

References

- [1] M. Z. Hasan and C. L. Kane, “Colloquium: Topological insulators,” *Rev. Mod. Phys.*, 2010, vol. 82, no. 4, pp. 3045–3067.
- [2] C.-Z. Chang *et al.*, “Experimental Observation of the Quantum Anomalous Hall Effect in a Magnetic Topological Insulator Downloaded from,” www.sciencemag.org Sci., 2013, vol. 340, pp. 167–170.
- [3] J. E. Moore, “The birth of topological insulators,” *Nature*, 2010, vol. 464, no. 7286, pp. 194–198.
- [4] Y. Xia *et al.*, “Observation of a large-gap topological-insulator class with a single Dirac cone on the surface,” *Nat. Phys.*, 2009, vol. 5, no. 6, pp. 398–402.
- [5] D. Hsieh *et al.*, “A tunable topological insulator in the spin helical Dirac transport regime,” *Nature*, 2009, vol. 460, no. 7259, pp. 1101–1105.
- [6] H. Zhang, C. X. Liu, X. L. Qi, X. Dai, Z. Fang, and S. C. Zhang, “Topological insulators in Bi_2Se_3 , Bi_2Te_3 and Sb_2Te_3 with a single Dirac cone on the surface,” *Nat. Phys.*, 2009, vol. 5, no. 6, pp. 438–442.
- [7] K. V. Klitzing, G. Dorda, and M. Pepper, “New method for high-accuracy determination of the fine-structure constant based on quantized hall resistance,” *Phys. Rev. Lett.*, 1980, vol. 45, no. 6, pp. 494–497.
- [8] D. J. Thouless, M. Kohmoto, M. P. Nightingale, and M. Den Nijs, “Quantized hall conductance in a two-Dimensional periodic potential,” *Phys. Rev. Lett.*, 1982, vol. 49, no. 6, pp. 405–408.
- [9] E. H. Hall, “On a New Action of the Magnet on Electric Currents,” *Am. J. Math.*, 1879, vol. 2, no. 3, p. 287.
- [10] D. R. Cooper *et al.*, “Experimental Review of Graphene,” *ISRN Condens. Matter Phys.*, 2012, vol. 2012, pp. 1–56.
- [11] C. L. Kane and E. J. Mele, “Quantum Spin Hall Effect in Graphene,” 2005, vol. 95, pp. 226801.
- [12] H. Buhmann, “The quantum spin Hall effect,” *J. Appl. Phys.*, 2011, vol. 109, pp. 102409.
- [13] B. A. Bernevig, T. L. Hughes, and S. C. Zhang, “Quantum spin hall effect and topological phase transition in HgTe quantum wells,” *Science (80-.)*, 2006, vol. 314, no. 5806, pp. 1757–1761.
- [14] M. König *et al.*, “Quantum spin hall insulator state in HgTe quantum wells,” *Science (80-.)*, 2007, vol. 318, no. 5851, pp. 766–770.
- [15] H. Weng, R. Yu, X. Hu, X. Dai, and Z. Fang, “Quantum anomalous Hall effect and

References

- related topological electronic states," *Adv. Phys.*, 2015, vol. 64, no. 3, pp. 227–282.
- [16] E. H. Hall, "XVIII. On the ‘Rotational Coefficient’ in nickel and cobalt," *London, Edinburgh, Dublin Philos. Mag. J. Sci.*, 1881, vol. 12, no. 74, pp. 157–172.
- [17] N. Nagaosa and Y. Tokura, "Topological properties and dynamics of magnetic skyrmions," *Nature Nanotechnology*, 2013, vol. 8, no. 12, pp. 899–911.
- [18] T. Suzuki *et al.*, "Large anomalous Hall effect in a half-Heusler antiferromagnet," *Nat. Phys.*, 2016, vol. 12, no. 12, pp. 1119–1123.
- [19] S. S-L Zhang and O. Heinonen, "Topological Hall effect in diffusive ferromagnetic thin films with spin-flip scattering," *Phys. Rev. B*, 2018, vol. 97, pp. 134401.
- [20] H. C. Manoharan, "Topological insulators: A romance with many dimensions," *Nat. Nanotechnol.*, 2010, vol. 5, no. 7, pp. 477–479.
- [21] D. Shoenberg, *Magnetic Oscillations in Metals*. Cambridge: Cambridge University Press, 1984.
- [22] Y. Ando, "Topological insulator materials," *Journal of the Physical Society of Japan*, 2013, vol. 82, no. 10, pp. 102001-1-32.
- [23] S. Hikami, A. I. Larkin, and Y. O. Nagaoka, "Spin-Orbit Interaction and Magnetoresistance in the Two Dimensional Random System," *Progress Letters*, 1980.
- [24] M. Brahlek, N. Koirala, N. Bansal, and S. Oh, "Transport properties of topological insulators: Band bending, bulk metal-to-insulator transition, and weak anti-localization," *Solid State Commun.*, 2015, vol. 215–216, no. 1, pp. 54–62.
- [25] C. Liu, T. L. Hughes, X. L. Qi, K. Wang, and S. C. Zhang, "Quantum spin hall effect in inverted type-II semiconductors," *Phys. Rev. Lett.*, 2008, vol. 100, no. 23, pp. 236601.
- [26] D. Hsieh *et al.*, "A topological Dirac insulator in a quantum spin Hall phase," *Nature*, 2008, vol. 452, no. 7190, pp. 970–974.
- [27] Y. L. Chen *et al.*, "Experimental Realization of a Three-Dimensional Topological Insulator, Bi_2Te_3 ," *Science*, 2009, vol. 325, no. 5937, pp. 178-181.
- [28] D. Hsieh *et al.*, "Observation of time-reversal-protected single-dirac-cone topological-insulator states in Bi_2Te_3 and Sb_2Te_3 ," *Phys. Rev. Lett.*, 2009, vol. 103, no. 14, pp.146401.
- [29] L. A. Wray *et al.*, "A topological insulator surface under strong Coulomb, magnetic and disorder perturbations," *Nat. Phys.*, 2011 vol. 7, no. 1, pp. 32–37.
- [30] Y. L. Chen *et al.*, "Massive dirac fermion on the surface of a magnetically doped

References

- topological insulator," *Science* (80-.)., 2010, vol. 329, no. 5992, pp. 659–662.
- [31] Y. S. Hor *et al.*, "Development of ferromagnetism in the doped topological insulator $\text{Bi}_{2-x}\text{Mn}_x\text{Te}_3$," *Phys. Rev. B - Condens. Matter Mater. Phys.*, 2010, vol. 81, no. 19, pp. 195203.
- [32] Y. S. Hor *et al.*, "Superconductivity in $\text{Cu}_x\text{Bi}_2\text{Se}_3$ and its Implications for Pairing in the Undoped Topological Insulator," *PRL*, 2010, vol. 104, pp. 57001.
- [33] J. L. Zhang *et al.*, "Pressure-induced superconductivity in topological parent compound Bi_2Te_3 ," *Proc. Natl. Acad. Sci.*, 2011, vol. 108, no. 1, pp. 24–28.
- [34] B. Yan and C. Felser, "Topological Materials: Weyl Semimetals," *Annu. Rev. Condens. Matter Phys.*, 2017, vol. 8, pp. 337–54.
- [35] H. Weng, X. Dai, Z. Fang, N. Xu, H. Ding, and M. Shi, "Physica Scripta Topological insulators, topological superconductors and Weyl fermion semimetals: discoveries, perspectives and outlooks Related content Topological semimetals predicted from first-principles calculations Spin-and angle-resolved photoemission on the topological Kondo insulator candidate: SmB₆," *Phys. Scr.*, 2015, pp. 14001.
- [36] H. Weyl, "GRAVITATION AND THE ELECTRON," *Proc. Natl. Acad. Sci.*, 1929, vol. 15, no. 4, pp. 323 LP – 334.
- [37] P. A. M. DIRAC, "The Quantum Theory of the Electron," in *Special Theory of Relativity*, 1970, vol. 43, pp. 237–256.
- [38] Y. Sun, S.-C. Wu, M. N. Ali, C. Felser, and B. Yan, "Prediction of Weyl semimetal in orthorhombic MoTe₂," *RAPID Commun. Phys. Rev. B*, vol. 92, p. 161107, 2015, doi: 10.1103/PhysRevB.92.161107.
- [39] T. Bzdušek, A. Rüegg, and M. Sigrist, "Weyl semimetal from spontaneous inversion symmetry breaking in pyrochlore oxides," *Phys. Rev. B*, 2015, vol. 91, pp. 165105.
- [40] D. F. Xu *et al.*, "Observation of Fermi Arcs in Non-Centrosymmetric Weyl Semi-Metal Candidate NbP," *Chinese Phys. Lett.*, 2015, vol. 32, no. 10, pp. 107101.
- [41] S. Y. Xu *et al.*, "Discovery of a Weyl fermion state with Fermi arcs in niobium arsenide," *Nat. Phys.*, 2015, vol. 11, no. 9, pp. 748–754.
- [42] S. Jia *et al.*, "Low-carrier-concentration crystals of the topological insulator $\text{Bi}_2\text{Te}_2\text{Se}$," *Phys. Rev. B*, 2011, vol. 84, pp. 235206.
- [43] Z. Li *et al.*, "Weyl Semimetal TaAs: Crystal Growth, Morphology, and Thermodynamics," *Cryst. Growth Des.*, 2016, vol. 16, no. 3, pp. 1172–1175.
- [44] W. H. Bragg, "The reflection of X-rays by crystals [3]," *Nature*, 1913, vol. 91, no. 2280, pp. 477.

References

- [45] Q. Design, “Magnetic Property Measurement System MPMS 3 User’s Manual,” *Measurement*, 2016, no. 1017, pp. 56.
- [46] H. Hertz, “Ueber sehr schnelle electrische Schwingungen,” *Ann. Phys.*, 1887, vol. 267, no. 7, pp. 421–448.
- [47] A. Einstein, “Über die von der molekularkinetischen Theorie der Wärme geforderte Bewegung von in ruhenden Flüssigkeiten suspendierten Teilchen,” *Ann. Phys.*, 1905, vol. 322, no. 8, pp. 549–560.
- [48] J. Walton and N. Fairley, “Quantitative surface chemical-state microscopy by x-ray photoelectron spectroscopy,” *Surf. Interface Anal.*, 2004, vol. 36, no. 1, pp. 89–91.
- [49] N. Nagaosa, J. Sinova, S. Onoda, A. H. MacDonald, and N. P. Ong, “Anomalous Hall effect,” *Rev. Mod. Phys.*, 2010, vol. 82, no. 2, pp. 1539–1592.
- [50] P. Bruno, V. K. Dugaev, and M. Taillefumier, “Topological Hall effect and Berry phase in magnetic nanostructures,” *Phys. Rev. Lett.*, 2004, vol. 93, no. 9, pp. 1–4.
- [51] S. Mühlbauer *et al.*, “Skyrmion lattice in a chiral magnet,” *Science*, 2009, vol. 323, no. 5916, pp. 915–919.
- [52] X. Z. Yu *et al.*, “Near room-temperature formation of a skyrmion crystal in thin-films of the helimagnet FeGe.,” *Nat. Mater.*, 2011, vol. 10, no. 2, pp. 106–109.
- [53] O. Boulle *et al.*, “Room-temperature chiral magnetic skyrmions in ultrathin magnetic nanostructures,” *Nat. Nanotechnol.*, 2016, vol. 11, pp. 449–454.
- [54] S. X. Huang and C. L. Chien, “Extended Skyrmion Phase in Epitaxial $\text{FeGe}(111)$ Thin Films,” *Phys. Rev. Lett.*, 2012, vol. 108, no. 26, pp. 267201.
- [55] Y. Li *et al.*, “Robust Formation of Skyrmions and Topological Hall Effect Anomaly in Epitaxial Thin Films of MnSi,” *Phys. Rev. Lett.*, 2013, vol. 110, no. 11, pp. 117202.
- [56] M. König *et al.*, “Quantum spin hall insulator state in HgTe quantum wells,” *Science* (80-.), 2007, vol. 318, no. 5851, pp. 766–770.
- [57] J. Ye, Y. B. Kim, A. J. Millis, B. I. Shraiman, P. Majumdar, and Z. Tešanović, “Berry Phase Theory of the Anomalous Hall Effect: Application to Colossal Magnetoresistance Manganites,” *Phys. Rev. Lett.*, 1999, vol. 83, no. 18, pp. 3737–3740.
- [58] S. Ishiwata *et al.*, “Versatile helimagnetic phases under magnetic fields in cubic perovskite SrFeO_3 ,” *Phys. Rev. B*, 2011, vol. 84, p. 54427.
- [59] Y. Machida, S. Nakatsuji, Y. Maeno, T. Tayama, T. Sakakibara, and S. Onoda, “Unconventional Anomalous Hall Effect Enhanced by a Noncoplanar Spin Texture

References

- in the Frustrated Kondo Lattice $\text{Pr}_2\text{Ir}_2\text{O}_7$,” 2007, vol. 98, pp. 057203.
- [60] C. Sürgers, G. Fischer, P. Winkel, and H. v. Löhneysen, “Large topological Hall effect in the non-collinear phase of an antiferromagnet,” *Nat. Commun.*, 2014, vol. 5, no. 1, pp. 3400.
- [61] A. Singh, A. K. Ghosh, and S. Chatterjee, “Antiferromagnetic Ordering at Room Temperature in Co-Doped Sb_2Te_3 Topological Insulators,” *J. Supercond. Nov. Magn.*, 2018, vol. 31, no. 2, pp. 299–305.
- [62] R. Singh *et al.*, “Unusual negative magnetoresistance in $\text{Bi}_2\text{Se}_3\text{-ySy}$ topological insulator under perpendicular magnetic field,” *Appl. Phys. Lett.*, 2018, vol. 112, no. 10, pp. 1–6.
- [63] H. Chen, Q. Niu, and A. H. MacDonald, “Anomalous Hall Effect Arising from Noncollinear Antiferromagnetism,” *Phys. Rev. Lett.*, 2014, vol. 112, no. 1, pp. 17205.
- [64] Y. Tian, L. Ye, and X. Jin, “Proper scaling of the anomalous hall effect,” *Phys. Rev. Lett.*, 2009, vol. 103, no. 8, pp. 087206.
- [65] N. A. Porter, J. C. Gartside, and C. H. Marrows, “Scattering mechanisms in textured FeGe thin films: Magnetoresistance and the anomalous Hall effect,” *Phys. Rev. B*, 2014, vol. 90, pp. 24403.
- [66] J. C. Gallagher *et al.*, “Robust Zero-Field Skyrmion Formation in FeGe Epitaxial Thin Films,” *Phys. Rev. Lett.*, 2017, vol. 118, pp. 027201.
- [67] Y. Ohuchi, Y. Kozuka, M. Uchida, K. Ueno, A. Tsukazaki, and M. Kawasaki, “Topological Hall effect in thin films of the Heisenberg ferromagnet EuO,” *Phys. Rev. B*, 2015, vol. 91, no. 24, p. 245115.
- [68] N. Kanazawa *et al.*, “Large Topological Hall Effect in a Short-Period Helimagnet MnGe,” *Phys. Rev. Lett.*, 2011, vol. 106, pp. 156603.
- [69] S. Aminorroaya-Yamini, C. Zhang, X. Wang, and I. Nevirkovets, “Crystal structure, electronic structure and thermoelectric properties of n-type BiSbSTe_2 ,” *J. Phys. D. Appl. Phys.*, 2012, vol. 45, no. 12, pp. 125301.
- [70] W. Shi, L. Zhou, S. Song, J. Yang, and H. Zhang, “Hydrothermal synthesis and thermoelectric transport properties of impurity-free antimony telluride hexagonal nanoplates,” *Adv. Mater.*, 2008, vol. 20, no. 10, pp. 1892–1897.
- [71] J. Li *et al.*, “Probing defects in nitrogen-doped Cu_2O ,” *Sci. Rep.*, 2014, vol. 4, pp. 7240.
- [72] G. D. Khattak, A. Mekki, and M. A. Gondal, “Effect of laser irradiation on the structure and valence states of copper in Cu-phosphate glass by XPS studies,” *Appl.*

References

- Surf. Sci.*, 2010, vol. 256, no. 11, pp. 3630–3635.
- [73] T. Ghodselahti, M. A. Vesaghi, A. Shafeikhani, A. Baghizadeh, and M. Lameii, “XPS study of the Cu@Cu₂O core-shell nanoparticles,” *Appl. Surf. Sci.*, 2008, vol. 255, no. 5, Part 2, pp. 2730–2734.
- [74] A. Amri *et al.*, “Surface Electronic Structure and Mechanical Characteristics of Copper–Cobalt Oxide Thin Film Coatings: Soft X-ray Synchrotron Radiation Spectroscopic Analyses and Modeling,” *J. Phys. Chem. C*, 2013, vol. 117, no. 32, pp. 16457–16467.
- [75] Z. Y. Zhao, H. L. Che, R. Chen, J. F. Wang, X. F. Sun, and Z. Z. He, “Magnetism study on a triangular lattice antiferromagnet Cu₂(OH)₃Br,” *J. Phys. Condens. Matter*, 2019, vol. 31, no. 27, pp. 275801.
- [76] I. de Pedro, J. M. Rojo, J. R. Fernández, and T. Rojo, “Effect of Cu²⁺(S = 1/2) substitution on the antiferromagnetic ordered phases Co₂(OH)XO₄(X = Py As),” *J. Phys. Conf. Ser.*, 2010, vol. 200, no. 8, pp. 82004.
- [77] S. Chu *et al.*, “A Cu²⁺(S = 1/2) Kagomé Antiferromagnet: Mg_xCu_{4-x}(OH)₆Cl₂,” *J. Am. Chem. Soc.*, 2010, vol. 132, no. 16, pp. 5570–5571.
- [78] H.-J. Koo and M.-H. Whangbo, “Magnetic Superstructures of Cupric Oxide CuO as Ordered Arrangements of One-Dimensional Antiferromagnetic Chains,” *Inorg. Chem.*, 2003, vol. 42, no. 4, pp. 1187–1192.
- [79] Y. Shimakawa, H. Shiraki, and T. Saito, “Unusual Ferromagnetic-to-Antiferromagnetic-to-Ferromagnetic Transitions in Cu²⁺ (S = 1/2) Cubic Spin Lattice of A-Site Ordered Perovskites,” *J. Phys. Soc. Japan*, 2008, vol. 77, no. 11, pp. 113702.
- [80] I. Dzyaloshinsky, “A thermodynamic theory of ‘weak’ ferromagnetism of antiferromagnetics,” *J. Phys. Chem. Solids*, 1958, vol. 4, no. 4, pp. 241–255.
- [81] T. Moriya, “Anisotropic Superexchange Interaction and Weak Ferromagnetism,” *Phys. Rev.*, 1960, vol. 120, no. 1, pp. 91–98.
- [82] S. Nakatsuji, N. Kiyohara, and T. Higo, “Large anomalous Hall effect in a non-collinear antiferromagnet at room temperature.,” *Nature*, 2015, vol. 527, no. 7577, pp. 212–215.
- [83] P. Blaha, K. Schwarz, P. Sorantin, and S. B. Trickey, “Full-potential, linearized augmented plane wave programs for crystalline systems,” *Comput. Phys. Commun.*, 1990, vol. 59, no. 2, pp. 399–415.
- [84] U. von Barth and L. Hedin, “A local exchange-correlation potential for the spin polarized case. i,” *J. Phys. C Solid State Phys.*, 1972, vol. 5, no. 13, pp. 1629–1642.

References

- [85] W. Kohn and L. J. Sham, “Self-Consistent Equations Including Exchange and Correlation Effects,” *Phys. Rev.*, 1965, vol. 140, no. 4A, pp. A1133–A1138.
- [86] S. M. Huang *et al.*, “The Aharonov-Bohm oscillation in the BiSbTe₃ topological insulator macroflake,” *Appl. Phys. Lett.*, 2018, vol. 112, no. 20, pp. 203103.
- [87] V. A. Kulbachinskii, V. G. Kytin, and P. M. Tarasov, “Anomalous enhancement of the thermoelectric power in gallium-doped p-(Bi_{1-x}Sb_x)₂Te₃ single crystals,” *J. Exp. Theor. Phys.*, 2010, vol. 110, no. 4, pp. 618–621.
- [88] V. A. Kulbachinskii *et al.*, “Quantum oscillations of Hall resistance, magnetoresistance in a magnetic field up to 54 T and the energy spectrum of Sn doped layered semiconductors p-(Bi_{1-x}Sb_x)₂Te₃,” *Semicond. Sci. Technol.*, 2002, vol. 17, no. 10, pp. 1133–1140.
- [89] X. Guo *et al.*, “Thermoelectric transport properties and crystal growth of BiSbTe₃ bulk materials produced by a unique high-pressure synthesis,” *Cryst. Eng. Comm.*, 2013, vol. 15, no. 36, pp. 7236–7242.
- [90] D. O. Scanlon *et al.*, “Controlling bulk conductivity in topological insulators: Key role of anti-site defects,” *Adv. Mater.*, 2012, vol. 24, no. 16, pp. 2154–2158.
- [91] P. Lošťák, Z. Starý, J. Horák, and J. Pancíř, “Substitutional defects in Sb₂Te₃ crystals,” *Phys. status solidi*, 1989, vol. 115, no. 1, pp. 87–96.
- [92] D. Kong *et al.*, “Ambipolar field effect in the ternary topological insulator (Bi_(x)Sb_(1-x))₂Te₃ by composition tuning,” *Nature nanotechnology*, 2011, vol. 6, no. 11, pp. 705–709.
- [93] J. Zhang *et al.*, “Band structure engineering in (Bi_{1-x}Sb_x)₂Te₃ ternary topological insulators,” *Nat. Commun.*, 2011, vol. 2, pp. 574.
- [94] X. He *et al.*, “Highly tunable electron transport in epitaxial topological insulator (Bi_{1-x}Sb_x)₂Te₃ thin films,” *Appl. Phys. Lett.*, 2012, vol. 101, no. 12, pp. 1–6.
- [95] W. Liu, L. Endicott, V. A. Stoica, H. Chi, R. Clarke, and C. Uher, “High-quality ultra-flat BiSbTe₃ films grown by MBE,” *J. Cryst. Growth*, 2015, vol. 410, pp. 23–29.
- [96] J. L. Zhang *et al.*, “Pressure-induced superconductivity in topological parent compound Bi₂Te₃,” *Proc. Natl. Acad. Sci. U. S. A.*, 2011, vol. 108, no. 1, pp. 24–28.
- [97] P. P. Kong *et al.*, “Superconductivity of the topological insulator Bi₂Se₃ at high pressure,” *J. Phys. Condens. Matter*, 2013, vol. 25, no. 36, pp. 1–6.
- [98] J. Zhu *et al.*, “Superconductivity in topological insulator Sb₂Te₃ induced by pressure,” *Sci. Rep.*, 2013, vol. 3, pp. 2016.
- [99] F. Wilczek, “Majorana returns,” *Nat. Phys.*, 2009, vol. 5, no. 9, pp. 614–618.

References

- [100] C. Nayak, S. H. Simon, A. Stern, M. Freedman, and S. Das Sarma, “Non-Abelian anyons and topological quantum computation,” *Rev. Mod. Phys.*, 2008, vol. 80, no. 3, pp. 1083–1159.
- [101] A. Ribak *et al.*, “Internal pressure in superconducting Cu-intercalated Bi_2Se_3 ,” *Phys. Rev. B*, 2016, vol. 93, no. 6, pp. 1–6.
- [102] M. Muntwiler *et al.*, “Surface science at the PEARL beamline of the Swiss Light Source,” *J. Synchrotron Radiat.*, 2017, vol. 24, no. 1, pp. 354–366.
- [103] H. Iwasawa *et al.*, “Development of laser-based scanning μ -ARPES system with ultimate energy and momentum resolutions,” *Ultramicroscopy*, 2017, vol. 182, pp. 85–91.
- [104] C. Weyrich *et al.*, “Growth, characterization, and transport properties of ternary $(\text{Bi}_{1-x}\text{Sb}_x)_2\text{Te}_3$ topological insulator layers,” *J. Phys. Condens. Matter*, 2016, vol. 28, no. 49, pp. 495501.
- [105] A. N. Mansour, W. Wong-Ng, Q. Huang, W. Tang, A. Thompson, and J. Sharp, “Structural characterization of Bi_2Te_3 and Sb_2Te_3 as a function of temperature using neutron powder diffraction and extended X-ray absorption fine structure techniques,” *J. Appl. Phys.*, 2014, vol. 116, no. 8, pp. 083513.
- [106] F. Serrano-Sánchez *et al.*, “Enhanced figure of merit in nanostructured $(\text{Bi},\text{Sb})_2\text{Te}_3$ with optimized composition, prepared by a straightforward arc-melting procedure,” *Sci. Rep.*, 2017, vol. 7, no. 1, pp. 1–10.
- [107] H. A. Rahnamaye Aliabad and M. Kheirabadi, “Thermoelectricity and superconductivity in pure and doped Bi_2Te_3 with Se,” *Phys. B Condens. Matter*, 2014, vol. 433, pp. 157–164.
- [108] A. Nakayama, M. Einaga, Y. Tanabe, S. Nakano, F. Ishikawa, and Y. Yamada, “Structural phase transition in Bi_2Te_3 under high pressure,” *High Press. Res.*, 2009, vol. 29, no. 2, pp. 245–249.
- [109] J. Zhao *et al.*, “Pressure-induced disordered substitution alloy in Sb_2Te_3 ,” *Inorg. Chem.*, 2011, vol. 50, no. 22, pp. 11291–11293.
- [110] W. H. Jiao *et al.*, “Growth and characterization of Bi_2Se_3 crystals by chemical vapor transport,” *AIP Adv.*, 2012, vol. 2, no. 2, pp. 22148.
- [111] Y. L. Chen *et al.*, “Experimental realization of a three-dimensional topological insulator, Bi_2Te_3 ,” *Science*, 2009, vol. 325, no. 5937, pp. 178–181.
- [112] X.-L. Qi and S.-C. Zhang, “The quantum spin Hall effect and topological insulators,” *Phys. Today*, 2010, vol. 63, pp. 33.
- [113] R. Yu, W. Zhang, H.-J. Zhang, S.-C. Zhang, X. Dai, and Z. Fang, “Quantized

References

- Anomalous Hall Effect in Magnetic Topological Insulators," *Science* (80-.), 2010, vol. 329, no. 5987, pp. 61 LP – 64.
- [114] X.-L. Qi, R. Li, J. Zang, and S.-C. Zhang, "Inducing a magnetic monopole with topological surface States.,," *Science*, 2009, vol. 323, no. 5918, pp. 1184–1187.
- [115] X. Kou *et al.*, "Interplay between Different Magnetisms in Cr-Doped Topological Insulators," *ACS Nano*, 2013, vol. 7, no. 10, pp. 9205–9212.
- [116] J. S. Dyck, P. Hájek, P. Lošt'ák, and C. Uher, "Diluted magnetic semiconductors based on $Sb_{2-x}V_xTe_3$ ($0.01 < \sim x < \sim 0.03$)," *Phys. Rev. B*, 2002, vol. 65, no. 11, pp. 1–7.
- [117] C. Z. Chang *et al.*, "High-precision realization of robust quantum anomalous Hall state in a hard ferromagnetic topological insulator," *Nat. Mater.*, 2015, vol. 14, no. 5, pp. 473–477.
- [118] T. Jungwirth, X. Marti, P. Wadley, and J. Wunderlich, "Antiferromagnetic spintronics," *Nat. Nanotechnol.*, vol. 11, no. 3, pp. 231–241, 2016, doi: 10.1038/nnano.2016.18.
- [119] R. S. K. Mong, A. M. Essin, and J. E. Moore, "Antiferromagnetic topological insulators," *Phys. Rev. B*, 2010, vol. 81, no. 24, pp. 1–10.
- [120] R. A. Müller *et al.*, "Magnetic structure of GdBiPt: A candidate antiferromagnetic topological insulator," *Phys. Rev. B*, 2014, vol. 90, no. 4, pp. 1–5.
- [121] A. Kreyssig *et al.*, "Magnetic order in GdBiPt studied by x-ray resonant magnetic scattering," *Phys. Rev. B*, 2011, vol. 84, no. 22, pp. 1–4.
- [122] S. E. Harrison *et al.*, "Massive Dirac Fermion Observed in Lanthanide-Doped Topological Insulator Thin Films," *Sci. Rep.*, 2015, vol. 5, no. 1, p. 15767.
- [123] J. Kim, K. Lee, T. Takabatake, H. Kim, M. Kim, and M. H. Jung, "Magnetic Transition to Antiferromagnetic Phase in Gadolinium Substituted Topological Insulator Bi_2Te_3 ," *Sci. Rep.*, 2015, vol. 5, pp. 1–9.
- [124] J. Jensen and A. R. Mackintosh, "Rare Earth Magnetism Structures and Excitations CLARENDON PRESS · OXFORD," 1991.
- [125] L. B. Duffy *et al.*, "Microscopic effects of Dy doping in the topological insulator Bi_2Te_3 ," *Phys. Rev. B*, 2018, vol. 97, no. 17, pp. 174427.
- [126] S. E. Harrison *et al.*, "Study of Dy-doped Bi_2Te_3 : Thin film growth and magnetic properties," *J. Phys. Condens. Matter*, 2015, vol. 27, no. 24, p. 245602.
- [127] A. Singh *et al.*, "Tuning of carrier type, enhancement of Linear magnetoresistance and inducing ferromagnetism at room temperature with Cu doping in Bi_2Te_3 Topological Insulators," *Mater. Res. Bull.*, 2018, vol. 98, pp. 1–7.

References

- [128] K. Shrestha, M. Chou, D. Graf, H. D. Yang, B. Lorenz, and C. W. Chu, “Extremely large nonsaturating magnetoresistance and ultrahigh mobility due to topological surface states in the metallic Bi₂Te₃ topological insulator,” *Phys. Rev. B*, 2017, vol. 95, no. 19, pp. 1–6.
- [129] H. T. He *et al.*, “Impurity effect on weak antilocalization in the topological insulator Bi₂Te₃,” *Phys. Rev. Lett.*, 2011, vol. 106, no. 16, pp. 1–4.
- [130] A. B. Pippard, *Magnetoresistance in metals*, vol. 2. Cambridge university press, 1989.
- [131] S. M. Huang, S. H. Yu, and M. Chou, “The large linear magnetoresistance in Sb₂Se₂Te single crystal with extremely low mobility,” *Mater. Res. Express*, 2016, vol. 3, no. 12, pp. 126101.
- [132] D. Kumar and A. Lakhani, “Large Linear Magnetoresistance from Neutral Defects in Bi₂Se₃ Single Crystal,” *Phys. status solidi – Rapid Res. Lett.*, 2018, vol. 12, no. 12, pp. 1800088.
- [133] J. J. Lin and J. P. Bird, “Recent experimental studies of electron dephasing in metal and semiconductor mesoscopic structures,” *J. Phys. Condens. Matter*, 2002, vol. 14, no. 18, pp. R501.
- [134] X. Zhu *et al.*, “Electron-phonon coupling on the surface of the topological insulator Bi₂Se₃ determined from surface-phonon dispersion measurements,” *Phys. Rev. Lett.*, 2012, vol. 108, no. 18, pp. 185501.
- [135] G. Xu *et al.*, “Weak antilocalization effect and noncentrosymmetric superconductivity in a topologically nontrivial semimetal LuPdBi,” *Sci. Rep.*, 2014, vol. 4, pp. 5709.
- [136] B. Chen *et al.*, “Large magnetoresistance and superconductivity in α -gallium single crystals,” *npj Quantum Mater.*, 2018, vol. 3, no. 1, pp. 40.
- [137] Z. Wang, L. Yang, X. Zhao, Z. Zhang, and X. P. A. Gao, “Linear magnetoresistance versus weak antilocalization effects in Bi₂Te₃,” *Nano Res.*, 2015, vol. 8, no. 9, pp. 2963–2969.
- [138] J. G. Checkelsky, Y. S. Hor, M. H. Liu, D. X. Qu, R. J. Cava, and N. P. Ong, “Quantum interference in macroscopic crystals of nonmetallic Bi₂Se₃,” *Phys. Rev. Lett.*, 2009, vol. 103, no. 24, pp. 3–6.
- [139] A. Lakhani and D. Kumar, “Observation of multichannel quantum coherent transport and electron-electron interaction in Bi₂Te₃ single crystal,” *Appl. Phys. Lett.*, 2019, vol. 114, no. 18, pp. 0–5.
- [140] S. Pokrzywnicki, “Crystal field effects and magnetic properties of Dy₂Te₃,” *J. Alloys Compd.*, 1995, vol. 225, no. 1–2, pp. 163–165.

References

- [141] H. S. Lee *et al.*, “Antiferromagnetic order competing with topological state in $\text{Ce}_x\text{Bi}_{2-x}\text{Te}_3$,” *Appl. Phys. Lett.*, 2015, vol. 107, no. 18, pp. 182409.
- [142] N. H. Jo *et al.*, “Tuning of magnetic and transport properties in Bi_2Te_3 by divalent Fe doping,” *Phys. Rev. B*, 2013, vol. 87, no. 20, pp. 1–5.
- [143] S. W. Kim, S. Vrtnik, J. Dolinšek, and M. H. Jung, “Antiferromagnetic order induced by gadolinium substitution in Bi_2Se_3 single crystals,” *Appl. Phys. Lett.*, 2015, vol. 106, pp. 252401.
- [144] K. Kuroda *et al.*, “Hexagonally Deformed Fermi Surface of the 3D Topological Insulator Bi_2Se_3 ,” 2010, vol. 105, pp. 076802.
- [145] S. Cho, Y. Kim, A. DiVenere, G. K. Wong, J. B. Ketterson, and J. R. Meyer, “Antisite defects of Bi_2Te_3 thin films,” *Appl. Phys. Lett.*, 1999, vol. 75, no. 10, pp. 1401–1403.
- [146] J. P. Fleurial, L. Gailliard, R. Triboulet, H. Scherrer, and S. Scherrer, “Thermal properties of high quality single crystals of bismuth telluride—Part I: Experimental characterization,” *J. Phys. Chem. Solids*, 1988, vol. 49, no. 10, pp. 1237–1247.
- [147] A. Singh, P. Shahi, A. K. Ghosh, J. G. Cheng, and S. Chatterjee, “Enhancement in power factor due to anti-correlation between electrical conductivity and thermoelectric power and induced magnetic ordering in high mobility Zn doped Bi_2Te_3 topological insulator,” *J. Alloys Compd.*, 2018, vol. 731, pp. 297–302.
- [148] K. Manna, Y. Sun, L. Muechler, J. Kübler, and C. Felser, “Heusler, Weyl and Berry,” *Nat. Rev. Mater.*, 2018, vol. 3, no. 8, pp. 244–256.
- [149] C. Guo, F. Wu, M. Smidman, and H. Yuan, “Sample dependence studies of the Kondo Weyl semimetal YbPtBi ,” *AIP Adv.*, 2018, vol. 8, no. 10, pp. 101336.
- [150] N. Liu, J. Teng, and Y. Li, “Two-component anomalous Hall effect in a magnetically doped topological insulator,” *Nat. Commun.*, 2018, vol. 9, no. 1, pp. 1282.
- [151] C. Z. Chang *et al.*, “Experimental observation of the quantum anomalous Hall effect in a magnetic topological Insulator,” *Science (80-.).*, 2013, vol. 340, no. 6129, pp. 167–170.
- [152] J. S. Lee *et al.*, “Ferromagnetism and spin-dependent transport in n-type Mn-doped bismuth telluride thin films,” *Phys. Rev. B*, 2014, vol. 89, p. 174425.
- [153] J. G. Checkelsky, J. Ye, Y. Onose, Y. Iwasa, and Y. Tokura, “Dirac-fermion-mediated ferromagnetism in a topological insulator,” *Nat. Phys.*, 2012, vol. 8, no. 10, pp. 729–733.
- [154] J. Choi *et al.*, “Magnetic properties of Mn-doped Bi_2Te_3 and Sb_2Te_3 ,” *Phys. status solidi*, 2004, vol. 241, no. 7, pp. 1541–1544.

References

- [155] H. Z. Lu, W. Y. Shan, W. Yao, Q. Niu, and S. Q. Shen, “Massive Dirac fermions and spin physics in an ultrathin film of topological insulator,” *Phys. Rev. B*, 2010, vol. 81, no. 11, pp. 115407.
- [156] I. A. Ado, I. A. Dmitriev, P. M. Ostrovsky, and M. Titov, “Anomalous Hall effect with massive Dirac fermions,” *EPL (Europhysics Lett.)*, 2015, vol. 111, no. 3, p. 37004.
- [157] H.-Z. Lu, A. Zhao, and S.-Q. Shen, “Quantum Transport in Magnetic Topological Insulator Thin Films,” *Phys. Rev. Lett.*, 2013, vol. 111, no. 14, pp. 146802.
- [158] A. Singh *et al.*, “Anomalous and topological Hall effect in Cu doped Sb_2Te_3 topological insulator,” *Appl. Phys. Lett.*, 2020, vol. 117, no. 9, pp. 92403.
- [159] P. Hohenberg and W. Kohn, “Inhomogeneous Electron Gas,” *Phys. Rev.*, 1964, vol. 136, no. 3B, pp. B864–B871.
- [160] G. Kresse and D. Joubert, “From ultrasoft pseudopotentials to the projector augmented-wave method,” *Phys. Rev. B*, 1999, vol. 59, no. 3, pp. 1758–1775.
- [161] J. P. Perdew, K. Burke, and M. Ernzerhof, “Generalized Gradient Approximation Made Simple,” 1996.
- [162] H. J. Monkhorst and J. D. Pack, “Special points for Brillouin-zone integrations,” *Phys. Rev. B*, 1976, vol. 13, no. 12, pp. 5188–5192.
- [163] A. Rohrbach, J. Hafner, and G. Kresse, “Ab initio study of the (0001) surfaces of hematite and chromia: Influence of strong electronic correlations,” *Phys. Rev. B*, 2004, vol. 70, no. 12, pp. 125426.
- [164] I. L. M. Locht *et al.*, “Standard model of the rare earths analyzed from the Hubbard I approximation,” *Phys. Rev. B*, 2016, vol. 94, pp. 85137.
- [165] M. El Khaldi *et al.*, “Magnetic properties of a layered and anisotropic rhombohedral compound: $Bi_{2(1-x)}Gd_{2x}Te_3$,” *Phys. Rev. B*, 1994, vol. 49, no. 3, pp. 1711–1715.
- [166] L. Fu and C. L. Kane, “Topological insulators with inversion symmetry,” *Phys. Rev. B - Condens. Matter Mater. Phys.*, 2007, vol. 76, no. 4, pp. 045302.
- [167] S.-W. Kim and M.-H. Jung, “Electronic properties of $Gd_xBi_{2-x}Se_3$ single crystals analyzed by Shubnikov-de Haas oscillations,” *Appl. Phys. Lett.*, 2018, vol. 112, pp. 202401.
- [168] J. Kim, K. Lee, T. Takabatake, H. Kim, M. Kim, and M.-H. Jung, “Magnetic Transition to Antiferromagnetic Phase in Gadolinium Substituted Topological Insulator Bi_2Te_3 ,” *Sci. Reports*, 2015, vol. 5, pp. 10309.
- [169] T. Hirahara *et al.*, “Large-Gap Magnetic Topological Heterostructure Formed by Subsurface Incorporation of a Ferromagnetic Layer,” *Nano Lett.*, 2017, vol. 17, no.

References

- 6, pp. 3493–3500.
- [170] M. M. Otrokov *et al.*, “Highly-ordered wide bandgap materials for quantized anomalous Hall and magnetoelectric effects,” *2D Mater.*, 2017, vol. 4, no. 2, pp. 025082.
- [171] M. M. Otrokov *et al.*, “Unique Thickness-Dependent Properties of the van der Waals Interlayer Antiferromagnet MnBi₂Te₄ Films,” *Phys. Rev. Lett.*, 2019, vol. 122, pp. 107202.
- [172] D. Zhang, M. Shi, T. Zhu, D. Xing, H. Zhang, and J. Wang, “Topological Axion States in the Magnetic Insulator MnBi₂Te₄ with the Quantized Magnetoelectric Effect,” *Phys. Rev. Lett.*, 2019, vol. 122, pp. 206401.
- [173] B. Chen *et al.*, “Intrinsic magnetic topological insulator phases in the Sb doped MnBi₂Te₄ bulks and thin flakes,” *Nat. Commun.*, 2019, vol. 10, no. 1, pp. 4469.
- [174] M. M. Otrokov *et al.*, “Prediction and observation of an antiferromagnetic topological insulator,” *Nature*, 2019, vol. 576, no. 7787, pp. 416–422.
- [175] S. H. Lee *et al.*, “Spin scattering and noncollinear spin structure-induced intrinsic anomalous Hall effect in antiferromagnetic topological insulator MnBi₂Te₄,” *Phys. Rev. Res.*, 2019, vol. 1, no. 1, pp. 12011.
- [176] R. C. Vidal *et al.*, “Surface states and Rashba-type spin polarization in antiferromagnetic MnBi₂Te₄(0001),” *Phys. Rev. B*, 2019, vol. 100, pp. 21.
- [177] Y. J. Hao *et al.*, “Gapless Surface Dirac Cone in Antiferromagnetic Topological Insulator MnBi₂Te₄,” *Phys. Rev. X*, 2019, vol. 91, no. 4, pp. 041038.
- [178] Y. J. Chen *et al.*, “Topological Electronic Structure and Its Temperature Evolution in Antiferromagnetic Topological Insulator MnBi₂Te₄,” *Phys. Rev. X*, 2019, vol. 91, no. 4, pp. 041040-1–9.
- [179] Y. R. Song *et al.*, “Large magnetic moment of gadolinium substituted topological insulator: Bi_{1.98}Gd_{0.02}Se₃,” *Appl. Phys. Lett.*, 2012, vol. 100, no. 24, pp. 242403.
- [180] J.-M. Zhang, W. Zhu, Y. Zhang, D. Xiao, and Y. Yao, “Tailoring Magnetic Doping in the Topological Insulator Bi₂Se₃,” *Phys. Rev. Lett.*, 2012, vol. 109, pp. 266405.
- [181] J. W. Allen and F. Wachter, “Large low-temperature Hall effect and resistivity in mixed-valent SmB₆,” 1979, *Phys. Rev. B*, vol. 20, pp. 4807.
- [182] J. C. Cooley, M. C. Aronson, Z. Fisk, P. C. Canfield, and R. P. Guertin, “High magnetic fields and the correlation gap in SmB₆,” 1995, *Phys. Rev. B*, vol. 52, pp. 7322.
- [183] M. Dzero, K. Sun, V. Galitski, and P. Coleman, “Topological kondo insulators,” *Phys. Rev. Lett.*, 2010, vol. 104, no. 10, pp. 106408.

References

- [184] M. Dzero, K. Sun, P. Coleman, and V. Galitski, “Theory of topological Kondo insulators,” *Phys. Rev. B*, 2012, vol. 85, pp. 45130.
- [185] L. B. Duffy *et al.*, “Imposing long-range ferromagnetic order in rare-earth-doped magnetic topological-insulator heterostructures,” *Phys. Rev. Mater.*, 2018, vol. 2, no. 5, pp. 54201.
- [186] A. Amato *et al.*, “The new versatile general purpose surface-muon instrument (GPS) based on silicon photomultipliers for μ SR measurements on a continuous-wave beam,” *Rev. of Scient. Instru.*, 2017, vol. 88, pp. 093301.
- [187] S. J. Blundell, “Spin-polarized muons in condensed matter physics,” *Contemp. Phys.*, 1999, vol. 40, no. 3, pp. 175–192.
- [188] A. Yaouanc, “Muon Spin Rotation, Relaxation, and Resonance: Applications to Condensed Matter,” *Oxford University Press*, 2011.
- [189] M. I. Zargarova, P. K. Babaeva, D. S. Azhdarova, Z. D. Melikova, and S. A. Mekhtieva, “A Study of the Systems CuInSe₂-InSe (SnSe₂, Bi₂Se₃),” *Inorg. Mater. York*, 1995, vol. 31, no. 2, pp. 263–264.
- [190] S. H. Lee *et al.*, “Spin scattering and noncollinear spin structure-induced intrinsic anomalous Hall effect in antiferromagnetic topological insulator MnBi₂Te₄,” *Phys. Rev. Res.* 2018, vol. 1, pp. 012011.,
- [191] T. A. Costi, A. C. Hewson, and V. Zlatic, “Transport coefficients of the Anderson model via the numerical renormalization group,” *J. Phys. Condens. Matter*, 1994, vol. 6, no. 13, pp. 2519–2558.
- [192] D. Goldhaber-Gordon, J. Göres, M. A. Kastner, H. Shtrikman, D. Mahalu, and U. Meirav, “From the Kondo Regime to the Mixed-Valence Regime in a Single-Electron Transistor,” *Phys. Rev. Lett.*, 1998, vol., 81, pp. 5225.
- [193] M. Lee, J. R. Williams, S. Zhang, C. D. Frisbie, and D. Goldhaber-Gordon, “Electrolyte gate-controlled kondo effect in SrTiO₃,” *Phys. Rev. Lett.*, 2011, vol. 107, no. 25, pp. 1–5.
- [194] J. J. Cha *et al.*, “Magnetic doping and kondo effect in Bi₂Se₃ nanoribbons,” *Nano Lett.*, 2010, vol. 10, no. 3, pp. 1076–1081.
- [195] J. J. Cha *et al.*, “Effects of magnetic doping on weak antilocalization in narrow Bi₂Se₃ nanoribbons,” *Nano Lett.*, 2012, vol. 12, no. 8, pp. 4355–4359.
- [196] A. Shvonski, J. Kong, and K. Kempa, “Plasmon-polaron of the topological metallic surface states,” *Phys. Rev. B*, 2019, vol. 99, no. 4, pp. 125148–125149.
- [197] B. N. Narozhny and A. Levchenko, “Coulomb drag,” *Rev. Mod. Phys.*, 2016, vol. 88, pp. 025003.

References

- [198] X. Jia *et al.*, “Anomalous Acoustic Plasmon Mode from Topologically Protected States,” *Phys. Rev. Lett.*, 2017, vol. 119, no. 13, pp. 1–5.
- [199] W. Chen, A. V. Andreev, and A. Levchenko, “Boltzmann-Langevin theory of Coulomb drag,” *Phys. Rev. B - Condens. Matter Mater. Phys.*, 2015, vol. 91, no. 24, pp. 1–12.
- [200] E. Uesugi *et al.*, “Fermi level tuning of Ag-doped Bi₂Se₃ topological insulator,” *Sci. Rep.*, 2019, vol. 9, no. 1, pp. 3–10.
- [201] D.-X. Qu, Y. S. Hor, J. Xiong, R. J. Cava, and N. P. Ong, “Quantum Oscillations and Hall Anomaly of Surface States in the Topological Insulator Bi₂Te₃,” *Science (80)*, 2010, vol. 329, no. 5993, pp. 821 LP – 824.
- [202] M. Liu *et al.*, “Crossover between weak antilocalization and weak localization in a magnetically doped topological insulator,” *Phys. Rev. Lett.*, 2012, vol. 108, no. 3, pp. 1–5.
- [203] H. Steinberg, J.-B. Laloë, V. Fatemi, J. S. Moodera, and P. Jarillo-Herrero, “Electrically tunable surface-to-bulk coherent coupling in topological insulator thin films,” *Phys. Rev. B*, 2011, vol. 84, no. 4, pp. 233101–233102.
- [204] S. Wiedmann *et al.*, “Anisotropic and strong negative magnetoresistance in the three-dimensional topological insulator Bi₂Se₃,” *Phys. Rev. B*, 2016, vol. 94, no. 8, pp. 1–5.
- [205] A. Suter and B. M. Wojek, “Musrfit: A Free Platform-Independent Framework for μSR Data Analysis,” *Phys. Procedia*, 2012, vol. 30, pp. 69–73.
- [206] J. A. Krieger *et al.*, “Spectroscopic perspective on the interplay between electronic and magnetic properties of magnetically doped topological insulators,” *Phys. Rev. B*, 2017, vol. 96, pp. 184402.
- [207] D. Joubert, “From ultrasoft pseudopotentials to the projector augmented-wave method,” *Phys. Rev. B - Condens. Matter Mater. Phys.*, 1999, vol. 59, no. 3, pp. 1758–1775.
- [208] S. Grimme, J. Antony, S. Ehrlich, and H. Krieg, “A consistent and accurate ab initio parametrization of density functional dispersion correction (DFT-D) for the 94 elements H-Pu,” *J. Chem. Phys.*, 2010, vol. 132, pp. 154104.
- [209] M. Z. Hasan, S. Y. Xu, and G. Bian, “Topological insulators, topological superconductors and Weyl fermion semimetals: Discoveries, perspectives and outlooks,” *Phys. Scr.*, 2015, vol. 2015, no. T164, pp. 14001.
- [210] L. X. Yang *et al.*, “Weyl semimetal phase in the non-centrosymmetric compound TaAs,” *Nat. Phys.*, 2015, vol. 11, no. 9, pp. 728–732.

References

- [211] Z. K. Liu *et al.*, “Evolution of the Fermi surface of Weyl semimetals in the transition metal pnictide family,” *Nat. Mater.*, 2016, vol. 15, no. 1, pp. 27–31.
- [212] D. T. Son and B. Z. Spivak, “Chiral anomaly and classical negative magnetoresistance of Weyl metals,” *Phys. Rev. B*, 2013, vol. 88, no. 10, pp. 104412.
- [213] K. Fukushima, D. E. Kharzeev, and H. J. Warringa, “Chiral magnetic effect,” *Phys. Rev. D*, 2008, vol. 78, no. 7, pp. 74033.
- [214] K.-Y. Yang, Y.-M. Lu, and Y. Ran, “Quantum Hall effects in a Weyl semimetal: Possible application in pyrochlore iridates,” *Phys. Rev. B*, 2011, vol. 84, no. 7, pp. 75129.
- [215] A. A. Burkov and L. Balents, “Weyl Semimetal in a Topological Insulator Multilayer,” *Phys. Rev. Lett.*, 2011, vol. 107, no. 12, pp. 127205.
- [216] S.-Y. Xu *et al.*, “Experimental discovery of a topological Weyl semimetal state in TaP,” *Sci. Adv.*, 2015, vol. 1, no. 10, pp. e1501092–e1501092.
- [217] C. L. Zhang *et al.*, “Electron scattering in tantalum monoarsenide,” *Phys. Rev. B*, 2017, vol. 95, no. 8, pp. 1–7.
- [218] N. J. Ghimire, Y. Luo, M. Neupane, D. J. Williams, E. D. Bauer, and F. Ronning, “Magnetotransport of single crystalline NbAs,” *J. Phys. Condens. Matter*, 2015, vol. 27, no. 15, pp. 152201.
- [219] C. Shekhar *et al.*, “Extremely large magnetoresistance and ultrahigh mobility in the topological Weyl semimetal candidate NbP,” *Nat. Phys.*, 2015, vol. 11, no. 8, pp. 645–649.
- [220] S.-Y. Xu *et al.*, “TOPOLOGICAL MATTER. Discovery of a Weyl fermion semimetal and topological Fermi arcs.,” *Science*, 2015, vol. 349, no. 6248, pp. 613–617.
- [221] Y. Moritomo, A. Asamitsu, H. Kuwahara, and Y. Tokura, “Giant magnetoresistance of manganese oxides with a layered perovskite structure,” *Nature*, 1996, vol. 380, no. 6570, pp. 141–144.
- [222] J. M. Daughton, “GMR applications,” *J. Magn. Magn. Mater.*, 1999, vol. 192, no. 2, pp. 334–342.,
- [223] J. E. Lenz, “A review of magnetic sensors,” *Proc. IEEE*, 1990, vol. 78, no. 6, pp. 973–989.
- [224] A. A. Taskin and Y. Ando, “Berry phase of nonideal Dirac fermions in topological insulators,” *Phys. Rev. B*, 2011, vol. 84, no. 3, pp. 35301.
- [225] J. Hu *et al.*, “ π Berry phase and Zeeman splitting of Weyl semimetal TaP,” *Sci. Rep.*, 2016, vol. 6, no. 1, p. 18674.

References

- [226] Sudesh, P. Kumar, P. Neha, T. Das, and S. Patnaik, “Evidence for trivial Berry phase and absence of chiral anomaly in semimetal NbP,” *Sci. Rep.*, 2017, vol. 7, pp. 1–9,.
- [227] P. Blaha, K. Schwarz, F. Tran, R. Laskowski, G. K. H. Madsen, and L. D. Marks, “WIEN2k: An APW+lo program for calculating the properties of solids,” *J. Chem. Phys.*, 2020, vol. 152, no. 7, pp. 74101.
- [228] J. M. Ziman, *Electrons and Phonons: The Theory of Transport Phenomena in Solids*, Oxford: Oxford University Press, 2001.
- [229] J. M. Ziman, *Principles of the Theory of Solids*, 2nd ed. Cambridge: Cambridge University Press, 1972.
- [230] Z. Wang *et al.*, “Helicity-protected ultrahigh mobility Weyl fermions in NbP,” *Phys. Rev. B*, 2016, vol. 93, no. 12, pp. 6–11.
- [231] J. Du *et al.*, “Large unsaturated positive and negative magnetoresistance in Weyl semimetal TaP,” *Sci. CHINA Physics, Mech. Astron.*, 2016, vol. 59, no. 5, pp. 657406.
- [232] M. H. *et al.*, “Detection of Berry’s Phase in a Bulk Rashba Semiconductor,” *Science (80-)*, 2013, vol. 342, pp. 1490.

List of Publications

1. “Pressure induced superconducting state in ideal topological insulator BiSbTe_3 ” **Vinod K. Gangwar** et al. *Phys. Scr.* **96**, 055802 (2021).
2. “Anomalous and topological Hall effect in Cu doped Sb_2Te_3 topological insulator” **Vinod K. Gangwar** et al. *Appl. Phys. Lett.* **117**, 092403 (2020).
3. “Roles of surface and bulk states in magnetotransport properties in antiferromagnetically ordered $\text{Bi}_{1.9}\text{Dy}_{0.1}\text{Te}_3$ Topological insulator” **Vinod K. Gangwar** et al. (*Under Review*).
4. “Observation of antiferromagnetic ordering from muon spin resonance and Kondo effect in Dy doped Bi_2Se_3 topological insulator” **Vinod K. Gangwar** et al. *J. Phys. D: Appl. Phys.* **54**, 455302 (2021).
5. “Crystal growth and observation of large magnetoresistance (LMR) and SdH oscillations in $\text{Ta}_{1-x}\text{Nb}_x\text{P}$ Weyl semimetals” **Vinod K. Gangwar** et al. (*To be communicated*).
6. “Anomalous Hall effect in Cu doped Bi_2Te_3 topological insulator” Abhishek Singh, Shiv Kumar, Mahima Singh, Prajyoti Singh, Rahul Singh, **Vinod K. Gangwar** et al. *J. Phys.: Condens. Matter* **32**, 305602 (2020).
7. “Evidence of surface and bulk magnetic ordering in Fe and Mn doped $\text{Bi}_2(\text{SeS})_3$ topological insulator” Mahima Singh, Shiv Kumar, Mohd Alam, **Vinod K. Gangwar** et al. *Appl. Phys. Lett.* **118**, 132409 (2021).
8. “Defect induced ferromagnetic ordering and room temperature negative magnetoresistance in MoTeP” Debarati Pal, Shiv Kumar, Prashant Shahi, Sambhab Dan, Abhineet Verma, **Vinod K. Gangwar** et al. *Sci. Rep.* **11**, 9104 (2021).
9. “Unusual negative magnetoresistance in $\text{Bi}_2\text{Se}_{3-y}\text{S}_y$ topological insulator under perpendicular magnetic field” Rahul Singh, **Vinod K. Gangwar** et al. *Appl. Phys. Letts.* **112**, 102401 (2018).
10. “B-site disorder driven multiple-magnetic phases: Griffiths phase, re-entrant cluster glass, and exchange bias in $\text{Pr}_2\text{CoFeO}_6$ ” Arkadeb Pal, Prajyoti Singh, **Vinod K. Gangwar** et al. *Appl. Phys. Lett.* **114**, 252403 (2019).
11. “Probing the Griffiths like phase, unconventional dual glassy states, giant exchange bias effects and its correlation with its electronic structure in $\text{Pr}_{2-x}\text{Sr}_x\text{CoMnO}_6$ ”

List of Publications

- Arkadeb Pal, Prajyoti Singh, **Vinod. K. Gangwar** et al. *J. Phys.: Condens. Matter* **32**, 215801, (2020).
- 12.** “Investigation of multi-mode spin–phonon coupling and local B-site disorder in Pr_2CoFeO_6 by Raman spectroscopy and correlation with its electronic structure by XPS and XAS studies” Arkadeb Pal, Surajit Ghosh, Amish G Joshi, Shiv Kumar, Swapnil Patil, Prince K Gupta, Prajyoti Singh, **Vinod K. Gangwar** et al. *J. Phys.: Condens. Matter* **31**, 275802, (2019).
- 13.** “Wasp – Waisted loop and spin frustration in $Dy_{2-x}Eu_xTi_2O_7$ pyrochlore” Prajyoti Singh, Arkadeb Pal, **Vinod K. Gangwar** et al. *Jmmm*, **518**, 167364, (2021).
- 14.** “Roles of Re-entrant cluster glass state and spin–lattice coupling in magneto–dielectric behavior of giant dielectric double perovskite $La_{1.8}Pr_{0.2}CoFeO_6$ ” P. Singh, Md. Alam, S. Kumar, K. Anand, **Vinod K. Gangwar** et al. *J. Phys.: Condens. Matter* **32**, 445801, (2020).
- 15.** “Spin freezing and field induced transition in $(Tb_{1-x}Eu_x)_2Ti_2O_7$: A magnetic property study” Prajyoti Singh, Arkadeb Pal, **Vinod K. Gangwar** et al. *Jmmm*, **490**, 165512, (2019).
- 16.** “Shell Thickness-Dependent Tunable Threshold Voltage Single Quantum Dot Rectification Diode” G. S. Kenath, R. Mahadevu, Anand Sharma, **Vinod K. Gangwar** et al. *J. Phys. Chem. C*, **122**, 5, 3176–3181(2018).
- 17.** “Single quantum dot rectifying diode with tunable threshold voltage” Gopal S. Kenath, Piyali Maity, Yogesh Kumar, Hemant Kumar, **Vinod K. Gangwar** et al. *J. Mater. Chem. C*, **5**, 9792-9798(2017).

Schools / Meetings / Workshops / Conference Attended

- 1.** 20th Symposium & Workshop on Thermal Analysis (THERMANS-2016), IIT BHU, VARANASI, INDIA.
- 2.** 8th AONSA Neutron School (2016), BARC, TROMBAY, MUMBAI, INDIA.
- 3.** Consortium Research Lecture Module, 1st Order Magnetic Phase Transitions and Some New Concepts (2017), UGC-DAE INDORE, INDIA.
- 4.** International Conference on Advances in Biological System and Materials Science in Nano World (2017), IIT BHU, VARANASI, INDIA
- 5.** The Indian Institute Of Metals (ICME-2017), IIT KANPUR, INDIA.
- 6.** 10th National Conference on Solid State Chemistry and Allied Areas (ISCAS-2017), DTU, NEW DELHI, INDIA.
- 7.** 62nd DAE Solid State Physics Symposium (2017), BARC, MUMBAI, INDIA.
- 8.** National Conference on Advanced materials and Nanotechnology (AMN-2018) JIIT, NOIDA, INDIA.