Professor Dr. Levan Chotorlishvili
Curriculum vitae and Publication list

January 27, 2026

Curriculum vitae

Prof. Dr hab. Levan Chotorlishvili
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Academic and research career:
2005 Habilitation in Theoretical Physics, Tbilisi State University, Georgia
1998 Ph.D. in Theoretical Physics, Faculty of Physics, Tbilisi State University, Georgia
1995 Diploma in Theoretical Physics, Faculty of Physics, Tbilisi State University, Georgia
Since 2022, an Associate Professor
Rzeszów University of Technology, Faculty of Mathematics and Applied Physics, Poland
2016-2021 Senior Scientist, University of Halle-Wittenberg, Germany
2012-2016 Research Associate, University of Halle-Wittenberg, Germany
2011 Research Associate, University of Heidelberg, Germany
2008-2010 Research Associate, University of Augsburg, Germany
2003-2008 Assistant Professor, Tbilisi State University, Georgia
2000-2003 Assistant at Tbilisi State University, Georgia
Teaching Experience, Lecture courses:
Since 2022, Rzeszów University of Technology, Poland: General Physics.
2021-2017, University of Halle-Wittenberg, Germany, Thermodynamics
2018-2017 University of Linz, Austria, Quantum information
2008-2003 Tbilisi State University, Georgia, Statistical Physics
2003-2000 Tbilisi State University, Georgia, Magnetism
The research interests: nonlinear phenomena, nonequilibrium phenomena, quantum entanglement, topological solitons, and invasive effects of quantum metrology, high-energy physics, and magnon-photon entanglement in optomagnonic systems. Entanglement of the Majorana fermions, dynamical phase transitions in topological systems.
The main achievements:
Developing the theory of plasmonic skyrmion lattice: Physical Review Letters 125 (22), 227201 (2025).
Proposed theory of the Skyrmion echo: Physical Review Letters 129, 126101 (2022).
The theory of magnon-photon entanglement of nonlinear systems: Physica D 476, 134699 (2025).
Study of the magnon-photon entanglement in chiral systems Physical Review B 107, 115126 (2023).
Solitons in a Composite Multiferroic Chain" In: Phys. Rev. Lett. 111 117202 (2013).
Fokker-Planck theory of the magnonic Seebeck effect". In: Phys. Rev. B 88, 144429 (2013).
Developing a model of a Quantum Otto heat engine based on a multiferroic chain working substance. In: New Journal of Physics 16.6 063018 (2014); Phys. Rev. E 94, 032116 (2016).
Quantum information theory in high energy physics In: Phys. Rev. D 96 103017 (2017); Phys. Rev. D 103,

036011 (2021).
Discovery of metamaterial properties in multiferroic systems. In: Nano Letters 16.11, 7290 (2016).
Proposing a model of the optical tweezer of skyrmions. In: npj Computational Materials 6.1, 140 (2020).
Model of the Plasmonic Skyrmion Lattice. In: Phys. Rev. Lett. 125, 227201 (2020).
Skyrmion Echo in a System of Interacting Skyrmions, In: Phys. Rev. Lett. 129,126101 (2022).
Prethermal Floquet time crystals in chiral multiferroic chains, In: Phys. Rev. B 111, 024315. (2025).
Topological dynamical quantum phase transition in a quantum skyrmion phase, In: Phys. Rev. B 107, L100419 (2023).

Publications:

https://scholar.google.com/citations?user=w6awgzUAAAAJ&hl=en&oi=ao

1. Andreas Sinner, Xi-Guang Wang, and Levan Chotorlishvili. "Skyrmion Footprint in the Thermodynamics of the Josephson Superconducting Diode". In: *Annalen der Physik* 538.1 (2026), e00488

2. R. Kumar, R. K. Shukla, L. Chotorlishvili, and S. K. Mishra. "Dynamics of Majorana zero modes across a hybrid Kitaev chain". In: *Phys. Rev. B* 112 (2025), p. 235159. DOI: 10.1103/7cqp-ws6c

3. M Wanic, R Khomeriki, S Stagraczyński, MI Katsnelson, Z Toklikishvili, and L Chotorlishvili. "Two-level atom witness of thermalization of multimode optical fibers". In: *Chaos: An Interdisciplinary Journal of Nonlinear Science* 35.8 (2025)

4. D. Maroulakos, C. Jasiukiewicz, A. Wal, A. Sinner, I. Weymann, T. Doma ński, and L. Chotorlishvili. "Majorana signatures in the tripartite uncertainty relations with quantum memory". In: *Phys. Rev. B* 111 (2025), p. 224426. DOI: 10.1103/dxb2-15jf

5. M. Kulig, T. Masłowski, K. A. Kouzakov, V. K. Dugaev, P. Kurashvili, S. Wolski, M. Inglot, C. Jasiukiewicz, and L. Chotorlishvili. "Fermionic entanglement in altermagnets". In: *Phys. Rev. B* 111 (2025), p. 184427. DOI: 10.1103/PhysRevB.111.184427

6. M. Wanic, C. Jasiukiewicz, Z. Toklikishvili, V. Jandieri, M. Trybus, E. Jartych, S. K. Mishra, and L. Chotorlishvili. "Entanglement properties of photon-magnon crystal from nonlinear perspective". In: *Physica D: Nonlinear Phenomena* (2025), p. 134699

7. V. Vijayan, L. Chotorlishvili, A. Ernst, M. I. Katsnelson, S. S. P. Parkin, and S. K Mishra. "Quantum heat engine with near-zero irreversible work utilizing quantum skyrmion working substance". In: *Physica A: Statistical Mechanics and its Applications* (2025), p. 130599

8. C. Jasiukiewicz, A. Sinner, I. Weymann, T. Doma ński, and L. Chotorlishvili. "Entanglement between quantum dots transmitted via a Majorana wire: Insights from the fermionic negativity, concurrence, and quantum mutual information". In: *Phys. Rev. B* 111 (2025), p. 075415. DOI: 10.1103/PhysRevB.111.075415

9. Rohit Kumar Shukla, Levan Chotorlishvili, Sunil K. Mishra, and Fernando Iemini. “Prethermal Floquet time crystals in chiral multiferroic chains and applications as quantum sensors of AC fields”. In: *Phys. Rev. B* 111 (2025), p. 024315. DOI: 10.1103/PhysRevB.111.024315

10. M Wanic, Z Toklikishvili, SK Mishra, M Trybus, and L Chotorlishvili. “Magnetoelectric fractals, Magnetoelectric parametric resonance and Hopf bifurcation”. In: *Physica D: Nonlinear Phenomena* 467 (2024), p. 134257

11. A. Sinner, X.-G. Wang, S. S. P. Parkin, A. Ernst, V. Dugaev, and L. Chotorlishvili. “Superconducting diode sensor”. In: *Phys. Rev. B* 109 (2024), p. 214510. DOI: 10.1103/PhysRevB.109.214510

12. Mariusz Trybus, Levan Chotorlishvili, and Elżbieta Jartych. “Dielectric and magnetoelectric properties of TGS–magnetite composite”. In: *Molecules* 29.6 (2024), p. 1378

13. M. Kulig, P. Kurashvili, C. Jasiukiewicz, M. Inglot, S. Wolski, S. Stagraczy ński, T. Masłowski, T. Szczepa ński, R. Stagraczy ński, V. K. Dugaev, and L. Chotorlishvili. “Topological insulator and quantum memory”. In: *Phys. Rev. B* 108 (2023), p. 134411. DOI: 10.1103/PhysRevB.108.134411

14. Rohit K Shukla, Levan Chotorlishvili, Vipin Vijayan, Harshit Verma, Arthur Ernst, Stuart SP Parkin, and Sunil K Mishra. “Quantum information diode based on a magnonic crystal”. In: *Materials for Quantum Technology* 3.3 (2023), p. 035003

15. Xi-guang Wang, Guang-hua Guo, V. K. Dugaev, J. Barnaś, J. Berakdar, S. S. P. Parkin, A. Ernst, and L. Chotorlishvili. “Steering skyrmions with microwave and terahertz electric pulses”. In: *Phys. Rev. B* 107 (2023), p. 094404. DOI: 10.1103/PhysRevB.107.094404

16. Z. Toklikishvili, L. Chotorlishvili, R. Khomeriki, V. Jandieri, and J. Berakdar. “Electrically controlled entanglement of cavity photons with electromagnons”. In: *Phys. Rev. B* 107 (2023), p. 115126. DOI: 10.1103/PhysRevB.107.115126

17. Vipin Vijayan, L. Chotorlishvili, A. Ernst, S. S. P. Parkin, M. I. Katsnelson, and S. K. Mishra. “Topological dynamical quantum phase transition in a quantum skyrmion phase”. In: *Phys. Rev. B* 107 (2023), p. L100419. DOI: 10.1103/PhysRevB.107.L100419

18. Podist Kurashvili and Levan Chotorlishvili. “Quantum discord and entropic measures of two relativistic fermions”. In: *Journal of Physics A: Mathematical and Theoretical* 55.49 (2022), p. 495303

19. S. Wolski, M. Inglot, C. Jasiukiewicz, K. A. Kouzakov, T. Masłowski, T. Szczepa ński, S. Stagraczy ński, R. Stagraczy ński, V. K. Dugaev, and L. Chotorlishvili. “Random spin-orbit gates in the system of a topological insulator and a quantum dot”. In: *Phys. Rev. B* 106 (2022), p. 224418. DOI: 10.1103/PhysRevB.106.224418

20. AK Singh, L Chotorlishvili, Z Toklikishvili, I Tralle, and SK Mishra. “Hybrid quantum–classical chaotic NEMS”. in: *Physica D: Nonlinear Phenomena* 439 (2022), p. 133418

21. X.-G. Wang, Guang-hua Guo, A. Dyrdał, J. Barnaś, V. K. Dugaev, S. S. P. Parkin, A. Ernst, and L. Chotorlishvili. “Skyrmion Echo in a System of Interacting Skyrmions”. In: *Phys. Rev. Lett.* 129 (2022), p. 126101. DOI: 10.1103/PhysRevLett.129.126101

22. X.-G. Wang, L. Chotorlishvili, G. Tatara, A. Dyrdał, Guang-hua Guo, V. K. Dugaev, J. Barnaś, S.S.P. Parkin, and A. Ernst. “Skyrmion lattice hosted in synthetic antiferromagnets and helix modes”. In: *Phys. Rev. B* 106 (2022), p. 104424. DOI: 10.1103/PhysRevB.106.104424

23. L. Chotorlishvili, Xi-guang Wang, A. Dyrdał, Guang-hua Guo, V. K. Dugaev, J. Barnaś, and J. Berakdar. “Rectification of the spin Seebeck current in noncollinear antiferromagnets”. In: *Phys. Rev. B* 106 (2022), p. 014417. DOI: 10.1103/PhysRevB.106.014417

24. Michał Kaczor, Igor Tralle, Paweł Jakubczyk, Stefan Stagraczyński, and Levan Chotorlishvili. “Switching of the information backflow between a helical spin system and non-Markovian bath”. In: *Annals of Physics* 442 (2022), p. 168918

25. Podist Kurashvili and Levan Chotorlishvili. “Quantum discord and entropic measures of two relativistic fermions”. In: *Journal of Physics A: Mathematical and Theoretical* 55.49 (2022), p. 495303

26. AK Singh, Kushagra Sachan, L Chotorlishvili, V Vipin, and Sunil K Mishra. “Scrambling and quantum feedback in a nanomechanical system”. In: *The European Physical Journal D* 76.2 (2022), p. 17

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28. Vakhtang Jandieri, Ramaz Khomeriki, Tornike Onoprishvili, Daniel Erni, Levan Chotorlishvili, Douglas H Werner, and Jamal Berakdar. “Band-gap solitons in nonlinear photonic crystal waveguides and their application for functional all-optical logic gating”. In: *Photonics*. Vol. 8. 7. MDPI. 2021, p. 250

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30. Podist Kurashvili, Levan Chotorlishvili, Konstantin Kouzakov, and Alexander Studenikin. “Coherence and mixedness of neutrino oscillations in a magnetic field”. In: *The European Physical Journal C* 81.4 (2021), p. 323

31. P. Kurashvili, L. Chotorlishvili, K. A. Kouzakov, A. G. Tevzadze, and A. I. Studenikin. “Quantum witness and invasiveness of cosmic neutrino measurements”. In: *Phys. Rev. D* 103 (2021), p. 036011. DOI: 10.1103/PhysRevD.103.036011

32. Xi-guang Wang, Yao-Zhuang Nie, L. Chotorlishvili, Qing-lin Xia, J. Berakdar, and Guang-hua Guo. “Electron-magnon spin conversion and magnonic spin pumping in an antiferromagnet/heavy metal heterostructure”. In: *Phys. Rev. B* 103 (2021), p. 064404. DOI: 10.1103/PhysRevB.103.064404

33. Igor Tralle, Levan Chotorlishvili, and Pawel Zieba. “Explicit Fresnel formulae for the absorbing double-negative metamaterials”. In: *Physics Letters A* 385 (2021), p. 126963

34. X.-G. Wang, L. Chotorlishvili, N. Arnold, V. K. Dugaev, I. Maznichenko, J. Barnaś, P. A. Buczek, S. S. P. Parkin, and A. Ernst. “Plasmonic Skyrmion Lattice Based on the Magnetoelectric Effect”. In: *Phys. Rev. Lett.* 125 (2020), p. 227201. DOI: 10.1103/PhysRevLett.125.227201

35. Harshit Verma, Levan Chotorlishvili, Jamal Berakdar, and Sunil Kumar Mishra. “Quantum teleportation by utilizing helical spin chains for sharing entanglement”. In: *Quantum Information Processing* 20 (2021), p. 54

36. Xi-Guang Wang, Levan Chotorlishvili, Vitalii K Dugaev, Arthur Ernst, Igor V Maznichenko, Nikita Arnold, Chenglong Jia, Jamal Berakdar, Ingrid Mertig, and Józef Barnaś. “The optical tweezer of skyrmions”. In: *npj Computational Materials* 6.1 (2020), p. 140

37. Dimitrios Maroulakos, Levan Chotorlishvili, Dominik Schulz, and Jamal Berakdar. “Local and nonlocal invasive measurements on two quantum spins coupled via nanomechanical oscillations”. In: *Symmetry* 12.7 (2020), p. 1078

38. L. Chotorlishvili, Z. Toklikishvili, X.-G. Wang, V. K. Dugaev, J. Barnaś, and J. Berakdar. “Stratonovich-Ito integration scheme in ultrafast spin caloritronics”. In: *Phys. Rev. B* 102 (2020), p. 024413. DOI: 10.1103/PhysRevB.102.024413

39. Levan Chotorlishvili, Chenglong Jia, Diana A Rata, Liane Brandt, Georg Woltersdorf, and Jamal Berakdar. “Magnonic Magnetoelectric Coupling in Ferroelectric/Ferromagnetic Composites”. In: *physica status solidi (b)* 257.7 (2020), p. 1900750

40. A. K. Singh, L. Chotorlishvili, S. Srivastava, I. Tralle, Z. Toklikishvili, J. Berakdar, and S. K. Mishra. “Generation of coherence in an exactly solvable nonlinear nanomechanical system”. In: *Phys. Rev. B* 101 (2020), p. 104311. DOI: 10.1103/PhysRevB.101.104311

41. Dorota Badziul, Paweł Jakubczyk, Levan Chotorlishvili, Zaza Toklikishvilie, Julian Traciak, Joanna Jakubowicz-Gil, and Sylwia Chmiel-Szajner. “Mathematical prostate cancer evolution: Effect of immunotherapy based on controlled vaccination strategy”. In: *Computational and Mathematical Methods in Medicine* 2020.1 (2020), p. 7970265

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44. L. Chotorlishvili, A. Gudyma, J. Wätzel, A. Ernst, and J. Berakdar. “Spin-orbit-coupled quantum memory of a double quantum dot”. In: *Phys. Rev. B* 100 (2019), p. 174413. DOI: 10.1103/PhysRevB.100.174413

45. Konstantin A. Kouzakov, Levan Chotorlishvili, Jonas Wätzel, Jamal Berakdar, and Arthur Ernst. “Entanglement balance of quantum $(e, 2e)$ scattering processes”. In: *Phys. Rev. A* 100 (2019), p. 022311. DOI: 10.1103/PhysRevA.100.022311

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47. L Chotorlishvili, S Stagraczyński, Michael Schüler, and J Berakdar. “From chaos to many-body localization: some introductory notes”. In: *arXiv preprint arXiv:1904.00091* (2019)

48. L. Chotorlishvili, Z. Toklikishvili, X.-G. Wang, V. K. Dugaev, J. Barna ś, and J. Berakdar. “Influence of spin-orbit and spin-Hall effects on the spin-Seebeck current beyond linear response: A Fokker-Planck approach”. In: *Phys. Rev. B* 99 (2019), p. 024410. DOI: 10.1103/PhysRevB.99.024410

49. M. Melz, J. Wätzel, L. Chotorlishvili, and J. Berakdar. “Electrically tunable entanglement of an interacting electron pair in a spin-active double quantum dot”. In: *Phys. Rev. B* 98 (2018), p. 104407. DOI: 10.1103/PhysRevB.98.104407

50. Xi-guang Wang, L Chotorlishvili, Guang-hua Guo, and J Berakdar. “Electric field controlled spin waveguide phase shifter in YIG”. in: *Journal of Applied Physics* 124.7 (2018)

51. AF Schäffer, L Chotorlishvili, IV Maznichenko, A Ernst, K Dörr, I Mertig, and J Berakdar. “Element specific hysteresis of La0. 7Sr0. 3MnO3—SrRuO3 (LSMO-SRO) heterostructures”. In: *APL Materials* 6.7 (2018)

52. M. Fechner, A. Sukhov, L. Chotorlishvili, C. Kenel, J. Berakdar, and N. A. Spaldin. “Magnetophononics: Ultrafast spin control through the lattice”. In: *Phys. Rev. Mater.* 2 (2018), p. 064401. DOI: 10.1103/PhysRevMaterials.2.064401

53. Xi-guang Wang, L Chotorlishvili, Guang-hua Guo, and J Berakdar. “Electric field controlled spin waveguide phase shifter in YIG”. in: *Journal of Applied Physics* 124.7 (2018)

54. L. Chotorlishvili, X.-G. Wang, Z. Toklikishvili, and J. Berakdar. “Thermoelastic enhancement of the magnonic spin Seebeck effect in thin films and bulk samples”. In: *Phys. Rev. B* 97 (2018), p. 144409. DOI: 10.1103/PhysRevB.97.144409

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65. Xi-guang Wang, Zhi-xiong Li, Zhen-wei Zhou, Yao-zhuang Nie, Qing-lin Xia, Zhong-ming Zeng, L. Chotorlishvili, J. Berakdar, and Guang-hua Guo. “Conversion of electronic to magnonic spin current at a heavy-metal magnetic-insulator interface”. In: *Phys. Rev. B* 95 (2017), p. 020414. DOI: 10.1103/PhysRevB.95.020414

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