

# Curriculum Vitae

Zaza G. Melikishvili



**Date and the place of birth:** May 12, 1959, Tbilisi, Georgia

**Position:**

- The Head of Department, Quantum and Coherent Optics, Institute of Cybernetics, Tbilisi, Georgia

**The scopes of activity:**

- Quantum optics and quantum electronics
- Molecular physics
- Biomedical optics
- Nano-optics
- Quantum information theory

**Scientific interests:**

- Multiphoton processes
- Optical/Laser spectroscopy of atomic clusters, biomolecules and biotissues
- Quantum computation with trapped laser-driven particles
- DNA-nanoparticle-photon interactions

**Scientific and pedagogical titles:**

- 1988, The Candidate of Sciences, Physics and Mathematics (equivalent to PhD)
- 1995, Docent of Quantum Electronics
- 2006, Principal Scientist of Institute of Cybernetics

**Education:**

<i>Years</i>	<i>Name of University</i>	<i>Speciality</i>	<i>Academic Degree</i>
1982 - 1988	Iv. Javakhishvili Tbilisi State University /A.M. Prokhorov General Physics Institute of the Russian Academy of Sciences (Moscow, The Russian Federation)	Quantum Electronics	Candidate of Sciences, Physics and Mathematics – PhD
1976 - 1982	Iv. Javakhishvili Tbilisi State University/ M.V. Lomonosov Moscow State University (Moscow, The Russian Federation)	Physicist, teacher, <b>specialization:</b> Quantum Electronics	MSc

**Scientific activities**

<i>Years</i>	<i>Activity</i>
2006 - until now	<i>The Head of Department, Coherent and Quantum Optics, Institute of Cybernetics, Tbilisi, Georgia</i>
2003 - 2006	<i>The Head of Department, Coherent Optics and Electronics, Institute of Cybernetics, Tbilisi, Georgia</i>

2000 - 2003	<i>Senior Scientific Worker</i> , Department of Coherent Optics and Electronics, Institute of Cybernetics, Tbilisi, Georgia
1995 - 1997	<i>Docent</i> , Iv. Javakhishvili Tbilisi State University, Department of Physics, Tbilisi, Georgia
1988 - 2003	<i>Senior Scientific Worker</i> , Iv. Javakhishvili Tbilisi State University, Laboratory of Quantum Electronics, Tbilisi, Georgia
1984 - 1988	<i>Scientific Worker</i> , Iv. Javakhishvili Tbilisi State University, Laboratory of Quantum Electronics, Tbilisi, Georgia
1982 - 1984	<i>Junior Scientific Worker</i> , Iv. Javakhishvili Tbilisi State University, Laboratory of Quantum Electronics, Tbilisi, Georgia
1982 - 1988	<i>Research Fellow</i> , A.M. Prokhorov General Physics Institute of the Russian Academy of Sciences, Moscow, The Russian Federation
1998 - 2000	<i>Researcher</i> , Project G-049 of International Center of Science and Technology (ICST), Moscow, Russian Federation

### **Pedagogical activities:**

<i>Years</i>	<i>Activities</i>
2008 - until now	“Medical Physics” – elective course of studies for bachelor students, Iv. Javakhishvili Tbilisi State University, Faculty of Exact and Natural Sciences, Iv. Javakhishvili Tbilisi State University, Tbilisi, Georgia.
2006 - 2008	The scientific adviser of PhD thesis of Z. Jaliashvili “Laser induced fluorescence in biological tissues” (2008, Georgian Technical University, Tbilisi, Georgia)
1989 - 1991	“Multiphoton Processes” – course of studies for students, speciality of Quantum Electronics, Department of Physics, Iv. Javakhishvili Tbilisi State University, Tbilisi, Georgia
1989 - 1992	The scientific adviser of 10 MSc theses in quantum electronics, speciality, Department of Physics, Iv. Javakhishvili Tbilisi State University, Tbilisi, Georgia

### **Selected publications:**

#### **Books**

G. Giorgadze, Z. Melikishvili, *Quantum Computations* (2009, Tbilisi) ISBN 978-9941-0-2110-7 ; UDC: 530145+519.6+004.78 (In Georgian)

#### **Book Chapters**

T. D. Medoidze, Z.G. Melikishvili, G. A. Tsintsadze, “Spectroscopy and Dynamics of Transitions in UV-Excited  $Tm^{3+}:YLiF_4$  Laser System,” In “*Focus on Lasers and Electro-Optics Research*,” Nova Science Publishers, New York. 2004, pp. 93-147

M. Yu. Ivanov and Z. G. Melikishvili, “Multiphoton matrix elements for interaction of an atom with polarized light,” In “*Nonlinear Spectroscopy of Atoms and Diatomic Molecules*” (N. B. Delone, ed.). Council for Spectroscopy of Academy of Sciences of USSR, Moscow, 1988, pp.48-61 (In Russian)

D. T. Alimov, F.A. Il'kov, V.P. Krainov, and Z. G. Melikishvili, “Polarization effects in nonresonant multiphoton ioniation of atoms,” In “*Elementary Processes in the Laser Radiation Field*” (N. B. Delone, ed.). Council for Spectroscopy of Academy of Sciences of USSR, Moscow, 1987, pp. 154-183 (In Russian)

*Articles*

1. Vasil G. Bregadze, Irina G. Khutsishvili, Sophie Z. Melikishvili, Zaza G. Melikishvili, Nickel (II) Ions Interaction with Polynucleotides and DNA of Different GC Composition, Los Alamos Quantum Physics electronic reprint archive paper: arXiv: 0912.4866v1 [physics.bio-ph] (24 Dec 2009)
2. Z. Jaliashvili<sup>1</sup>, T. Medoidze, Z. Melikishvili, N. Merkviladze, P. Tushurashvili, Optical Spectroscopy of Parotid Gland in Case of Adenopathy, Georgian Medical News, #11 (164), 80-83 (2008)
3. G. Giorgadze and Z. Melikishvili, Atom-photon interactions with respect to quantum computation: three-level atom in two-mode field. Journal of Mathematical Sciences, Vol., 153, #2, 2008, 167 – 185
4. E. Ekaladze, K. Akhmeteli, T. Medoidze, Z. Melikishvili, P. Tushurashvili, Study of Distribution of the Vitamin A After Overdose Feeding Along the Digestive Tract of Rats Intestine by LIFS, Georgian Medical News, #4 (157), 75-79 (2008)
5. K.T. Akhmeteli, E.N. Ekaladze, Z.V. Jaliashvili, T.D. Medoidze, Z.G. Melikishvili, N.Z. Merkviladze, M.B. Papava, and P.R. Tushurashvili, Study of vitamin A distribution in rats by laser induced fluorescence, Laser Physics Letters, 5, #6, 471-475 (2008)
6. Z.V. Jaliashvili, T.D. Medoidze, K.M. Mardaleishvili, J.J. Ramsden, and Z.G. Melikishvili, Laser induced fluorescence model of human goiter, Laser Physics Letters, 5, #3, 217-219 (2008)
7. G.K. Giorgadze, Z.V. Jaliashvili, K.M. Mardaleishvili, T.D. Medoidze, and Z.G. Melikishvili, Measurement of the abnormality degree in the biological tissue by the laser induced fluorescence, Laser Physics Letters, vol.3, #2, 2006, pp. 89-91
8. Z.V. Jaliashvili, T.D. Medoidze, Z.G. Melikishvili, K.M. Mardaleishvili, and J.J. Ramsden, Real time noninvasive cancer diagnostics. Los Alamos Physics/Medical Physics electronic reprint archive paper number physics/0502102 (22 Feb 2005), accessible via the world wide web at <http://lanl.arxiv.org/abs/physics/0502102>
9. Z.V. Jaliashvili, T.D. Medoidze, Z.G. Melikishvili, K.M. Mardaleishvili, and J.J. Ramsden, Laser-excited fluorescence from normal and abnormal human thyroid cells: a pilot study. Laser Physics Letters, vol.1, #10, 521-524 (2004)
10. T.D. Medoidze, Z.G. Melikishvili, A.G. Papashvili, G.A. Tsintsadze. Laser-Excited Ultraviolet Fluorescence in  $\text{Tm}^{3+}:\text{YLiF}_4$ . Laser Physics, Vol. 11, No 12, 2001, pp.1262-1269
11. V.I. Zhekov, G.G. Asatiani, Z.G. Melikishvili, G.A. Tsintsadze, T.I. Sanadze, T.D. Medoidze, G.I. Petriashvili and A.G. Papashvili. Absorption Spectra and Selective Excitation of  $\text{Y}_3\text{Al}_5\text{O}_{12}:\text{Tm}^{3+}$  and  $\text{YLiF}_4:\text{Tm}^{3+}$  Laser Systems. Laser Physics, Vol. 10, No 2, 2000, pp. 532-539
12. M. I. Dzhibladze, Z. G. Melikishvili, and V. Bykov. The Interaction of Photon Clusters with Matter. Laser Physics, Vol. 10, No 3, 2000, pp. 730-732
13. M.I. Dzhibladze, Z.G. Melikishvili, S.D. Uchaneishvili. Lasertherapy by Noncoherent Light Field of Radiation, Biomedical Sciences Instrumentation, **34**, 1997, pp.235-239
14. Z.G. Melikishvili, E.S. Teplitsky. Theory of Nonlinear Interaction of Atoms with High Intensity Laser Pulses. Multiphoton Processes. Ed.s D.K. Evans & S.L. Chin, World Scientific (Singapore, New Jersey, London, Hong Kong), 1993, pp. 111-113
15. Z.G. Melikishvili, D. T. Alimov, F.A. Ilkov. Polarization dependence of direct three-photon ionization for Ca, Sr and Ba atoms, J. Phys. B: At. Mol. Opt. Phys. **24**, 1991, pp. 1949-1952