

## **Madhav Prasad Ghimire, PhD**

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### **EDUCATION**

- **Doctor of Philosophy (Ph.D.) in Physics**, 12<sup>th</sup> November, 2010

**Supervisor: Prof. Dr. R. K. Thapa**

**Topic:** A theoretical study of photofield emission and band structure calculations

*Department of Physics, Mizoram University, Aizawl, India*

<http://mzuir.inflibnet.ac.in/handle/123456789/171>

- **Master of Science (M. Sc.) Physics** (Solid State Physics), 4<sup>th</sup> June, 2003

**Supervisor: Prof. Dr. Sanjay Kumar**

**Topic:** Series analysis and critical phenomena

*Central Department of Physics, Banaras Hindu University, Varanasi, India*

- **Bachelor of Science (B. Sc.) Physical Science**, (Phys., Stat., Maths.), 3<sup>rd</sup> July, 2001

Subjects: Physics, Statistics, Mathematics

*Pachhunga University College, North-Eastern Hill University, Shillong, India*

### **PROFESSIONAL POSITIONS (for the last 10+ years)**

**Central Department of Physics, Tribhuvan University, Kathmandu, Nepal**

*Associate Prof. in Physics*

*August, 2018 – Present*

**Leibniz Institute for Solid State and Materials Research, IFW- Dresden, Germany**

*Alexander von Humboldt Post-doctoral Fellow July, 2015 – July, 2018*

**National Institute for Materials Science (NIMS), Tsukuba, Japan**

*NIMS Post-Doctoral Researcher*

*Feb. 2012 – August 2014*

**Nepal Academy of Science and Technology (NAST), Lalitpur, Nepal**

*Senior Scientific Officer*

*April, 2011 – Jan. 2012*

**Bose Institute, Kolkata, India [NAST-INSAs Bilateral exchange program]**

*Visiting Scientist (supported by INSA, India) November, 2011 – December, 2011*

## COURSES TAUGHT AT THE HOME INSTITUTION (Tribhuvan University)

- Electrodynamics [PHY554 & PHY602] - M. Sc compulsory course (II & III-Semester)
- Computational Physics Lab [PHY604] - M. Sc compulsory course (III-Semester)
- Advanced Solid State Physics [PHY611 & PHY661] - M. Sc elective course (III & IV-Semester)

## SUPERVISION/ MENTORING STUDENTS

- Ph.D. students who completed: Dr. Shalika Ram Bhandari
- Supervising Ph.D. students in Tribhuvan University:
  - Mr. Gang Ram Acharya (since 2019)
  - Mr. Deergh Bahadur Shahi (since 2020)
  - Mr. Dipak Bhattarai (since 2020)
  - Ms. Sarita Lawaju (since 2022)
  - Mr. Ram Babu Ray (as co-supervisor since 2018)
  - Ms. Kalpana Gyawali (as co-supervisor since 2021)
  - Mr. Rajesh Maharjan (as co-supervisor since 2021)
- Supervised 25 Master thesis students.
  - 8 of them have enrolled for PhD program in several universities of USA
  - 1 joined with me for her PhD
- Supervised Mr. Shalika Ram Bhandari for the UGC-Mini Research Project (2015)
- Supervised M. Sc. (Physics) of Mr. Anup Pradhan Shakya from Mizoram University, India, 2009-2010

## PUBLICATIONS:

Total citations for all the publications (as of 5 Nov. 2023)	1785
Total number of articles published	80 +

## 25 Significant publication with citation information:

Sl. No.	Authors, title of the article, Journal Publication information
1	B. P. Belbase, L. Ye, B. Karki, J. I. Facio, J.-S. You, J. G. Checkelsky, J. van den Brink, and <b>M. P. Ghimire*</b> , Large anomalous Hall effect in single crystals of the kagome Weyl ferromagnet $\text{Fe}_3\text{Sn}$ , <i>Phys. Rev. B</i> <b>108</b> , 075164 (2023).
2	P. E. Siegfried, H. Bhandari, J. Qi, R. Ghimire, J. Joshi, Z. T. Messegee, W. Beeson, K. Liu, <b>M. P. Ghimire</b> , Y. Dang, H. Zhang, A. Davydov, X. Tan, P. M. Vora, I. I. Mazin, and N. J. Ghimire, $\text{CoTe}_2$ : A Quantum Critical Dirac Metal with Strong Spin Fluctuations, <i>Adv. Mater.</i> <b>35</b> , 2300640 (2023).
3	B. Rasche, J. Brunner, T. Schramm, <b>M. P. Ghimire</b> , U. Nitzsche, B. Buchner, R. Giraud, M. Richter, and J. Dufouleur, Determination of Cleavage Energy and Efficient Nanostructuring of Layered Materials by Atomic Force Microscopy, <i>Nano Lett.</i> <b>22</b> , 3550 (2022).
4	B. Karki, B. P. Belbase, G. B. Acharya, S. Singh, and <b>M. P. Ghimire*</b> , Pressure-induced creation and annihilation of Weyl points in $\text{Td-Mo}_{0.5}\text{W}_{0.5}\text{Te}_2$ and $1\text{T}'\text{-Mo}_{0.5}\text{W}_{0.5}\text{Te}_2$ , <i>Phys. Rev. B</i> <b>105</b> , 125138 (2022).
5	P. E. Siegfried, H. Bhandari, D. C. Jones, <b>M. P. Ghimire</b> , R. L. Dally, L. Poudel, M. Bleuel,

	J. W. Lynn, I. I. Mazin, and N. J. Ghimire, Magnetization-driven Lifshitz transition and charge-spin coupling in the kagome metal $\text{YMn}_6\text{Sn}_6$ , <i>Comm. Phys.</i> <b>5</b> , s42005-022-00833-2 (2022).
6	D. C. Jones, S. Das, H. Bhandari, X. Liu, P. Siegfried, <b>M. P. Ghimire</b> , S. S. Tsirkin, I. I. Mazin, and N. J. Ghimire, Origin of spin reorientation and intrinsic anomalous Hall effect in the kagome ferrimagnet $\text{TbMn}_6\text{Sn}_6$ , arXiv:2203.17246 (2022).
7	Z. Ren, H. Li, S. Sharma, D. Bhattarai, H. Zhao, B. Rachmilowitz, F. Bahrami, F. Tafti, S. Fang, <b>M. P. Ghimire</b> , Z. Wang, and I. Zeljkovic, Plethora of tunable Weyl fermions in kagome magnet $\text{Fe}_3\text{Sn}_2$ thin films, <i>NPJ Quant. Mat.</i> <b>7</b> , 109 (2022).
8	M. Han, H. Inoue, S. Fang, C. John, L. Ye, M. K. Chan, D. Graf, T. Suzuki, <b>M. P. Ghimire</b> , W. J. Cho, E. Kaxiras, and J. G. Checkelsky “Evidence of two-dimensional flat band at the surface of antiferromagnetic kagome metal $\text{FeSn}$ ” <i>Nat. Commun.</i> <b>12</b> , 5345 (2021).
9	S. Fang, L. Ye, <b>M. P. Ghimire</b> , M. Kang, J. Liu, L. Fu, M. Richter, J. van den Brink, E. Kaxiras, R. Comin, and J. G. Checkelsky, Ferromagnetic helical nodal line and Kane-Mele spin-orbit coupling in kagome metal $\text{Fe}_3\text{Sn}_2$ , <i>Phys. Rev. B</i> <b>105</b> , 035107 (2022).
10	D. R. Jaishi, N. Sharma, B. Karki, B. P. Belbase, R. Adhikari, and <b>M. P. Ghimire*</b> , “Electronic structure and thermoelectric properties of half-Heusler alloys $\text{NiTZ}$ ” <i>AIP Adv.</i> <b>11</b> , 025304 (2021).
11	D. P. Rai, T. V.Vu, A. Laref, <b>M. P. Ghimire</b> , P. K. Patra, and S. Srivastava, Electronic and optical properties of 2D monolayer (ML) $\text{MoS}_2$ with vacancy defect at S sites, <i>Nano-Structures &amp; Nano-Objects</i> <b>21</b> , 100404 (2020).
12	S. R. Bhandari, D. K. Yadav, B. P. Belbase, M. Zeeshan, B. Sadhukhan, D. P. Rai, R. K. Thapa, G. C. Kaphle, and <b>M. P. Ghimire*</b> , Electronic, magnetic, optical and thermoelectric properties of $\text{Ca}_2\text{Cr}_{1-x}\text{Ni}_x\text{OsO}_6$ double perovskites, <i>RSC Adv.</i> , <b>10</b> , 16179-16186 (2020)
13	M. Kang, L. Ye, S. Fang, J.-S. You, A. Levitan, M. Han, J. I. Facio, C. Jozwiak, A. Bostwick, E. Rotenberg, M. K. Chan, R. D. McDonald, D. Graf, K. Kaznatcheev, E. Vescovo, D. C. Bell, E. Kaxiras, J. van den Brink, M. Richter, <b>M. P. Ghimire</b> , J. G. Checkelsky, and R. omin, “Dirac fermions and flat bands in the ideal kagome metal $\text{FeSn}$ ” <i>Nat. Mater.</i> <b>19</b> , 163 (2020).
14	<b>M. P. Ghimire</b> , J. I. Facio, J.-S. You, L. Ye, J. G. Checkelsky, S. Fang, E. Kaxiras, M. Richter and J. van den Brink, Creating Weyl nodes and controlling their energy by magnetization rotation” <i>Phys. Rev. Research</i> <b>1</b> , 032044 (R) (2019) <b>Rapid Comm.</b>
15	H. L. Feng, <b>M. P. Ghimire</b> , Z. Hu, S.-C. Liao, S. Agrestini, J. Chen, Y. Yuan, Y. Matsushita, Y. Tsujimoto, Y. Katsuya, M. Tanaka, H.-J. Lin, C.-T. Chen, S.-C. Weng, M. Valvidares, K. Chen, F. Baudalet, A. Tanaka, M. Greenblatt, L. H. Tjeng, and K. Yamaura, Room-temperature ferrimagnetism of anti-site-disordered $\text{Ca}_2\text{MnOsO}_6$ , <i>Phys. Rev. Materials</i> <b>3</b> , 124404 (2019)
16	J. Zeisner, A. Alfonsov, S. Selter, S. Aswartham, <b>M. P. Ghimire</b> , M. Richter, J. van den Brink, B. Buchner, and V. Kataev, “Magnetic anisotropy and spin-polarized two-dimensional electron gas in the van der Waals ferromagnet $\text{Cr}_2\text{Ge}_2\text{Te}_6$ ” <i>Phys. Rev. B</i> <b>99</b> , 165109 (2019).
17	<b>M. P. Ghimire*</b> , and M. Richter, “Chemical gating of a weak topological insulator: $\text{Bi}_{14}\text{Rh}_3\text{I}_9$ ” <i>Nano Lett.</i> <b>17</b> , 6303 (2017).
18	H. L. Feng, S. Calder, <b>M. P. Ghimire*</b> , Y.-H. Yuan, Y. Shirako, Y. Tsujimoto, Y. Matsushita,

	Z. Hu, C.-Y. Kuo, L. H. Tjeng, T.-W. Pi, Y.-L. Soo, J. He, M. Tanaka, Y. Katsuya, M. Richter, and K. Yamaura “Ba <sub>2</sub> NiOsO <sub>6</sub> : A Dirac-Mott insulator with ferromagnetism near 100 K” <i>Phys. Rev. B</i> <b>94</b> , 235158 (2016).
19	<b>M. P. Ghimire*</b> , and X. Hu “Compensated half metallicity in osmium double perovskite driven by doping effects” <i>Mater. Res. Express</i> <b>3</b> , 106107 (2016).
20	<b>M. P. Ghimire</b> , L.-H. Wu, and X. Hu “Possible half-metallic antiferromagnetism in an iridium double-perovskite material” <i>Phys. Rev. B</i> <b>93</b> , 134421 (2016).
21	<b>M. P. Ghimire*</b> , L. H. Wu, and X. Hu “Half metallic ferrimagnetism in hole-doped lanthanide iridates” <i>J. Supercond. Nov. Magn.</i> <b>28</b> , 917-919 (2015).
22	<b>M. P. Ghimire*</b> , R. K. Thapa, D. P. Rai, Sandeep, T. P. Sinha, and X. Hu “Half metallic ferromagnetism in tri-layered perovskites Sr <sub>4</sub> T <sub>3</sub> O <sub>10</sub> (T=Co, Rh)” <i>J. Appl. Phys.</i> <b>117</b> , 063903 (2015).
23	Y. Yahua, H. Feng, <b>M. P. Ghimire</b> , Y. Matshushita, Y. Tsujimoto, J. He, M. Tanaka, Y. Katsuya, and K. Yamaura “High-pressure synthesis, crystal structure, and magnetic properties of 5d double perovskite oxides Ca <sub>2</sub> MgOsO <sub>6</sub> and Sr <sub>2</sub> MgOsO <sub>6</sub> ” <i>Inorg. Chem.</i> <b>54</b> , 3422-3431 (2015).
24	<b>M. P. Ghimire*</b> , Sandeep, T. P. Sinha, and R. K. Thapa “First principles study of the electronic and magnetic properties of semi-Heusler alloys NiXSb (X=Ti, V, Cr and Mn)” <i>J. Alloys Compds.</i> <b>509</b> , 9742-9752 (2011).
25	<b>M. P. Ghimire</b> , Sandeep, and R. K. Thapa “Study of the electronic properties of CrO <sub>2</sub> using density functional theory” <i>Mod. Phys. Letts. B</i> <b>24</b> , 2187-2193 (2010).

Note: Asterix (\*) in the publication represents for the articles where I was the corresponding author.

### Organizing National & International Conferences/Workshops

(as a convener being at the home institution: Tribhuvan University)

- i) Workshop on Computational Materials Engineering and Scientific Writing (2018)
- ii) International Workshop on Quantum Espresso and Data Visualization (2020)
- iii) Refresher Course on Material Science (2021)
- iv) International Workshop on Computational Materials Engineering (2021)
- v) Kathmandu Humboldt Kolleg (KHK-2022): Interdisciplinary collaboration for strengthening science and culture (2022)

### EDITORIAL RESPONSIBILITY

- i) Editor: Journal of Institute of Science and Technology, Tribhuvan University (2021 onwards)
- ii) Coordinator: Symmetry (An annual magazine of the Central Department of Physics, Tribhuvan University)
- iii) Topical Editor: CRYSTALS (MDPI Publisher’s) – 2020 - 2022
- iv) International Advisory Board: SENHRI Journal of Multidisciplinary Studies, India (2020-2022).
- v) Associate Editor (2016): Journal of Physics: Conference Series, Vol. 765, 24th Condensed Matter Days National Conference (CMDAYS2016), (Oct 2016). DOI:10.1088/1742-6596/765/1/011001

vi) Editorial Board Member, Nepal Physical Society (2011-2012)

### **INTERNATIONAL CONFERENCE PARTICIPATION AS SPEAKER (8 significant presentations)**

- DPG Spring Meeting in Dresden, Germany (March, 2017) – Contributory talk
- March Meeting of American Physical Society (2017, 2019, 2021) – Contributory talk
- International Seminar on Correlative Advancement on Analytical and Applied Physics (Oct. 2019) – Keynote Speaker
- International Conference on Recent Advances in Energy Materials and its Applications (May, 2023) – Invited Speaker
- Third International Conference on Mathematical Modelling and Simulations in Physical Science, (June 2023) India – Plenary Speaker
- Kathmandu Humboldt-Kolleg 2022, (Oct. 2022) Kathmandu – Invited Speaker

### **PROFESSIONAL HONORS, AWARDS & FELLOWSHIPS**

- AvH Renewed Research Grant (2023)
- UGC Collaborative Research Grant (2022-2024)
- AvH Book Grants (2022)
- UNESCO-TWAS Research Grant (2021-2023)
- AvH Equipments Grant (2020)
- Indian Science and Research Fellowship (ISRF) Award (2019-2020)
- Fast Track SEED Grant under HERP DLI-7B, Tribhuvan University (2018-2019)
- Vidhya Bhusan-Ka Medal from the President of Nepal (2018)
- Humboldt Postdoctoral Award (HERMES), Alexander von Humboldt Foundation, Germany, November (2015-2018)
- Nominated for the 66th Lindau Nobel Laureate Meeting (2016)
- TWAS Award (for Physics), Third World Academy of Sciences, Italy (2011)
- Young Scientist Scholarship awarded for the VASP Workshop, France, August (2016)
- Awarded the NAST-INSA Bilateral Exchange Program, INSA, India (2011)

### **PROFESSIONAL SERVICE**

- Research Implementation Committee Member, The Assessment of online Teaching and Learning (Digital Pedagogy) Intervention on Student Engagement and Learning Achievement in Tribhuvan University (During COVID – 19) 22 May, 2022 – Oct. 2023
- Member, Policy formation of Young Scientist Research Grant Support 2079, NAST, Nepal (Sept. 2022 – April 2023)
- Member, NAST Award Selection Committee 2079-2080, NAST, Nepal (25 August, 2023 - present)
- Member, Grading System and the Academic Transcript for the Bachelor and Masters' Level of Manmohan Technical University (Dec. 2022 – Jan. 2023)
- Facilitator, Strengthening the Semester System: Making Major Shifts, Tribhuvan University (Sept. 2018 - May, 2019)
- Founder, Tribhuvan University Supercomputer (August, 2021). Facilitating the computing facilities to faculties, researchers and students of Tribhuvan University and Kathmandu University since November, 2021.

## COMMUNITY SERVICE

- National service scheme
- Red Cross Society
- Facilitator in Scientific Writing & Teaching
- Adviser to School level teaching, etc.

## RESEARCH INTERESTS

- Topological phase transition in kagome systems and prediction of magnetic Weyl semi-metals
- Thin-film deposition of magnetic ions in weak and strong topological insulators
- Magnetic anisotropies energies in two-dimensional (2D) and 3D systems.
- Surface and interfacial properties of 2D materials including bismuth-rhodates
- Chemical gating and doping in weak topological insulators for transport experiments
- Energy efficient materials for thermoelectric applications
- Electronic and magnetic properties of complex oxides (perovskites, etc.)

## ACADEMIC WORKSHOPS/ TRAINING

- NVIDIA DLI Certificate Course Completed  
31-10-2022
- Vienna Ab initio Simulation Package (VASP): DFT code  
31-08-2016 to 07-09-2016      Rennes, France
- Universal Structure Predictor: Evolutionary Xtallography (USPEX)  
20-01-2015 to 25-01-2015      Delhi, India
- Full-Potential Local Orbital (FPLO) code  
04-11-2013 to 08-11-2013      Dresden, Germany  
13-11-2017 to 17-11-2017      Dresden, Germany
- 19<sup>th</sup> WIEN2k Workshop (A Full-Potential code for DFT calculations)  
03-09-2012 to 08-09-2012      Tokyo, Japan
- Experimental collaboration: Synthesis of double perovskites oxides  
07-11-2011 to 17-12-2011      Bose Institute, Kolkata, India
- FORTRAN Programming      24-11-2010 to 26-11-2010      Mizoram, India

## REVIEWER OF JOURNALS:

- Nature (Nature Publishing Group); Physical Review Letters (APS Publishers); Physical Review B (APS Publishers); Physical Review Materials (APS Publishers); Applied Physics Letters (AIP Publishers); Euro Physics Letters (IOP Publishers); RSC Advances, PCCP (RSC Publishers); Elsevier journals, ...