Professor
George I. Japaridze
Member of the Georgian National Academy of Sciences
Head of the Scientific Counsel of the
Andronikashvili Institute of Physics

CV

Date of birth: 29 July 1953, Tbilisi, Georgia.
Nationality: Georgian
Family status: Married. Two children.

Home Address: Chavchavadze Avenue 30, app. 1, Tbilisi, 0177 Georgia
Phone: +995-32-2223597
Email: giajaparidze@gmail.com

Education: Graduated from the Tbilisi State University in 1975
PhD in Theoretical Condensed Matter Physics - 1983
Institute of Physics of the Georgian Academy of Sciences
Scientific Degree: Doctor of Sciences – 1998
Institute of Physics of the Georgian Academy of Sciences

Academic record:
1978-82 - Junior Researcher, Institute of Physics, GAoS.
1982-98 - Senior Researcher, Institute of Physics GAoS.
1998-05 - Principal Researcher, Institute of Physics, GNAS
2005-10 - Head of the Condensed Matter Department, Andronikashvili Institute of Physics (AIP).
From -2010 - Senior Researcher, Institute of Physics GAoS.
2004-2009 - Invited Professor, Tbilisi Javakhishvili State University.
From 2001 - Member of the Georgian National Academy of Sciences
From 2009 - Full Professor, Ilia State University, Tbilisi, Georgia
From 2018 - Head of the Scientific Council of the AIP
2018-2019 - Participant of the Project: *"Development of Radioactive Waste Management Infrastructure in Georgia" Phase 1*

Research Interests:

1. Theory of low-dimensional strongly correlated electron systems.
2. Low-dimensional magnetism.
3. Theory of metal-insulator transitions.
4. High temperature superconductivity.
5. Unconventional mechanisms of superconductivity.
6. New materials for modern electronics.

Long-term visits and research collaborations.

1991-2008, Institute of Theoretical Physics, University of Cologne.
1998-2002. Institute of Magnetism, University of Augsburg.
1999-2012. Institute of Theoretical Physics, University of Fribourg.
2002-2004. Institute of Theoretical Physics, University of Hannover.
2002-2009. Institute of Theoretical Physics, University of Goteborg.
2006-2008. Institute of Nanophysics and Materials for Microelectronics, University of Marseille.
2005-2012. International Center for Condensed Matter Physics, University of Brasilia.

Membership of Professional Organizations:

Member of the Georgian National Academy of Sciences
Member of the Georgian Health Physics Society.
Member of the Italian Physical Society.

Community Service as Journal referee

1. Physical Review B
2. European Journal of Physics Letters
3. European Journal of Physics B
4. Journal of Physics C; Condensed Matter
5. Physica A, Physica B
6. Annals of Physics
7. Physica Scripta
8. Critical Reports on Solid State

List of main publications

1. G. I. Japaridze , Hadi Cheraghi and Saeed Mahdavifar, *„Magnetic phase diagram of a Spin-1/2 XXZ chain with modulated Dzyaloshinskii-Moriya interaction“,* Phys. Rev. E 104, 014134 (2021)
2. F. Khastehdel Fumani, B. Beradze, S. Nemati, S. Mahdavifar and G. I. Japaridze, *„Quantum correlations in the spin-1/2 Heisenberg XXZ chain with modulated Dzyaloshinskii-Moriya interaction”* Jour. Magn. Magnet. Materials, 151 167411 (2020).
3. G. L. Rossini, D. C. Cabra, G. I. Japaridze *„Long-range alternating spin current order in a quantum wire with modulated spin-orbit interactions“,* Phys. Rev. B 101, 014441 (2020).
4. Niko Avalishvili, Bachana Beradze and George I. Japaridze, *„Magnetic phase diagram of a spin S=1/2 antiferromagnetic two-leg ladder in the presence of modulated along legs Dzyaloshinskii-Moriya interaction”.* Eur. Phys. J. B 92, 262 (2019) doi.org/10.1140/epjb/e2019-100323-1
5. N. Avalishvili, G.I. Japaridze G. L. Rossini, *“Long-range spin chirality dimer order in the Heisenberg chain with modulated Dzyaloshinskii-Moriya interactions” ,* Phys. Rev. B 99, 205159 (2019).
6. G.I. Japaridze, A.A.Nersesyan “*Ground state phases and quantum criticalities of one-dimen-sional Peierls model with spin-dependent sign-alternating potentials*”, Phys. Rev. B 99, 035134 (2019).
7. D. C. Cabra, G. L. Rossini. A. Ferraz, G. I. Japaridze and H. Johannesson, “*Half-metal phases in a quantum wire with modulated spin-orbit interaction*”, Phys. Rev. B 96, 205135 (2017).
8. Michael Sekania, Dionys Baeriswyl, Luka Jibuti, and G.I. Japaridze *„The Mass-Imbalanced Ionic Hubbard Chain*“, Phys. Rev. B 96, 035116 (2017).
9. Luka Jibuti, Micheil Sekania and G.I. Japaridze, *„Ground state phase diagram of the half-filled ionic chain with spin-asymmetric hopping*“, Nano Studies v.13, 41-50, (2016).
10. Michael Sekania, Dionys Baeriswyl, Luka Jibuti, and G.I. Japaridze *„The Mass-Imbalanced Ionic Hubbard Chain*“, Phys. Rev. B 96, 035116 (2017).
11. Luka Jibuti, Micheil Sekania and G.I. Japaridze, *„Ground state phase diagram of the half-filled ionic chain with spin-asymmetric hopping*“, Nano Studies v.13, 41-50, (2016).
12. Mariana Malard, George I. Japaridze and Henrik Johannesson, “*Synthesizing Majorana zero-energy modes in a periodically gated quantum wire*”, Phys. Rev. B 94, 115128 (2016). ArXiv/1512.00827
13. Inna Grusha, Micheil Menteshashivi and G.I. Japaridze, *“Effective Hamiltonian for a half-filled asymmetric ionic Hubbard chain with alternating on-site interaction*”, International Jour of Mod . Phys. B 30, 1550260 (2016).
14. M. Di Liberto, D. Malpetti, G.I. Japaridze C. Morais Smith, *“Ultracold fermions in a one-dimensional bipartite optical potential: metal-insulator transitions driven by shaking”* Phys. Rev. A 90, 023634 (2014). ArXiv/1405/4756
15. G. I. Japaridze, Henrik Johannesson and Mariana Malard, *"Synthetic helical liquid in a quantum wire"* Phys. Rev. B 89, 201403 (2014).

16. M. Eliashvili, G.I. Japaridze, G. Tsitsishvili, and G. Tukhashvili, "*Edge states in 2D lattices with hopping anisotropy and Chebyshev polynomials*", Jour. of Phys. Soc. Japan 83, 044706 (2014).

17. M. Di Liberto, C. E. Creffield, G. I. Japaridze C. Morais Smith, "*Quantum simulation of correlated-hopping models with fermions in optical lattices*" Phys. Rev. A 89, 013624 (2014).

18. Bernd Braunecker, Anders Stroem and G.I. Japaridze, *"Magnetic-field switchable metal-insulator transition in a quasi-helical conductor"*, Phys. Rev. B 87, 075107 (2013). ArXiv/1206.5844

19. M. Shahri Naseri, G. I. Japaridze, S. Mahdavifar and S. Farjami Shayesteh, "*Quantum phase transition in a dimerized chain with hexamer distortion*", Phys. Status Solidi B v.250, 238 (2013).

20. Inna Grusha and G.I. Japaridze, *"Effective Hamiltonian for the half-filled spin-asymmetric ionic Hubbard chain with strong on-site repulsion*", in: "Low Dimensional Physics and Gauge Principles" (Eds.V.G.Gurzadyan, A.G.Sedrakyan), World Scientific, (2013)

21. N. Avalishvili and G.I. Japaridze, *"Magnetic phase diagram of a spin antiferromagnetic S=1/2 ladder with alternating rung exchange and dimerized legs*", Nano Studies v.6, 85-92 (2012).

22. Merab Eliashvili, George I. Japaridze, and George Tsitsishvili, *"Quantum group, Harper equation and the structure of Bloch eigenstates on a honeycomb lattice" ,* Jour. of Phys. A: Math. Gen. v.45, 305305 (2012).

23. N. Avalishvili, G. I. Japaridze, D. Nozadze and S. Mahdavifar, *"Magnetization plateau in the spin S=1/2 two-leg ladder with trimer modulation of the rung-exchange",* Bulletin of the Georgian National Academy of Sciences, v6, N2, 53-61 (2012).

24. Merab Eliashvili, George I. Japaridze, and George Tsitsishvili, *"Quantum group on a honeycomb lattice"*, Proceedings of the Georgian mathematical Institute v 160 38-51 (2012).

25. M. Shahri Naseri, G. I. Japaridze, S. Mahdavifar and S. Farjami Shayesteh, "*Magnetic properties of the spin S=1/2 Heisenberg chain with hexamer modulation of exchange*", Jour. Phys. C: Condens. Matt. v. 24, 116002 (2012). Arxiv/1110.4467.

26. Mariana Malard, Inna Grusha, G. I. Japaridze and Henrik Johannesson, "*Modulated Rashba interaction in a quantum wire: Spin and charge dynamics*" *"* Phys. Rev. B 84, 075466 (2011).

27. Gia-Wei Chern, N. Perkins and George I. Japaridze, "*Quantum criticality of vanadium chains with strong relativistic spin-orbit interaction"* Phys. Rev. B 82, 172408 (2010).

28. Bernd Braunecker, George I. Japaridze, Jelena Klinovaja, and Daniel Loss,"*Spin-selective Peierls transition in interacting one-dimensional conductors with spin-orbit interaction",* Phys. Rev. B 82, 045127 (2010).

29. Anders Ström, Henrik Johannesson, G. I. Japaridze, "*Edge Dynamics in a Quantum Spin Hall State: Effects from Rashba Spin-Orbit interaction*" Phys. Rev. Lett. 104, 256804 (2010) .

30. Zoran Ristivojevic, George I. Japaridze and Thomas Nattermann, "*Spin-filtering by field dependent resonant tunneling"* Phys. Rev. Lett. 104, 076401 (2010) ArXiv/0909.0025

31. T. Jonckheere , G.I. Japaridze, T. Martin, and R. Hayn *"Transport through a band insulator with Rashba spin-orbit coupling:metal-insulator transition and spin-filtering effects",* Phys. Rev. B 81, 165443 (2010).

32. G.I. Japaridze, Henrik Johannesson, and Alvaro Ferraz *"Metal-insulator transition in a quantum wire driven by a modulated Rashba spin-orbit coupling"*, Phys. Rev. B 80, 041308(R) (2009).

33. G.I. Japaridze and Saeed Mahdavifar, "Magnetic phase diagram of the spin S=1/2 ladder with rung-exchange dimerization" , Eur. Phys. J. B 68, 59-66 (2009) .

34. G.I. Japaridze and Saeed Mahdavifar, "*Magnetic phase diagram of a spin antiferromagnetic S=1/2 ladder with alternating rung exchange*", Bullet. Georgian National Academy of Sciences, v. 2, N4, 62-69 (2008).

35. M. Menteshashvili, N. Chachava and G.I. Japaridze, "Effective Hamiltonian for a half-filled tetramerized ionic-Hubbard chain" Bulletin of the Georgian National Academy of Sciences, v. 2, p. 67 (2008).

36. L. Craco, P. Lombardo, R. Hayn, G.I. Japaridze, E. Müller-Hartmann "Electronic phase transitions in the half-filled ionic Hubbard model", Phys. Rev. B 78, 075121 (2008).

37. G.I. Japaridze, R.M. Noack, D. Baeriswyl and L. Tincani, "*Phases and phase transitions in the half--filled t-t' Hubbard chain* ", Phys. Rev. B 76, 115118 (2007).

38. G.I. Japaridze, R. Hayn, P. Lombardo and E. Mueller-Hartmann, *"Band-Insulator-Metal-Mott-Insulator transition in the* half--filled t-t' ionic-Hubbard chain", Phys. Rev. B 75, 245122 (2007).

39. G.I. Japaridze, A. Langari and S. Mahdavifar, *"Spin ladder with anisotropic ferromagnetic legs in a transverse magnetic field"*, Jour. Phys. C: Cond. Matt. v. 19, 9297-9306 (2007).

40. G.I. Japaridze and E. Pogosyan *"Mean-field phase diagram of the half-filled Hubbard chain with alternating on-site interaction"* Proc. Georg. Acad. of Sciences v. 139. N2 (2006).

41. G.I. Japaridze and E. Pogosyan *"Magnetization plateau in the spin S=1/2 ladder with alternating rung exchange"* Jour. Phys. C: Cond. Matt. v. 18, 9297-9306 (2006).

42. P. Lombardo, R. Hayn and G.I. Japaridze, *"Insulator-metal-insulator transition and selective spec-tral weight transfer in a disordered strongly correlated system",* Phys. Rev. B 74, 085116 (2006).

43. G.I. Japaridze, R.M. Noack and D. Baeriswyl, "Nature of the metal-insulator transition in the half--filled t-t' Hubbard chain ". Condmat/0607054.

44. C. Dziurzik, G.I. Japaridze, A. Schadschneider, I. Titvinidze and J. Zittartz, *"Triplet superconduc- tivity in a 1D itinerant electron system with trasverse spin anisotropy*", Eur. Phys. J. B 51, pp. 41-51 (2006).

45. M.E. Torio, A.A. Aligia, G.I. Japaridze and B. Normand*, "Quantum phase diagram of the generalized ionic Hubbard model for AB_n chains",* Phys. Rev. B 73, 115109 (2006).

46. V. Gritsev, G. Japaridze, M. Pletyukhov, and D. Baeriswyl *"Competing Effects of Interactions and Spin-Orbit Coupling in a Quantum Wire"* Phys. Rev. Lett. 94, 137207 (2005).

47. T.Vekua, G.I. Japaridze and H.J. Mikeska, *"Phase diagrams of spin ladders with ferromagnetic legs in a magnetic field"* Phys. Rev. B v. 70, 014425 (2004).

48. P. Kakashvili and G.I. Japaridze, *„Effective Hamiltonian for a half-filled Hubbard chain with alternating interactions"* Jour. Phys. C: Cond. Matt. v. 16, 5815-5823 (2004).

49. Irakli Titvinidze and G.I. Japaridze, *"Correlation functions in the spin S=1/2 Extended XY model"* Proc.Geor.Acad.Scien, v. 163, p.501, (2004).

50. C. Dziurzik, G.I. Japaridze, A. Schadschneider, and J. Zittartz, *"Triplet superconductivity vs easy-plane Ferromagnet in a 1D itinerant electron system with trasverse spin anisotropy"* Eur. Phys. J. B v.37, 453-463 (2004).

51. H. Johannesson and G.I. Japaridze, *"Pairing and Density Correlations of Stripe Electrons in a Two-Dimensional Antiferromagnet"* Phys. Rev. B 68, 214507 (2003) .

52. A.P. Kampf, M. Sekania, G.I. Japaridze, and Ph. Brune, *"Nature of the insulating phases in the half-filled ionic Hubbard model"* Jour. Phys. C: Cond. Matt. v.15, 5895 (2003).

53. Irakli Titvinidze and G.I. Japaridze, *"Phase Diagram of the spin S=1/2 Extended XY model"* Eur. Phys. J. B v.32, 383-393 (2003).

54. T. Vekua, G.I. Japaridze and H.J. Mikeska,_*"Phase diagrams of spin ladders with ferromagnetic legs"* Phys. Rev. B . v. 67, 064419-064429, (2003).

55. G.I. Japaridze, Sujit Sarkar, "Phase Diagram of the Extended Hubbard Model with Pair Hopping Interaction". Eur. Phys. J. B v.28, 139-144 (2002).

56. G.I. Japaridze, A.P. Kampf, M.Sekania, P. Kakashvili and Ph. Brune *"Local pair superconductivuty in one-dimensional electron system with pair hopping interaction"* Phys. Rev. B v. 65, 014518-014527 (2002).

57. G.I. Japaridze and E. Mueller-Hartmann, *"Triplet superconductivity in a one-dimensional ferromagnetic t-J model"* Phys. Rev. B v. 61, 9019-9027 (2000).

58. G.I. Japaridze and A.P. Kampf, "Phase diagram of the extended Hubbard model with correlated-hopping interactions" Phys. Rev. B v. 59, 12822-12829, (1999).

59. G. Bouzerar, A.P. Kampf and G.I. Japaridze, *"Elementary excitation in dimerized and frustrated Heisenberg chains"* Phys. Rev. B v. 58, 3117-3123, (1998).

60. G.I. Japaridze and T. Vekua, "The weak-coupling phase diagram of the one-dimensional electron system with U(1)-symmetric correlated-hopping interactions" Proceedings of the ISPM-98, pages 139-152 Tbilisi, 5-18.09.1998.

61. G. Japaridze and E. Mueller-Hartmann, *"Bond-located ordering in the one-dimensional Penson-Kolb-Hubbard model",* Journal of Physics C: Cond.Matt. v.9, N47, 10509-10519, (1997).

62. G. Jackeli and G.I. Japaridze *"Renormalization group approach to the one-dimensional Hubbard model with alternating interaction",* Int. Jour. Mod. Phys. B v.11, 1925-1936, (1997).

63. G. Bouzerar and G.I. Japaridze, *" η-superconductivity in the one-dimensional Penson-Kolb model",* Zeit. f. Physik B, v.104, 215-219, (1997).

64. G. Bouzerar and G.I. Japaradze *"η-superconductivity in the one-dimensional pair-hopping model" ,* Proceedings of the International Conference "SIMI-96", Tbilisi, 1996. Cond.Mat-9605161. (1996)

65. G.I. Japaridze "The bond--located antiferromagnetizm in the One--Dimensional interacting electron system" Physics Letters A, v.201, 239-246, (1995).

66. G.I. Japaridze and E. Mueller-Hartmann, " Electrons with with Alternating On--Site and Correlated Hopping Interactions", Annalen der Physik, v.3, 392-407, (1994).

67. G.I. Japaridze and E.Mueller-Hartmann, *" Electrons with correlated hopping interaction on one dimension" ,* Annalen der Physik, v.3, 163-180, (1994).

68. G.I. Japaridze, D. Khomskii and E. Mueller-Hartmann, *" The one-dimensional 1/4-filled Hubbard model with non-equal on-site interaction on even and odd sites",* Annalen der Physik, v.2, 38, (1993).

69. A.A. Nersesyan, G.I. Japaridze and I.G. Kimeridze, *"Low-temperature magnetic properties of the two-dimensional spin nematic",* Journal of Physics C: Cond.Matt., v.3, 3353, (1991).

70. Г.И. Джапаридзе, А.А. Нерсесян, "'1/N-expansion from the Bethe-ansatz solution of the SU(N)-symmetric Gross-Neveu model in the large-N limit" Proc.Geor.Acad.Scien, v. 88, p.501, (1988).

71. G.I. Japaridze, A.A. Nersesyan and P.B. Wiegmann, *"Exact results in two-dimensional U(1)-Thirring model",* Nuclear Physics B, v.230, FS10, 511, (1984).

72. Г.И. Джапаридзе, " Магнитные свойства одномерной системы взаимодействующих фермионов. Точно решаемые модели." Кандидатская диссертация Тбилиси (1983).

73. G.I. Japaridze, A.A. Nersesyan and P.B. Wiegmann, *"Regularized integrable version of one-dimensional quantum Sine-Gordon model",* Physica Scripta, v.27, 5, (1983).

74. G.I. Japaridze, A.A. Nersesyan and P.B. Wiegmann, "Crossover from strong-coupling regime to the weak-coupling regime in the SU(2)-symmetric Thirring model", Phys.Letters A, v.94, 254, (1983).

75. G.I. Japaridze and A.A. Nersesyan, "Excitation spectrum and low-temperature thermodynamics of one-dimensional interacting Fermi system", Phys.Letters A, v.94, 224, (1983).

76. G.I. Japaridze and A.A. Nersesyan, *"Low-temperature thermodynamics of one-dimensional interacting fermions",* Jour. Low Temp. Phys. v.47, 91, (1982).

77. G.I. Japaridze and A.A. Nersesyan, *"Magnetic properties of one-dimensional interacting fermions",* Phys.Letters A, v.85, 23 (1981).

78. G.I. Japaridze and A.A. Nersesyan, *"One dimensional electron system with attraction in magnetic field",* Jour. Low Temp. Phys., v.37, 95, (1979).

79. G.I. Japaridze and A.A. Nersesyan,*"Phase transition with respect to magnetic field in one-dimensional electron system",* Pis'ma ZhETF, v.27, 356, (1978).

80. G.I. Japaridze and A.A. Nersesyan, "Application of renormalization-group method to the problem of one-dimensional electron system in a magnetic field", Proc.Geor.Acad.Scien, v. 88, p.501, (1978).