Chapter 9

Publication

1. **Sambhab Dan**, et al. *"Unraveling the Obscure Electronic Transition and Tuning of Fermi Level in Cu Substituted Bi2Te3 Compound."* Applied Physics Letters 120.2 (2022): 022105.

2. **Sambhab Dan**, et al. *"Magnetotransport Properties and Fermi Surface Topology of Nodal line Semimetal InBi."* Physical Review B 107.20 (2023): 205111.

3. **Sambhab Dan**, et al. *"First Principle Study of the Defect-Induced Band Structure in Cu Substituted Bi2Te3 Topological Insulator."* Book Chapter Springer Nature Publication, 2022 (Accepted).

4.**Sambhab Dan**, et al. *"Experimental realization of non–trivial type-II Dirac Cone Protected By C4 Symmetry in Nodal Line Semimetal InBi"* Manuscript under preparation (2023)

5. D Pal… **Sambhab Dan**, et al. *"Multiple Magnetic Phases and Anomalous Hall Effect in Sb1. 9Fe0. 1Te2. 85S0. 15 Topological Insulators."* The Journal of Physical Chemistry

C 127.5 (2023): 2508-2517.

6. P. Singh… **Sambhab Dan**, et al. *"Double Glassy States and Large Spontaneous and Conventional Exchange Bias in La1. 5Ca0. 5CoFeO6 Ferrimagnetic Double Perovskite."* Journal of Physics: Condensed Matter 34.37 (2022): 375803.

7. D. Pal… **Sambhab Dan**, et al. *"Pressure-Induced Topological and Structural Transitions in Iron and Sulphur Doped Sb2Te3."* Materials Letters 302 (2021): 130401.

8. K. Anand… **Sambhab Dan**, et al. *"Emergence of metamagnetic Transition, Re-entrant Cluster Glass and Spin Phonon Coupling in Tb2CoMnO6."* Journal of Physics: Condensed Matter 33.27 (2021): 275802.

9. D. Pal… **Sambhab Dan**, et al. *"Defect-induced Ferromagnetic Ordering and Room Temperature Negative Magnetoresistance in MoTeP."* Scientific Reports 11.1 (2021): 9104.

10. D. Pal…**Sambhab Dan**, et al. *"Structural, Magnetic and Vibrational Properties of BSTS Topological Insulator."* AIP Conference Proceedings. Vol. 2265. No. 1. AIP Publishing LLC, 2020.

11. D. Pal…**Sambhab Dan**, et al. *"Multiple Magnetic Phases and Anomalous Hall Effect in Sb1.9Fe0.1Te2.85S0.15 Topological Insulators"* he Journal of Physical Chemistry C 127.5 (2023): 2508-2517.

References

[1] D. J. Thouless, M. Kohmoto, M. P. Nightingale, and M. den Nijs, “Quantized Hall Conductance in a Two-Dimensional Periodic Potential,” *Physical Review Letter*, vol. 49, pp. 405–408, 6 1982. [Online]. Available: https://link.aps.org/doi/10.1103/PhysRevLett.49.405.

[2] X.-G. Wen, “Topological orders and edge excitations in fractional quantum Hall states,” *Advances in Physics*, vol. 44, no. 5, pp. 405–473, 1995. [Online]. Available: https://doi.org/10.1080/00018739500101566.

[3] *Continious deformation of coffee mug to donut*, “[Online; accessed 18-June-2023]”, 2023. [Online]. Available: https://cems.riken.jp/en/laboratory/qmtrt.

[4] M. Nakahara, *Geometry, topology and physics*. CRC press, 2003.

[5] “Wikipedia contributors”, *“genus (mathematics) — Wikipedia, the free encyclopedia”*, “[Online; accessed 18-June-2023]”, “2023”. [Online]. Available: ``https://en.wikipedia.org/w/index.php?title=Genus_(mathematics)&oldid=1148981045".

[6] M. Z. Hasan and C. L. Kane, “Colloquium: Topological insulators,” *Reviews of Modern Physics*, vol. 82, no. 4, p. 3045, 2010. [Online]. Available: https://link.aps.org/doi/10.1103/RevModPhys.82.3045.

[7] B. I. Halperin, “Quantized Hall conductance, current-carrying edge states, and the existence of extended states in a two-dimensional disordered potential,” *Physical Review B*, vol. 25, pp. 2185–2190, 4 1982. [Online]. Available: https://link.aps.org/doi/10.1103/PhysRevB.25.2185.

[8] K. Von Klitzing, "Developments in the quantum Hall effect," *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences*, vol. 363, no. 1834, pp. 2203–2219, 2005. [Online]. Available: https://doi.org/10.1098/rsta.2005.1640.

[9] J. M. Kosterlitz and D. J. Thouless, "Long range order and metastability in two dimensional solids and superfluids. (application of dislocation theory)," *Journal of Physics C: Solid State Physics*, vol. 5, no. 11, p. L124, 1972. [Online]. Available: https://dx.doi.org/10.1088/0022-3719/5/11/002.

[10] J. M. Kosterlitz and D. J. Thouless, "Ordering, metastability and phase transitions in two-dimensional systems," *Journal of Physics C: Solid State Physics*, vol. 6, no. 7, p. 1181, 1973. [Online]. Available: https://dx.doi.org/10.1088/0022-3719/6/7/010.

[11] M. Kim, Z. Jacob, and J. Rho, "Recent advances in 2D, 3D and higher-order topological photonics," *Light: Science & Applications*, vol. 9, no. 1, p. 130, 2020. [Online]. Available: https://doi.org/10.1038/s41377-020-0331-y.

[12] *The schematic of topological phase transition*, "[Online; accessed 18-June-2023]", 2023. [Online]. Available: https://blogs.iu.edu/sciu/2020/11/14/can-you-turn-a-baseball-into-a-donut/.

[13] H. Weng, X. Dai, and Z. Fang, "Exploration and prediction of topological electronic materials based on first-principles calculations," *Mrs Bulletin*, vol. 39, no. 10, pp. 849–858, 2014. [Online]. Available: https://doi.org/10.1557/mrs.2014.216.

[14] M. Mogi, *Quantized Phenomena of Transport and Magneto-Optics in Magnetic Topological Insulator Heterostructures*. Springer Nature, 2022.

[15] F. D. M. Haldane, "Model for a quantum Hall effect without Landau levels: Condensed-matter realization of the parity anomaly," *Physical review letters*, vol. 61, no. 18, p. 2015, 1988. [Online]. Available: https://link.aps.org/doi/10.1103/PhysRevLett.61.2015.

[16] L. Kou, Y. Ma, S. C. Smith, and C. Chen, "Anisotropic ripple deformation in phosphorene," *The journal of physical chemistry letters*, vol. 6, no. 9, pp. 1509–1513, 2015. [Online]. Available: https://doi.org/10.1021/acs.jpclett.5b00522.

[17] K. S. Novoselov, A. K. Geim, S. V. Morozov, *et al.*, "Electric field effect in atomically thin carbon films," *science*, vol. 306, no. 5696, pp. 666–669, 2004. [Online]. Available: https://doi.org/10.1126/science.1102896.

[18] C. L. Kane and E. J. Mele, "Quantum spin Hall effect in graphene," *Physical review letters*, vol. 95, no. 22, p. 226 801, 2005. [Online]. Available: https://link.aps.org/doi/10.1103/PhysRevLett.95.226801.

[19] C. L. Kane and E. J. Mele, "Z_2 topological order and the quantum spin Hall effect," *Physical review letters*, vol. 95, no. 14, p. 146 802, 2005. [Online]. Available: https://link.aps.org/doi/10.1103/PhysRevLett.95.146802.

[20] Y. Yao, F. Ye, X.-L. Qi, S.-C. Zhang, and Z. Fang, "Spin-orbit gap of graphene: First-principles calculations," *Physical Review B*, vol. 75, no. 4, p. 041 401, 2007. [Online]. Available: https://link.aps.org/doi/10.1103/PhysRevB.75.041401.

[21] C. Weeks, J. Hu, J. Alicea, M. Franz, and R. Wu, "Engineering a robust quantum spin Hall state in graphene via adatom deposition," *Physical Review X*, vol. 1, no. 2, p. 021 001, 2011. [Online]. Available: https://link.aps.org/doi/10.1103/PhysRevX.1.021001.

[22] C.-C. Liu, W. Feng, and Y. Yao, "uantum spin Hall effect in silicene and two-dimensional germanium," *Physical review letters*, vol. 107, no. 7, p. 076 802, 2011. [Online]. Available: https://link.aps.org/doi/10.1103/PhysRevLett.107.076802.

[23] Y. Xu, B. Yan, H.-J. Zhang, *et al.*, "Large-gap quantum spin Hall insulators in tin films," *Physical review letters*, vol. 111, no. 13, p. 136 804, 2013. [Online]. Available: https://link.aps.org/doi/10.1103/PhysRevLett.111.136804.

[24] B. A. Bernevig, T. L. Hughes, and S.-C. Zhang, "Quantum spin Hall effect and topological phase transition in HgTe quantum wells," *science*, vol. 314, no. 5806, pp. 1757–1761, 2006. [Online]. Available: https://doi.org/10.1126/science.1133734.

[25] M. Konig, S. Wiedmann, C. Brune, *et al.*, "Quantum spin Hall insulator state in HgTe quantum wells," *Science*, vol. 318, no. 5851, pp. 766–770, 2007. [Online]. Available: https://doi.org/10.1126/science.1148047.

[26] *The experimental band structure of Bi_2Se_3 and schematic of surface state*, [Online; accessed 18-June-2023], 2023. [Online]. Available: https://newscenter.lbl.gov/2012/05/14/topological-insulators/.

[27] S.-Y. Yang, H. Yang, E. Derunova, S. S. Parkin, B. Yan, and M. N. Ali, "Symmetry demanded topological nodal-line materials," *Advances in Physics: X*, vol. 3, no. 1, p. 1 414 631, 2018. [Online]. Available: https://doi.org/10.1080/23746149.2017.1414631.

[28] Bzdušek, Tomáš and Wu, QuanSheng and Rüegg, Andreas and Sigrist, Manfred and Soluyanov, Alexey A, "Nodal-chain metals," *Nature*, vol. 538, no. 7623, pp. 75–78, 2016. [Online]. Available: https://doi.org/10.1038/nature19099.

[29] H. Weng, Y. Liang, Q. Xu, *et al.*, "Topological node-line semimetal in three-dimensional graphene networks," *Physical Review B*, vol. 92, p. 045 108, 4 2015. [Online]. Available: https://link.aps.org/doi/10.1103/PhysRevB.92.045108.

[30] A. A. Burkov, M. D. Hook, and L. Balents, "Topological nodal semimetals," *Physical Review B*, vol. 84, p. 235 126, 23 2011. [Online]. Available: https://link.aps.org/doi/10.1103/PhysRevB.84.235126.

[31] T. T. Heikkilä and G. E. Volovik, "Dimensional crossover in topological matter: Evolution of the multiple dirac point in the layered system to the flat band on the surface," *Journal of Experimental and Theoretical Physics Letters*, vol. 93, pp. 59–65, 2011. [Online]. Available: https://doi.org/10.1134/S002136401102007X.

[32] N. Kopnin, T. Heikkilä, and G. Volovik, "High-temperature surface superconductivity in topological flat-band systems," *Physical Review B*, vol. 83, no. 22, p. 220 503, 2011. [Online]. Available: https://link.aps.org/doi/10.1103/PhysRevB.83.220503.

[33] *The natural grown crystal*, "[Online; accessed 18-June-2023]", 2023. [Online]. Available: https://www.bern.com/en/news-events/detail/the-planggenstock-treasure.

[34] W. contributors", *"bridgman–stockbarger method — Wikipedia, the free encyclopedia"*, "[Online; accessed 14-June-2023]", "2022". [Online]. Available: ``https://en.wikipedia.org/w/index.php?title=Bridgman%E2%80%93Stockbarger_method&oldid=1117012325".

[35] W. H. Bragg and W. L. Bragg, "The reflection of X-rays by crystals," *Proceedings of the Royal Society of London. Series A, Containing Papers of a Mathematical and Physical Character*, vol. 88, no. 605, pp. 428–438, 1913. [Online]. Available: https://doi.org/10.1098/rspa.1913.0040.

[36] M. S. Suzuki and I. S. Suzuki, "Lecture note on de haas van alphen effect solid state physics," 2013.

[37] J. Z. Buchwald *et al.*, *The creation of scientific effects: Heinrich Hertz and electric waves*. University of Chicago Press, 1994.

[38] A. Einstein, "Über die von der molekularkinetischen theorie der wärme geforderte bewegung von in ruhenden flüssigkeiten suspendierten teilchen," *Annalen der physik*, vol. 4, 1905. [Online]. Available: http://sedici.unlp.edu.ar/handle/10915/2785.

[39] "Wikipedia contributors", *"angle-resolved photoemission spectroscopy — Wikipedia, the free encyclopedia"*, "[Online; accessed 13-June-2023]", "2023". [Online]. Available: ``https://en.wikipedia.org/w/index.php?title=Angle-resolved_photoemission_spectroscopy&oldid=1159886502".

[40] J Henk, A Ernst, S. Eremeev, E. V. Chulkov, I. Maznichenko, and I Mertig, "Complex spin texture in the pure and Mn-doped topological insulator Bi_2Te_3," *Physi-*

cal Review letters, vol. 108, no. 20, p. 206 801, 2012. [Online]. Available: https://link.aps.org/doi/10.1103/PhysRevLett.108.206801.

[41] A. Baker, A. Figueroa, K Kummer, L. J. Collins-McIntyre, T. Hesjedal, and G van der Laan, "Magnetic proximity-enhanced Curie temperature of Cr-doped Bi_2Se_3 thin films," *Physical Review B*, vol. 92, no. 9, p. 094 420, 2015. [Online]. Available: https://link.aps.org/doi/10.1103/PhysRevB.92.094420.

[42] S. Harrison, L. Collins-McIntyre, S. Zhang, *et al.*, "Study of Dy-doped Bi_2Te_3: thin film growth and magnetic properties," *Journal of Physics: Condensed Matter*, vol. 27, no. 24, p. 245 602, 2015. [Online]. Available: https://doi.org/10.1088/0953-8984/27/24/245602.

[43] S. Harrison, L. J. Collins-McIntyre, S. Zhang, *et al.*, "Study of Ho-doped Bi_2Te_3 topological insulator thin films," *Applied Physics Letters*, vol. 107, no. 18, p. 182 406, 2015. [Online]. Available: https://doi.org/10.1063/1.4935235.

[44] L. B. Duffy, N.-J. Steinke, J. Krieger, *et al.*, "Microscopic effects of Dy doping in the topological insulator Bi_2Te_3," *Physical Review B*, vol. 97, no. 17, p. 174 427, 2018. [Online]. Available: https://link.aps.org/doi/10.1103/PhysRevB.97.174427.

[45] N. Jo, K. Lee, C. Kim, *et al.*, "Tuning of magnetic and transport properties in Bi_2Te_3 by divalent Fe doping," *Physical Review B*, vol. 87, no. 20, p. 201 105, 2013. [Online]. Available: https://link.aps.org/doi/10.1103/PhysRevB.87.201105.

[46] S. Harrison, L. Collins-McIntyre, S Li, *et al.*, "Study of Gd-doped Bi_2Te_3 thin films: Molecular beam epitaxy growth and magnetic properties," *Journal of Applied Physics*, vol. 115, no. 2, p. 023 904, 2014. [Online]. Available: https://doi.org/10.1063/1.4861615.

[47] A. Figueroa, S. Harrison, L. Collins-McIntyre, G van der Laan, and T Hesjedal, "Magnetic ordering in Ho-doped Bi_2Te_3 topological insulator," *physica status solidi (RRL)–Rapid Research Letters*, vol. 10, no. 6, pp. 467–470, 2016. [Online]. Available: https://doi.org/10.1002/pssr.201600061.

[48] M. D. Watson, L. J. Collins-McIntyre, L. R. Shelford, *et al.*, "Study of the structural, electric and magnetic properties of Mn-doped Bi_2Te_3 single crystals," *New Journal of Physics*, vol. 15, no. 10, p. 103 016, 2013. [Online]. Available: https://doi.org/10.1088/1367-2630/15/10/103016.

[49] J. S. Lee, A. Richardella, D. W. Rench, *et al.*, "Ferromagnetism and spin-dependent transport in *n*-type Mn-doped bismuth telluride thin films," *Physical Review B*, vol. 89, no. 17, p. 174 425, 2014. [Online]. Available: https://link.aps.org/doi/10.1103/PhysRevB.89.174425.

[50] A. Ghasemi, D Kepaptsoglou, A. Figueroa, *et al.*, "Experimental and density functional study of Mn doped Bi_2Te_3 topological insulator," *Applied Physics Letter Materials*, vol. 4, no. 12, p. 126 103, 2016. [Online]. Available: https://doi.org/10.1063/1.4971354.

[51] Y. S. Hor, P. Roushan, H. Beidenkopf, *et al.*, "Development of ferromagnetism in the doped topological insulator $Bi_{2-x}Mn_xTe_3$," *Physical Review B*, vol. 81, no. 19, p. 195 203, 2010. [Online]. Available: https://link.aps.org/doi/10.1103/PhysRevB.81.195203.

[52] Y. Li, X. Zou, J. Li, and G. Zhou, "Ferromagnetism and topological surface states of manganese doped Bi_2Te_3: Insights from density-functional calculations," *The Journal of chemical physics*, vol. 140, no. 12, p. 124 704, 2014. [Online]. Available: https://doi.org/10.1063/1.4869146.

[53] H Yang, L. Liu, M Zhang, and X. Yang, "Growth and magnetic properties of Ni-doped Bi_2Se_3 topological insulator crystals," *Solid State Communications*, vol. 241, pp. 26–31, 2016. [Online]. Available: https://doi.org/10.1016/j.ssc.2016.05.008.

[54] C.-Z. Chang, P. Tang, Y.-L. Wang, *et al.*, "Chemical-potential-dependent gap opening at the Dirac surface states of Bi_2Se_3 induced by aggregated substitutional Cr atoms," *Physical Review letters*, vol. 112, no. 5, p. 056 801, 2014. [Online]. Available: https://link.aps.org/doi/10.1103/PhysRevLett.112.056801.

[55] A. Shikin, D. Estyunin, Y. I. Surnin, *et al.*, "Dirac gap opening and dirac-fermion-mediated magnetic coupling in antiferromagnetic gd-doped topological insulators and their manipulation by synchrotron radiation," *Scientific reports*, vol. 9, no. 1, pp. 1–17, 2019. [Online]. Available: https://doi.org/10.1038/s41598-019-41137-w.

[56] J Henk, M Flieger, I. Maznichenko, *et al.*, "Topological character and magnetism of the Dirac state in Mn-doped Bi_2Te_3," *Physical Review letters*, vol. 109, no. 7, p. 076 801, 2012. [Online]. Available: https://link.aps.org/doi/10.1103/PhysRevLett.109.076801.

[57] J. Cui, W. Xiu, L. Mao, P. Ying, L Jiang, and X Qian, "Thermoelectric properties of Ag-doped n-type $(Bi_2Te_3)_{0.9}$–$(Bi_{2-x}Ag_xSe_3)_{0.1}$ (x= 0–0.4) alloys prepared by spark plasma sintering," *Journal of Solid State Chemistry*, vol. 180, no. 3, pp. 1158–1162, 2007. [Online]. Available: https://doi.org/10.1016/j.jssc.2006.12.010.

[58] M.-P. Lu, C.-N. Liao, J.-Y. Huang, and H.-C. Hsu, "Thermoelectric properties of Ag-doped $Bi_2(Se, Te)_3$ compounds: dual electronic nature of Ag-related lattice defects," *Inorganic chemistry*, vol. 54, no. 15, pp. 7438–7444, 2015. [Online]. Available: https://doi.org/10.1021/acs.inorgchem.5b01031.

[59] J. K. Lee, J. H. Son, Y.-I. Kim, *et al.*, "Control of carrier concentration by Ag doping in *n*-type Bi_2Te_3 based compounds," *Applied Sciences*, vol. 8, no. 5, p. 735, 2018. [Online]. Available: https://doi.org/10.3390/app8050735.

[60] O. Ivanov and M. Yaprintsev, "Variable-range hopping conductivity in Lu-doped Bi_2Te_3," *Solid State Sciences*, vol. 76, pp. 111–117, 2018. [Online]. Available: https://doi.org/10.1016/j.solidstatesciences.2017.12.012.

[61] O. Ivanov and M. Yaprintsev, "Mechanisms of thermoelectric efficiency enhancement in Lu-doped Bi_2Te_3," *Materials Research Express*, vol. 5, no. 1, p. 015 905, 2018. [Online]. Available: https://doi.org/10.1088/2053-1591/aaa265.

[62] A. Singh, S. Kumar, M. Singh, *et al.*, "Anomalous Hall effect in Cu doped Bi_2Te_3 topological insulator," *Journal of Physics: Condensed Matter*, vol. 32, no. 30,

p. 305 602, 2020. [Online]. Available: https://doi.org/10.1088/1361-648X/ab8521.

[63] J. Bludska, I. Jakubec, Č Drašar, P Lošt'ák, and J. Horak, "Structural defects in Cu-doped Bi_2Te_3 single crystals," *Philosophical Magazine*, vol. 87, no. 2, pp. 325–335, 2007. [Online]. Available: https://doi.org/10.1080/14786430600990337.

[64] H.-J. Wu and W.-T. Yen, "High thermoelectric performance in Cu-doped Bi_2Te_3 with carrier-type transition," *Acta Materialia*, vol. 157, pp. 33–41, 2018. [Online]. Available: https://doi.org/10.1016/j.actamat.2018.07.022.

[65] S. Sasaki, M Kriener, K. Segawa, *et al.*, "Topological superconductivity in $Cu_xBi_2Se_3$," *Physical review letters*, vol. 107, no. 21, p. 217 001, 2011. [Online]. Available: https://link.aps.org/doi/10.1103/PhysRevLett.107.217001.

[66] M. Nassary, H. Shaban, and M. El-Sadek, "Semiconductor parameters of Bi_2Te_3 single crystal," *Materials Chemistry and Physics*, vol. 113, no. 1, pp. 385–388, 2009. [Online]. Available: https://doi.org/10.1016/j.matchemphys.2008.07.106.

[67] Y. Kumar, R. Sultana, and V. Awana, "Comprehensive analysis for the high field magneto-conductivity of Bi_2Te_3 single crystal," *Physica B: Condensed Matter*, p. 412 759, 2021. [Online]. Available: https://doi.org/10.1016/j.physb.2020.412759.

[68] D. T. Wiles and R. Young, "A new computer program for rietveld analysis of x-ray powder diffraction patterns," *Journal of Applied Crystallography*, vol. 14, no. 2, pp. 149–151, 1981. [Online]. Available: https://doi.org/10.1107/S0021889881008996.

[69] J. Rodríguez-Carvajal, "Recent advances in magnetic structure determination by neutron powder diffraction," *Physica B: Condensed Matter*, vol. 192, no. 1-2, pp. 55–69, 1993. [Online]. Available: https://doi.org/10.1016/0921-4526(93)90108-I.

[70] M. Francombe, “Structure-cell data and expansion coefficients of bismuth telluride,” *British Journal of Applied Physics*, vol. 9, no. 10, p. 415, 1958. [Online]. Available: https://doi.org/10.1088/0508-3443/9/10/307.

[71] C. Chen, S. He, H. Weng, *et al.*, “Robustness of topological order and formation of quantum well states in topological insulators exposed to ambient environment,” *Proceedings of the National Academy of Sciences*, vol. 109, no. 10, pp. 3694–3698, 2012. [Online]. Available: https://doi.org/10.1073/pnas.1115555109.

[72] Y. Chen, J. G. Analytis, J.-H. Chu, *et al.*, “Experimental realization of a three-dimensional topological insulator Bi_2Te_3,” *Science*, vol. 325, no. 5937, pp. 178–181, 2009. [Online]. Available: https://www.science.org/doi/abs/10.1126/science.1173034.

[73] V Wagner, G Dolling, B. Powell, and G Landweher, “Lattice vibrations of Bi_2Te_3,” *physica status solidi (b)*, vol. 85, no. 1, pp. 311–317, 1978. [Online]. Available: https://doi.org/10.1002/pssb.2220850134.

[74] J. Jenkins, J. Rayne, and R. Ure Jr, “Elastic moduli and phonon properties of Bi_2Te_3,” *Physical Review B*, vol. 5, no. 8, p. 3171, 1972. [Online]. Available: https://link.aps.org/doi/10.1103/PhysRevB.5.3171.

[75] Y. Zhao, R. W. Hughes, Z. Su, W. Zhou, and D. H. Gregory, “One-Step Synthesis of Bismuth Telluride Nanosheets of a Few Quintuple Layers in Thickness,” *Angewandte Chemie International Edition*, vol. 50, no. 44, pp. 10 397–10 401, 2011. [Online]. Available: https://doi.org/10.1002/anie.201104299.

[76] K. Shahil, M. Hossain, D Teweldebrhan, and A. Balandin, “Crystal symmetry breaking in few-quintuple Bi_2Te_3 films: Applications in nanometrology of topological insulators,” *Applied physics letters*, vol. 96, no. 15, p. 153 103, 2010. [Online]. Available: https://doi.org/10.1063/1.3396190.

[77] F. Liu, L. Hu, M. Karakaya, *et al.*, “A micro-Raman study of exfoliated few-layered *n*-type $Bi_2Te_{2.7}Se_{0.3}$,” *Scientific Reports*, vol. 7, no. 1, pp. 1–10, 2017. [Online]. Available: https://doi.org/10.1038/s41598-017-16479-y.

[78] R. Sultana, P Neha, R Goyal, S Patnaik, and V. Awana, "Unusual non saturating Giant Magneto-resistance in single crystalline Bi_2Te_3 topological insulator," *Journal of Magnetism and Magnetic Materials*, vol. 428, pp. 213–218, 2017. [Online]. Available: https://doi.org/10.1016/j.jmmm.2016.12.011.

[79] A. Maiti, R. P. Pandeya, B. Singh, K. K. Iyer, A Thamizhavel, and K. Maiti, "Anomalies in the temperature evolution of dirac states in the topological crystalline insulator snte," *Physical Review B*, vol. 104, no. 19, p. 195 403, 2021. [Online]. Available: https://link.aps.org/doi/10.1103/PhysRevB.104.195403.

[80] D. Kumar and A. Lakhani, "Effect of band bending on topological surface transport of Bi_2Te_3 single crystal," *Journal of Physics: Condensed Matter*, vol. 33, no. 11, p. 115 703, 2020. [Online]. Available: https://doi.org/10.1088/1361-648X/abd335.

[81] A. Ahmed and S. Han, "Fabrication, micro-structure characteristics and transport properties of co-evaporated thin films of Bi_2Te_3 on AlN coated stainless steel foils," *Scientific Reports*, vol. 11, no. 1, pp. 1–17, 2021. [Online]. Available: https://doi.org/10.1038/s41598-021-83476-7.

[82] O. Norimasa, T. Kurokawa, R. Eguchi, and M. Takashiri, "Evaluation of Thermoelectric Performance of Bi_2Te_3 Films as a Function of Temperature Increase Rate during Heat Treatment," *Coatings*, vol. 11, no. 1, p. 38, 2021. [Online]. Available: https://doi.org/10.3390/coatings11010038.

[83] K. Cicvaric, L. Meng, D. W. Newbrook, *et al.*, "Thermoelectric properties of bismuth telluride thin films electrodeposited from a nonaqueous solution," *ACS omega*, vol. 5, no. 24, pp. 14 679–14 688, 2020. [Online]. Available: https://doi.org/10.1021/acsomega.0c01284.

[84] J.-H. Kim, J.-Y. Choi, J.-M. Bae, M.-Y. Kim, and T.-S. Oh, "Thermoelectric characteristics of *n*-type Bi_2Te_3 and *p*-type Sb_2Te_3 thin films prepared by co-evaporation and annealing for thermopile sensor applications," *Materials Transactions*, vol. 54,

no. 4, pp. 618–625, 2013. [Online]. Available: https://doi.org/10.2320/matertrans.M2013010.

[85] J. E. Moore, "he birth of topological insulators," *Nature*, vol. 464, no. 7286, pp. 194–198, 2010. [Online]. Available: https://doi.org/10.1038/nature08916.

[86] N. P. Armitage, E. J. Mele, and A. Vishwanath, "Weyl and Dirac semimetals in three-dimensional solids," *Review of Modern Physics*, vol. 90, p. 015 001, 1 2018.

[87] R. Bi, Z. Yan, L. Lu, and Z. Wang, "Nodal-knot semimetals," *Physical Review B*, vol. 96, p. 201 305, 20 2017. [Online]. Available: https://link.aps.org/doi/10.1103/PhysRevB.96.201305.

[88] Z. Yan, R. Bi, H. Shen, L. Lu, S.-C. Zhang, and Z. Wang, "Nodal-link semimetals," *Physical Review B*, vol. 96, p. 041 103, 4 2017. [Online]. Available: https://link.aps.org/doi/10.1103/PhysRevB.96.041103.

[89] P.-Y. Chang and C.-H. Yee, "Weyl-link semimetals," *Physical Review B*, vol. 96, p. 081 114, 8 2017. [Online]. Available: https://link.aps.org/doi/10.1103/PhysRevB.96.081114.

[90] W. Chen, H.-Z. Lu, and J.-M. Hou, "Topological semimetals with a double-helix nodal link," *Physical Review B*, vol. 96, p. 041 102, 4 2017. [Online]. Available: https://link.aps.org/doi/10.1103/PhysRevB.96.041102.

[91] Y. Kim, B. J. Wieder, C. L. Kane, and A. M. Rappe, "Dirac Line Nodes in Inversion-Symmetric Crystals," *Physical Review Letter*, vol. 115, p. 036 806, 3 2015. [Online]. Available: https://link.aps.org/doi/10.1103/PhysRevLett.115.036806.

[92] R. Yu, H. Weng, Z. Fang, X. Dai, and X. Hu, "Topological Node-Line Semimetal and Dirac Semimetal State in Antiperovskite Cu_3PdN," *Physical Review Letter*, vol. 115, p. 036 807, 3 2015. [Online]. Available: https://link.aps.org/doi/10.1103/PhysRevLett.115.036807.

[93] L. M. Schoop, M. N. Ali, C. Straßer, *et al.*, "Dirac cone protected by non-symmorphic symmetry and three-dimensional Dirac line node in ZrSiS," *Nature Communica-*

tion, vol. 7, no. 1, pp. 1–7, 2016. [Online]. Available: https://doi.org/10.1038/ncomms11696.

[94] M. M. Hosen, K. Dimitri, I. Belopolski, *et al.*, "Tunability of the topological nodal-line semimetal phase in ZrSiX-type materials (X = S, Se, Te)," *Physical Review B*, vol. 95, p. 161 101, 16 2017. [Online]. Available: https://link.aps.org/doi/10.1103/PhysRevB.95.161101.

[95] H. Huang, K.-H. Jin, and F. Liu, "Topological nodal-line semimetal in nonsymmorphic Cmce-phase Ag_2S," *Physical Review B*, vol. 96, p. 115 106, 11 2017. [Online]. Available: https://link.aps.org/doi/10.1103/PhysRevB.96.115106.

[96] H. Huang, J. Liu, D. Vanderbilt, and W. Duan, "Topological nodal-line semimetals in alkaline-earth stannides, germanides, and silicides," *Physical Review B*, vol. 93, p. 201 114, 20 2016. [Online]. Available: https://link.aps.org/doi/10.1103/PhysRevB.93.201114.

[97] Y.-H. Chan, C.-K. Chiu, M. Y. Chou, and A. P. Schnyder, "Ca_3P_2 and other topological semimetals with line nodes and drumhead surface states," *Physical Review B*, vol. 93, p. 205 132, 20 2016. [Online]. Available: https://link.aps.org/doi/10.1103/PhysRevB.93.205132.

[98] Q. Xu, R. Yu, Z. Fang, X. Dai, and H. Weng, "Topological nodal line semimetals in the CaP_3 family of materials," *Physical Review B*, vol. 95, p. 045 136, 4 2017. [Online]. Available: https://link.aps.org/doi/10.1103/PhysRevB.95.045136.

[99] Y. Du, F. Tang, D. Wang, *et al.*, "CaTe: a new topological node-line and Dirac semimetal," *npj Quantum Materials*, vol. 2, no. 1, pp. 1–4, 2017. [Online]. Available: https://doi.org/10.1038/s41535-016-0005-4.

[100] B. Singh, S. Mardanya, C. Su, H. Lin, A. Agarwal, and A. Bansil, "Spin-orbit coupling driven crossover from a starfruitlike nodal semimetal to Dirac and Weyl semimetal state in CaAuAs," *Physical Review B*, vol. 98, p. 085 122, 8 2018. [On-

line]. Available: https://link.aps.org/doi/10.1103/PhysRevB.98.085122.

[101] D. Takane, K. Nakayama, S. Souma, *et al.*, "Observation of Dirac-like energy band and ring-torus Fermi surface associated with the nodal line in topological insulator CaAgAs," *npj Quantum Materials*, vol. 3, no. 1, pp. 1–6, 2018. [Online]. Available: https://doi.org/10.1038/s41535-017-0074-z.

[102] T.-R. Chang, I. Pletikosic, T. Kong, *et al.*, "Realization of a type-II nodal-line semimetal in Mg_3Bi_2," *Advanced Science*, vol. 6, no. 4, p. 1 800 897, 2019. [Online]. Available: https://doi.org/10.1002/advs.201800897.

[103] R. Lou, P. Guo, M. Li, *et al.*, "Experimental observation of bulk nodal lines and electronic surface states in ZrB_2," *npj Quantum Materials*, vol. 3, no. 1, pp. 1–7, 2018. [Online]. Available: https://doi.org/10.1038/s41535-018-0121-4.

[104] Y. K. Song, G. W. Wang, S. C. Li, *et al.*, "Photoemission Spectroscopic Evidence for the Dirac Nodal Line in the Monoclinic Semimetal $SrAs_3$," *Physical Review Letter*, vol. 124, p. 056 402, 5 2020. [Online]. Available: https://link.aps.org/doi/10.1103/PhysRevLett.124.056402.

[105] G. Chang, S.-Y. Xu, H. Zheng, *et al.*, "Room-temperature magnetic topological Weyl fermion and nodal line semimetal states in half-metallic Heusler Co_2TiX (X= Si, Ge, or Sn)," *Scientific Reports*, vol. 6, no. 1, pp. 1–9, 2016. [Online]. Available: https://doi.org/10.1038/srep38839.

[106] X. Zhang, Z.-M. Yu, Z. Zhu, *et al.*, "Nodal loop and nodal surface states in the Ti_3Al family of materials," *Physical Review B*, vol. 97, p. 235 150, 23 2018. [Online]. Available: https://link.aps.org/doi/10.1103/PhysRevB.97.235150.

[107] C. Niu, P. M. Buhl, G. Bihlmayer, *et al.*, "Two-dimensional topological nodal line semimetal in layered X_2Y (X = Ca, Sr, and Ba; Y = As, Sb, and Bi)," *Physical Review B*, vol. 95, p. 235 138, 23 2017. [Online]. Available: https://link.aps.org/doi/10.1103/PhysRevB.95.235138.

[108] Y. Xu, Y. Gu, T. Zhang, *et al.*, "Topological nodal lines and hybrid Weyl nodes in $YCoC_2$," *Applied Physics Letter Materials*, vol. 7, no. 10, p. 101 109, 2019. [Online]. Available: https://doi.org/10.1063/1.5123222.

[109] S.-S. Wang, Z.-M. Yu, Y. Liu, *et al.*, "Two-dimensional nodal-loop half-metal in monolayer MnN," *Physical Review Materials*, vol. 3, p. 084 201, 8 2019. [Online]. Available: https://link.aps.org/doi/10.1103/PhysRevMaterials.3.084201.

[110] D. Shao, T. Chen, Q. Gu, *et al.*, "Nonsymmorphic symmetry protected node-line semimetal in the trigonal YH_3," *Scientific Reports*, vol. 8, no. 1, pp. 1–7, 2018. [Online]. Available: https://doi.org/10.1038/s41598-018-19870-5.

[111] Y. Sun, Y. Zhang, C.-X. Liu, C. Felser, and B. Yan, "Dirac nodal lines and induced spin Hall effect in metallic rutile oxides," *Physical Review B*, vol. 95, p. 235 104, 23 2017. [Online]. Available: https://link.aps.org/doi/10.1103/PhysRevB.95.235104.

[112] Y. Huh, E.-G. Moon, and Y. B. Kim, "Long-range Coulomb interaction in nodal-ring semimetals," *Physical Review B*, vol. 93, p. 035 138, 3 2016. [Online]. Available: https://link.aps.org/doi/10.1103/PhysRevB.93.035138.

[113] J.-W. Rhim and Y. B. Kim, "Landau level quantization and almost flat modes in three-dimensional semimetals with nodal ring spectra," *Physical Review B*, vol. 92, p. 045 126, 4 2015. [Online]. Available: https://link.aps.org/doi/10.1103/PhysRevB.92.045126.

[114] C. Fang, Y. Chen, H.-Y. Kee, and L. Fu, "Topological nodal line semimetals with and without spin-orbital coupling," *Physical Review B*, vol. 92, p. 081 201, 8 2015. [Online]. Available: https://link.aps.org/doi/10.1103/PhysRevB.92.081201.

[115] C. Fang, H. Weng, X. Dai, and Z. Fang, "Topological nodal line semimetals," *Chinese Physics B*, vol. 25, no. 11, p. 117 106, 2016. [Online]. Available: https://doi.org/10.1088/1674-1056/25/11/117106.

[116] G. Bian, T.-R. Chang, H. Zheng, *et al.*, "Drumhead surface states and topological nodal-line fermions in $TlTaSe_2$," *Physical Review B*, vol. 93, p. 121 113, 12 2016. [Online]. Available: https://link.aps.org/doi/10.1103/PhysRevB.93.121113.

[117] G. Bian, T.-R. Chang, R. Sankar, *et al.*, "Topological nodal-line fermions in spin-orbit metal $PbTaSe_2$," *Nature Communication*, vol. 7, no. 1, pp. 1–8, 2016. [Online]. Available: https://doi.org/10.1038/ncomms10556.

[118] S. A. Ekahana, "Investigation of topological nodal semimetals through angle-resolved photoemission spectroscopy," Ph.D. dissertation, University of Oxford, 2018.

[119] K. Okawa, M. Kanou, H. Namiki, and T. Sasagawa, "Extremely large magnetoresistance induced by hidden three-dimensional Dirac bands in nonmagnetic semimetal InBi," *Physical Review Materials*, vol. 2, p. 124 201, 12 2018. [Online]. Available: https://link.aps.org/doi/10.1103/PhysRevMaterials.2.124201.

[120] V. Tissen, V. Degtyareva, M. Nefedova, E. Ponyatovskii, and W. Holzapfel, "Superconductivity and crystallographic transitions of InBi under pressure," *Journal of Physics Condensed Matter*, vol. 10, no. 33, p. 7303, 1998. [Online]. Available: https://doi.org/10.1088/0953-8984/10/33/003.

[121] R. T. W. Meyer, J. Hofmans, and A. De Vroomen, "The de Haas-van Alphen effect in InBi," *Journal of Physics and Chemistry of Solids*, vol. 35, no. 3, pp. 307–312, 1974. [Online]. Available: https://doi.org/10.1016/S0022-3697(74)80023-5.

[122] K. Schwarz and P. Blaha, "Solid state calculations using WIEN2k," *Computational Materials Science*, vol. 28, no. 2, pp. 259–273, 2003. [Online]. Available: https://doi.org/10.1016/S0927-0256(03)00112-5.

[123] J. P. Perdew, K. Burke, and M. Ernzerhof, "Generalized Gradient Approximation Made Simple," *Physical Review Letter*, vol. 77, pp. 3865–3868, 18 1996. [Online]. Available: https://link.aps.org/doi/10.1103/PhysRevLett.77.3865.

[124] P. E. Blöchl, O. Jepsen, and O. K. Andersen, "Improved tetrahedron method for Brillouin-zone integrations," *Physical Review B*, vol. 49, pp. 16 223–16 233, 23 1994. [Online]. Available: https://link.aps.org/doi/10.1103/PhysRevB.49.16223.

[125] C. Shekhar, A. K. Nayak, Y. Sun, *et al.*, "Extremely large magnetoresistance and ultrahigh mobility in the topological Weyl semimetal candidate NbP," *Nature Physics*, vol. 11, no. 8, pp. 645–649, 2015. [Online]. Available: https://doi.org/10.1038/nphys3372.

[126] J. Hu, J. Liu, D. Graf, *et al.*, "π Berry phase and Zeeman splitting of Weyl semimetal TaP," *Scientific Reports*, vol. 6, no. 1, pp. 1–8, 2016. [Online]. Available: https://doi.org/10.1038/srep18674.

[127] F. Tafti, Q. Gibson, S. Kushwaha, N. Haldolaarachchige, and R. Cava, "Resistivity plateau and extreme magnetoresistance in LaSb," *Nature Physics*, vol. 12, no. 3, pp. 272–277, 2016. [Online]. Available: https://doi.org/10.1038/nphys3581.

[128] S. Sun, Q. Wang, P.-J. Guo, K. Liu, and H. Lei, "Large magnetoresistance in LaBi: origin of field-induced resistivity upturn and plateau in compensated semimetals," *New Journal of Physics*, vol. 18, no. 8, p. 082 002, 2016. [Online]. Available: https://doi.org/10.1088/1367-2630/18/8/082002.

[129] Y. L. Wang, L. R. Thoutam, Z. L. Xiao, *et al.*, "Origin of the turn-on temperature behavior in WTe_2," *Physical Review B*, vol. 92, p. 180 402, 18 2015. [Online]. Available: https://link.aps.org/doi/10.1103/PhysRevB.92.180402.

[130] F. F. Tafti, Q. Gibson, S. Kushwaha, J. W. Krizan, N. Haldolaarachchige, and R. J. Cava, "Temperature- field phase diagram of extreme magnetoresistance," *Proceedings of the National Academy of Sciences*, vol. 113, no. 25, E3475–E3481, 2016. [Online]. Available: https://doi.org/10.1073/pnas.1607319113.

[131] X. Du, S.-W. Tsai, D. L. Maslov, and A. F. Hebard, "Metal-Insulator-Like Behavior in Semimetallic Bismuth and Graphite," *Physical Review Letter*, vol. 94,

p. 166 601, 16 2005. [Online]. Available: https://link.aps.org/doi/10.1103/PhysRevLett.94.166601.

[132] J. M. Ziman, *Electrons and phonons: the theory of transport phenomena in solids*. Oxford university press, 2001.

[133] R. Singha, A. Pariari, B. Satpati, and P. Mandal, "Magnetotransport properties and evidence of a topological insulating state in LaSbTe," *Physical Review B*, vol. 96, p. 245 138, 24 2017. [Online]. Available: https://link.aps.org/doi/10.1103/PhysRevB.96.245138.

[134] R. Singha, B. Satpati, and P. Mandal, "Fermi surface topology and signature of surface Dirac nodes in LaBi," *Scientific Reports*, vol. 7, no. 1, pp. 1–9, 2017. [Online]. Available: https://doi.org/10.1038/s41598-017-06697-9.

[135] P. M. Hall, S. Legvold, and F. H. Spedding, "Electrical Resistivity of Yttrium Single Crystals," *Physical Review*, vol. 116, pp. 1446–1447, 6 1959. [Online]. Available: https://link.aps.org/doi/10.1103/PhysRev.116.1446.

[136] X Zhang, Z Xiao, H Lei, and Y Toda, "Two-Dimensional Transition-Metal Electride Y_2C," *Chemistry of Materials*, vol. 26, p. 6638, 2014. [Online]. Available: https://doi.org/10.1021/cm503512h.

[137] M. Kohler, "Zur magnetischen widerstandsänderung reiner metalle," *Annalen der physik*, vol. 424, no. 1-2, pp. 211–218, 1938. [Online]. Available: https://doi.org/10.1002/andp.19384240124.

[138] J. Xu, F. Han, T.-T. Wang, *et al.*, "Extended Kohler's Rule of Magnetoresistance," *Physical Review X*, vol. 11, p. 041 029, 4 2021. [Online]. Available: https://link.aps.org/doi/10.1103/PhysRevX.11.041029.

[139] D. V. Khveshchenko, "Magnetic-Field-Induced Insulating Behavior in Highly Oriented Pyrolitic Graphite," *Physical Review Letter*, vol. 87, p. 206 401, 20 2001. [Online]. Available: https://link.aps.org/doi/10.1103/PhysRevLett.87.206401.

[140] H. Fritzsche, "Electrical properties of germanium semiconductors at low temperatures," *Physical Review*, vol. 99, pp. 406–419, 2 1955. [Online]. Available: https://link.aps.org/doi/10.1103/PhysRev.99.406.

[141] Y. Kopelevich, V. Lemanov, S. Moehlecke, and J. Torres, "Landau level quantization and possible superconducting instabilities in highly oriented pyrolitic graphite," *Physics of the Solid State*, vol. 41, pp. 1959–1962, 1999. [Online]. Available: https://doi.org/10.1134/1.1131135.

[142] M. Sercheli, Y Kopelevich, R Ricardo da Silva, J. Torres, and C Rettori, "Evidence for internal field in graphite: A conduction electron spin-resonance study," *Solid State Communications*, vol. 121, no. 9, pp. 579–583, 2002, ISSN: 0038-1098. [Online]. Available: https://www.sciencedirect.com/science/article/pii/S0038109801004653.

[143] C. Hurd, *The Hall effect in metals and alloys*. Springer Science & Business Media, 2012.

[144] F. Werner, "Hall measurements on low-mobility thin films," *Journal of Applied Physics*, vol. 122, no. 13, p. 135 306, 2017. [Online]. Available: https://doi.org/10.1063/1.4990470.

[145] Y. Saito, "The de Haas-van Alphen Effect of InBi," *Journal of the Physical Society of Japan*, vol. 17, no. 4, pp. 716–716, 1962. [Online]. Available: https://doi.org/10.1143/JPSJ.17.716.

[146] The supplementary information contains: (i) Experimental details and theoritical methods, (ii) Structure (iii) Temperature dependent Raman study.

[147] D. Shoenberg, *Magnetic oscillations in metals*. Cambridge university press, 2009.

[148] A. Narayanan, M. D. Watson, S. F. Blake, *et al.*, "Linear Magnetoresistance Caused by Mobility Fluctuations in n-Doped Cd_3As_2," *Physical Review Letter*, vol. 114, p. 117 201, 11 2015. [Online]. Available: https://link.aps.org/doi/10.1103/PhysRevLett.114.117201.

[149] S. A. Ekahana, S.-C. Wu, J. Jiang, *et al.*, "Observation of nodal line in non-symmorphic topological semimetal InBi," *New Journal of Physics*, vol. 19, no. 6, p. 065 007, 2017. [Online]. Available: https://doi.org/10.1088/1367-2630/aa75a1.

[150] C. Le, S. Qin, X. Wu, *et al.*, "Three-dimensional topological critical Dirac semimetal in AMgBi (A= K, Rb, Cs)," *Physical Review B*, vol. 96, no. 11, p. 115 121, 2017. [Online]. Available: https://link.aps.org/doi/10.1103/PhysRevB.96.115121.

[151] 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," *Nature physics*, vol. 5, no. 6, pp. 438–442, 2009. [Online]. Available: https://doi.org/10.1038/nphys1270.

[152] Z. Wang, H. Weng, Q. Wu, X. Dai, and Z. Fang, "Three-dimensional Dirac semimetal and quantum transport in Cd_3As_2," *Physical Review B*, vol. 88, no. 12, p. 125 427, 2013. [Online]. Available: https://link.aps.org/doi/10.1103/PhysRevB.88.125427.

[153] A. A. Soluyanov, D. Gresch, Z. Wang, *et al.*, "Type-II Weyl semimetals," *Nature*, vol. 527, no. 7579, pp. 495–498, 2015. [Online]. Available: https://doi.org/10.1038/nature15768.

[154] W. Tian, W. Yu, J. Shi, and Y. Wang, "The property, preparation and application of topological insulators: A review," *Materials*, vol. 10, no. 7, p. 814, 2017. [Online]. Available: https://doi.org/10.3390/ma10070814.

[155] S. Dan, S. Kumar, S. Dan, *et al.*, "Unraveling the obscure electronic transition and tuning of Fermi level in Cu substituted Bi_2Te_3 compound," *Applied Physics Letters*, vol. 120, no. 2, p. 022 105, 2022. [Online]. Available: https://doi.org/10.1063/5.0077476.

[156] G. Kresse and J. Furthmüller, "Efficiency of *ab-initio* total energy calculations for metals and semiconductors using a plane-wave basis set," *Computational materials science*, vol. 6, no. 1, pp. 15–50, 1996. [Online]. Available: https://doi.org/10.1016/0927-0256(96)00008-0.

[157] R Sehr and L. Testardi, "The optical properties of *p*-type Bi_2Te_3 Sb_2Te_3 alloys between 2–15 microns," *Journal of Physics and Chemistry of Solids*, vol. 23, no. 9, pp. 1219–1224, 1962. [Online]. Available: https://doi.org/10.1016/0022-3697(62)90169-5.