treat, A.; Wang, K. F.; Liu, J.; Ren, Z. F.; Wilson, S. D. Neutron scattering study of magnetic phase separation in nanocrystalline $La_{5/8}Ca_{3/8}MnO_3$. *Physical Review B* **2011**, *84*, 144401.

32. Okada, Y.; **Dhital, C**.; Zhou, W.; Huemiller, E. D.; Lin, H.; Basak, S.; Bansil, A.; Huang, Y.; Ding, H.; Wang, Z. Direct observation of broken time-reversal symmetry on the surface of a magnetically doped topological insulator. *Phys. Rev. Lett.* **2011**, *106*, 206805.

33. Okada, Y.; **Dhital, C**.; Zhou, W.; Lin, H.; Basak, S.; Bansil, A.; Huang, Y.; Ding, H.; Wang, Z.; Wilson, S. D. Observation of novel interference patterns in $Bi_{2-x}Fe_xTe_{3-d}$ by Fourier transform scanning tunneling spectroscopy. *arXiv preprint arXiv:1011.4913* **2010**.

Professional Service

- Reviewing articles for peer- reviewed journals PRB, PRL, Communication Physics Nature
- Oak Ridge National Laboratory general proposal reviewer
- Regional science Olympiad judge
- Member of Neutron Scattering Society of America
- Chair for *emergent magnetism in correlated electron systems* session (APS March meeting 2020, session D41)
- Member of American Physical Society (APS)
- Judge for undergraduate research symposium Kennesaw State University (2020)

- Abstract Reviewer National Conference on Undergraduate Research

Workshops/Conference Abstracts/ Presentations/Invited Talks

(Undergraduate students are underlined)

1. C. Quick and **C. Dhital**, *Solid State Synthesis of Chiral Magnetic Alloys*; Undergraduate Research Symposium (Fall), Kennesaw State University, 2020.
2. American Association of Physics Teachers (AAPT) workshop, Oct 15-18, 2020.
3. *Online Course Design*, USG, 2 weeks asynchronous course, Virtual. Aug 24-Sep 5, 2020.
4. *workshop on Neutrons and Complementary Techniques for Quantum Materials* (Aug 18-21, 2020, Oak Ridge National Laboratory, virtual).
5. Faculty learning community (FLC) workshop (2020), Kennesaw State University
6. D. Pham, C. Bucholz, T. Lawal, **C. Dhital**, *Physical properties of polar magnetic oxide $HoFeWO_6$*; Undergraduate Research Symposium, Kennesaw State University, 2020.
7. C. Bucholz, D. Pham, T. Lawal, **C. Dhital**, *Physical properties of polar magnetic oxide $HoCrWO_6$*; Undergraduate Research Symposium, Kennesaw State University, 2020.
8. C. Bucholz, D. Pham, R. Rai and **C. Dhital**, *Synthesis and physical properties study of polar magnet $HoFeWO_6$,* APS March Meeting, 2020. (Abstract: **C71.00041**)
9. *Crystal structure and magnetic behavior of NdAlGe*, APS March Meeting, 2020. (Abstract: **H71.00323**)
10. *Structure-Property Relationship in Multiferroic Oxides*, University of Southern Alabama, 21 Nov 2019 (**Department Colloquium**).
11. *Hanover Research Workshop*, Kennesaw State University, Oct 2019.
12. *Maglab summer school*, National High Magnetic Field Laboratory, Tallahassee, FL (May 2019).

13. *Unpinning the skyrmion lattice in MnSi*, APS March Meeting 2019, Boston, MA. (Oral) (Abstract: **H41.00003)**
14. *Unconventional metallic phases from doped spin-orbit assisted Mott insulators*, APS regional Meeting Nov 2018, Knoxville, TN (**Invited talk**) (Abstract: **C02.00001)**
15. *Quantum Materials Young Investigator Workshop*, July 2018, Oak Ridge National Laboratory.
16. *Exploring magnetism in* $Mn_{1-x}Ir_xSi$, APS March Meeting 2018 (Oral) (Abstract: **B22.002**)
17. *Effect of chemical substitution on magnetic and charge transport behavior of MnSi*, APS March Meeting 2017 (Oral) (Abstract:**F50.009**)
18. *Workshop on Fundamentals of Quantum Materials*, University of Maryland, January 2017.
19. *Quantum phenomena using neutron scattering*, Neutron User Meeting, SNS, August, 2017).
20. *Magnetic Phase Diagram of Doped MnSi*, APS March Meeting 2016 (Oral) (Abstract:**X18.002**)
21. *Effect of negative pressure on the stability of skyrmion phase in MnSi*, MRS fall meeting 2016.
22. *Electronic Phase Separation and Magnetic Phase Behavior in the Ru-doped Spin-Orbit Mott Insulator* $Sr_3Ir_2O_7$, APS March Meeting 2014 (**GMAG Outstanding dissertation award Invited talk**). (Abstract:**A4.007**)
23. *Electronic and magnetic phase evolution in* $Sr_3(Ir_{1-x}Ru_x)_2O_7$, APS March Meeting 2013 (Oral).(Abstract:**B17.00006**)
24. *Effect of uniaxial strain on the structural and magnetic phase transitions in* $BaFe_2As_2$, APS March Meeting 2012 (Oral)(Abstract: **V22.00007**)
25. *Magnetic order in* $La1_{-x}Ca_xMnO_3$ *nanopowder*, APS March Meeting 2011 (Oral). (Abstract: **B17.00010**)
26. *Neutron and X-ray scattering summer school*, 2010.
27. A complete list of coauthored presentations can be found at https://scholar.google.com/citations?user=hEbr_o4AAAAJ&hl=en

Technical Skills

- **Material Synthesis**: Experienced in different high temperature solid state synthesis of polycrystalline and single crystalline materials

- **Neutron and X-ray scattering**: Expertise in neutron and x-ray scattering techniques to determine crystal and magnetic structure, spin and lattice dynamics
- **Magnetic and electrical transport measurement**: Experienced in measurements of electrical and magnetic measurements in extreme environments such as low temperature, high magnetic field and high pressure.
- **Softwares**: Origin, matlab, python, LaTex, crystal maker, VESTA, Rietveld refinement
- **Microscopy**: Magnetic force microscopy **(MFM)**

Short term visit to international facilities for experiments

- Oak Ridge National Laboratory, Oak Ridge, TN
- NIST, Maryland
- Argonne National Laboratory, Argonne, IL
- Chalk River Laboratory, Chalk River Canada
- Rutherford Appleton Laboratory (ISIS), Oxford, UK
- Leon Brillouin Laboratory (LLB), Saclay, France
- Fudan University, Shanghai, China
- National High Magnetic Field Laboratory, Tallahassee, FL

Funding applications

- **NSF DMR**: Investigation of interplay between topology and magnetism in non-centrosymmetric magnetic materials ($215,647) (Pending)
- **Internal**: Mentor protégé 2020-2021 ($ 3000) (Funded)
- **Internal**: Mentor protégé 2019-2020 ($ 3000) (Funded)
- **NSF RUI**: *synthesis and structure-property relationship study in multiferroic oxides* ($274073) (Not funded)
- **NSF MRI**: *Acquisition of Cryogen-Free Measurement System for Precision Characterization of Physical Properties (Vibrating sample magnetometer and dc resistivity option)* ($299775) (Co PI) (Not funded)
- **NSF MRI**: *Acquisition of Physical Property Measurement System (PPMS)* ($549757) (Senior personnel) (Not funded)

- **Internal I3**: *Quantum Information at room temperature* (PI) ($75000) (Not funded).

List of Mentored Undergraduate Students

- Duy Pham (KSU) (Spring 2019-continue)
- Taofik Lawal (KSU) (Spring 2019, continue)
- Christian Bucholz (KSU) (Fall 2019-continue)
- Connor Quick (KSU) (Fall 2020 -continue)