

# Khatuna Chargazia

## Curriculum Vitae



# Tbilisi State University

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**DATE OF BIRTH:** MARCH 19, 1977

### EDUCATION

- 2006 – Degree of Candidate of Physical and Mathematical sciences with specialty –Geophysics, physics of atmosphere and hydrosphere
- 2000 -2004 Post-graduate student, Tbilisi State University, Institute of Applied Mathematics, Tbilisi, Georgia.
- 1994 -1999 (Applied mathematics) Faculty of Physics and mathematics, Sokhumi branch of Tbilisi State University, Tbilisi, Georgia

### PROFESSIONAL EXPERIENCE

- 2011 – Researcher  
Institute of Applied Mathematics, Tbilisi State University
  - Alfvén Type waves interaction with inhomogeneous zonal winds in the ionosphere
  
- 2010 – Researcher  
Institute of Applied Mathematics, Tbilisi State University
  - Criterion of the ULF planetary electromagnetic waves' instability in the ionosphere with inhomogeneous wind
  
- 2009 – Specialist  
Institute of Applied Mathematics, Tbilisi State University
  - Turbulent dynamics of ULF electromagnetic waves in the ionosphere and magnetosphere
  
- 2007 - 2009 – Researcher  
Institute of Applied Mathematics, Tbilisi State University
  - Dynamics of ULF planetary electromagnetic waves in the ionosphere and magnetosphere
  
- 2007-still – Senior researcher  
Department of Earth's physics and geomagnetism at M. Nodia Institute of Geophysics
  - Non-Gaussian transport, Strong turbulence and nonlinear phenomena in magnetosphere and ionosphere
  
- 2004 - 2006 Specialist  
Science and Technology department, Georgian Space Agency
  - Physical and Mathematical modeling of internal vortex electric field generation in the ionosphere
  - Numerical Calculation of obtained models
  
- 2004 -2006 Senior Scientist  
Laboratory of investigations of extraordinary phenomena, Institute of Applied Mathematics, Tbilisi State University
  - Physical and Mathematical modeling of planetary scale ULF electromagnetic waves in the ionosphere
  - Numerical Processing of two dimensional models
  
- 2000 - 2004 Senior Laborator  
Department of Numerical Analysis, Institute of Applied Mathematics, Tbilisi State University
  - Investigation of a class of economy finite-difference schemes for initial-boundary problem stated for parabolic equations
  - Processing of generalized alternation method

2003 - 2004 Lecturer

Sokhumi branch of Tbilisi State University, Tbilisi, Georgia

- Courses of Information Technologies and Programming Languages

## OTHER WORK EXPERIENCE

2000 -2004 English and Technical editor

- AMIM-International Scientific journal, published at the Institute of Applied Mathematics, Tbilisi, Georgia
- proceedings of enlarged Seminars of I.Vekua Institute of Applied Mathematics, Tbilisi, Georgia

1999 - 2000 Manager, LTD “G&G design”

## IT SKILLS

Basic, Pascal, C++, HTML, Microsoft office, Front Page, Photoshop, PageMaker, CorelDraw.

## RESEARCH INTERESTS

- Theoretical studies of Space Plasma
- Physics of Atmosphere, ionosphere, Magnetosphere
- ULF Planetary Electromagnetic Wave
- Space Weather
- Theoretical Modelling

## AWARDS

2008 – Young Scientist Award of Georgian M. Nodia Institute of Geophysics and Geophysical Association.

2008 – Conference Grant at UN/ESA/NASA/JAXA Workshop on the International Heliophysical Year 2007 and Basic Space Science "First Results from the International Heliophysical Year 2007", 2-6 June, 2008, Sozopol, Bulgaria. Kh. Chargazia – “Ultra Low Frequency Electromagnetic Wave’s dynamics at interaction with local inhomogeneous winds”.

2008 - Conference grant at IAU Symposium 257 – Universal Heliophysical Processes 257, September 15-19, 2008, Greece, Ioannia. Kh. Chargazia – “Alfven wave generation and mutual transformation into drift waves at interaction with local inhomogeneous shear flows in the Earth Upper Atmosphere”

2007- Young Scientist Travel Grant at ISAP2007 International Symposium on Antennas and Propagation August 20-24, 2007, Toki Messe, Niigata, Japan

2007 – Short term travel award, Georgian National Science Foundation, 2007.

2007 – Young Scientist travel award, International School of Space Science, 2007 Course on: Turbulence and Waves in Space Plasmas 9-14 September 2007, L’Aquila, Italy.

2006 – Young Scientist Award at 3<sup>rd</sup> IAGA/ICMA (International Association of Geomagnetism and Aeronomy / International Commission on middle Atmosphere) Workshop on “*Vertical Coupling in the Atmosphere-Ionosphere System*”

1999 - First Premium at the Republic Scientific Olympiads among students

1998 - J. Soros Stipend.

## GRANTS

- **2011-2013** - DISSIPATIVE STRUCTURES AND KINETIC PROCESSES IN THE NEAR EARTH PLASMAS”. 7<sup>th</sup> Framework Program Research, Technologies Development and Demonstration, Marie Curie Actions – People, International Research Staff Exchange Scheme, No PIRSES-GA-2009-269198 (2010-2013).
- **2009** – “Physical and Mathematical Models of Electromagnetic Weather Formation by Ultra Low Frequency Wave Structures in Atmosphere and Ionosphere of the Earthe”. Prezident’s Scientific Grant for Young Scientists. GNSF/PRES08/ 5-327.2009.
- **Project Executant 2007-2009** - INTAS (International Association for the Promotion of Cooperation with Scientists from the Independent State of the Former Soviet Union). (Funded by Eurocouncil ;

<http://www.intas.be>) – “Non Gaussian transport, strong turbulence, and nonlinear phenomena in the magnetosphere and ionosphere”

#### PRESENTATIONS AT CONFERENCES

1. The 4<sup>th</sup> IAGA/ICMA/CAWSES II TG4 International workshop on Vertical Coupling in the Atmosphere-Ionosphere System., February 14-18, 2011, Prague, Czech Republic. Chargazia Kh., Aburjania G. – “The interaction of planetary Rossby wave structures with inhomogeneous geomagnetic field and sheared wind in the upper atmosphere”. 2011.
2. International Workshop “Magnetic turbulence in the Geospace Environment”, University of Calabria, Cosenza, Italy, 29 October-1 November, 2008. Kh. Chargazia – “Strong Vortex Turbulence in Magnetized Plasma”, 2008.
3. IAGA (International Association of Geomagnetism and Aeronomy) International Symposium "Space weather and its effects on Spacecraft" Cairo, Egypt, October 5-9, Chargazia Kh. – “Shear flow induced Alfvén wave generation and mutual transformation into drift waves and vice versa in the ionosphere”, 2008.
4. IAU Symposium 257 – Universal Heliophysical Processes 257, September 15-19, 2008, Greece, Ioannina. Kh. Chargazia – “Alfvén wave generation and mutual transformation into drift waves at interaction with local inhomogeneous shear flows in the Earth Upper Atmosphere” 2008.
5. UN/ESA/NASA/JAXA Workshop on the International Heliophysical Year 2007 and Basic Space Science "First Results from the International Heliophysical Year 2007", 2-6 June, 2008, Sozopol, Bulgaria. Kh. Chargazia – “Ultra Low Frequency Electromagnetic Wave’s dynamics at interaction with local inhomogeneous winds”, 2008.
6. ISAP2007, International Symposium on Antennas and Propagation, Toki Messe, Niigata, Japan, 2007. “Kh. Chargazia – Long-Scale Planetary Ultra-Low-Frequency Electromagnetic Wave Structures in F-region of the Spherical Dissipative Ionosphere”, August 20-24, 2007.
7. International School of Space Science, 2007 Course on: Turbulence and Waves in Space Plasmas 9-14 September 2007, L’Aquila, Italy. Aburjania G., Chargazia Kh. “The planetary ulf electromagnetic wave structures in the ionosphere”.
8. Workshop INTAS – South-Caucasus 2006 Scientific Cooperation and Collaborative Call, Tbilisi (Georgia) 19-21 April 2006. “Aburjania G.D., Chargazia Kh.Z.. Large-scale vortex electric field generation in the ionosphere”, 2006.
9. 3<sup>rd</sup> IAGA/ICMA (International Association of Geomagnetism and Aeronomy / International Commission on middle Atmosphere) Workshop on “*Vertical Coupling in the Atmosphere-Ionosphere System*”, September 18-22, 2006, Varna, Bulgaria. Aburjania G. D., Chargazia Kh. Z., Khantadze A. G.- “Dynamics of the Global Weather-Forming ULF Electromagnetic Wave Structures in the ionosphere”, 2006.
10. ISROSES, September 17-22, 2006 Varna, Bulgaria. Aburjania G.D., Chargazia Kh.Z., Kharshiladze O.A. – “Mechanism of Amplification and Mutual Transformation of Eigen Modes in the Ionosphere with Inhomogeneous Zonal Wind”, 2006
11. IAGA 2005 Scientific Assembly, Toulouse, Pierre Baudis Congress Centre, France (18 – 29) July. “G. Aburjania, J. Lominadze, Kh. Chargazia, A. Khantadze and O. Kharshiladze New generation mechanism of the planetary-scale ULF electromagnetic wave structures in the ionosphere”, 2005.
12. Antennas, Radar, and Wave Propagation ~ Arp 2005 July 19 – 21, 2005. Banff, Alberta, Canada. “G.D. Aburjania, J.G. Lominadze, A.G. Khantadze, Kh. Z. Chargazia, O.A. Kharshiladze. The New Modes of Ulf Electromagnetic Waves Related to the Geomagnetic Field Curvature”, 2005.
13. Annual Meeting of the Balkan, Black Sea, and Caspian Sea Region network on Space Weather Studies. March 30-April 1, 2006, Antalya, Turkey. “Aburjania G.D., Chargazia Kh.Z., Khantadze A.G. and J.G. Lominadze. Generation mechanism and propagation features of the ionospheric weather forming ULF electromagnetic wave structures”, 2005.
14. International Symposium on Antennas and Propagation (ISAP’04), Sendai, Japan, 2004. “Aburjania G.D., Chargazia Kh.Z., Jandieri G.V., Kharshiladze O.A. ULF Electromagnetic Wavy Structures in F-region of the Spherical Ionosphere Caused from Inhomogeneity of the Geomagnetic Field”, 2004.

#### PUBLICATIONS

2010

1. G. D. Aburjania , Kh. Z. Chargazia, O.A. Kharshiladze. Shear flow driven magnetized planetary wave structures in the ionosphere. JASTP, 72 (2010) 971–981. <http://dx.doi.org/10.1016/j.jastp.2010.05.008>.
2. G. D. Aburjania , Kh. Z. Chargazia. Self-organization of large-scale ULF electromagnetic wave structures in E-region of the ionosphere at interaction with inhomogeneous zonal winds. Plasma Phys. Rep. (in press), 2010.
3. G. Zimbardo, A. Greco, L. Sorriso-Valvo, S. Perri, Z. Vˆorˆos, G. Aburjania, Kh.Chargazia. Magnetic turbulence in the geospace environment. Space Science Rev. J., DOI 10.1007/s11214-010-9692-5. 2010.

2009

1. G. D. Aburjania, Kh. Z. Chargazia, L. M. Zelenyi, and G. Zimbardo. Model of strong stationary vortex turbulence in space plasmas. *Nonlin. Processes Geophys.*, V. 16, pp. 11–22, 2009. <http://www.nonlin-processes-geophys.net/16/11/2009/npg-16-11-2009.html>
2. G.D. Aburjania, Kh.Z. Chargazia, G. Zimbardo, L. Zelenyi. Large Scale Zonal Flow and The Magnetic Field Generation due to the Drift-Alfven Turbulence in the Ionosphere Plasma// *Planetary and Space Science*, Volume 57, Issue 12, p. 1474-1484. DOI: 10.1016/j.pss.2009.07.007
3. G. D. Aburjania, Kh. Z. Chargazia. Nonlinear Dynamics of the low frequency drift wave structures in the dissipative ionosphere plasma. *Plazma Phys. Rep.* (in press).

#### 2008

4. G.Aburjania, Kh. Chargazia. Ultra Low Frequency Electromagnetic Wave's Dynamics at Interaction with Local Inhomogeneous Winds in the Ionosphere. *Sun&Geosphere.* (Submitted in 2008).

#### 2007

5. Aburjania G. D., Chargazia Kh. Z. Dynamics of the Global Weather-Forming ULF Electromagnetic Wave Structures in the ionosphere. *Journal of Solar terr. phys.*, V. 69, P. 2428–2441, 2007.
6. Aburjania G.D., Chargazia Kh. Dynamics of the Large-Scale ULF Electromagnetic Wave Structures in the Ionosphere// Report on the “INTAS-South Caucasus Workshop”. 28-30 March, Tbilisi State University, Tbilisi, 2007.
7. Chargazia Kh. “Long-Scale Planetary Ultra-Low-Frequency Electromagnetic Wave Structures in F-region of the Spherical Dissipative Ionosphere” // Abstracts of the 2007 International Symposium on Antennas and Propagation, p.236, 2007.

#### 2006

8. Aburjania G.D., Chargazia Kh.Z. Large-scale vortex electric field generation in the ionosphere// Workshop INTAS – South-Caucasus 2006 Scientific Cooperation and Collaborative Call, Tbilisi (Georgia) 19-21 April, 2006.
9. Aburjania G.D., Chargazia Kh.Z., Khantadze A.G., Lominadze J.G.. Generation Mechanism and Propagation Features of the Ionospheric Weather Forming ULF Electromagnetic Wave Structures. *Sun and Geosphere*, v 1, N 2, 2006.
10. Aburjania G.D., Chargazia Kh.Z, Kharshiladze O.A. Mechanism of amplification and mutual transformation of eigen modes in the ionosphere with inhomogeneous zonal wind// Abstract of International Symposium on Recent Observations and Simulations of the Sun-Earth System (ISROSES) , 17-22 September, 2006. Varna, Bulgaria. 2006.
11. Chargazia Kh.Z., Aburjania G.D., Khantadze A.G. Dynamics of the global weather-forming ULF electromagnetic wave structures in the ionosphere// Abstract of 3-rd IAGA/ICMA Workshop on Vertical Coupling in the Atmosphere/Ionosphere System, 18-22 September, 2006. Varna. Bulgaria. 2006.
12. Aburjania G.D., Chargazia Kh.Z. Generation mechanism and propagation features of the ionospheric weather forming ULF electromagnetic wave structures// Report on the “Annual Meeting of the Balkan, Black Sea, and Caspian Sea Region network on Space Weather Studies”. March 30-April 1, Antalya, Turkey, 2006.

#### 2005

13. Aburjania G.D., Chargazia Kh.Z, Lominadze J.G., Khantadze A.G., Kharshiladze O.A. Generation and Propagation of the ULF planetary-scale electromagnetic wavy structures in the ionosphere// *Planetary and Space Science*. V. 53. No 9. P. 881-901. 2005.
14. G. Aburjania, J. Lominadze, Kh. Chargazia, A. Khantadze and O. Kharshiladze. “New generation mechanism of the planetary-scale ULF electromagnetic wave structures in the ionosphere” // IAGA 2005 Scientific Assembly, Toulouse, Pierre Baudis Congress Centre, France (18 – 29) July, 2005.

#### 2004

15. Chargazia Kh. Generation of Ultra Low – Frequency Electromagnetic Planetary Wave Structures in F-Region in the Spherical Ionosphere. *Bulletin of GAS*, V 169, N 3, p 484, 2004.
16. Aburjania G.D., Chargazia Kh.Z., Jandieri G.V., Kharshiladze O.A. ULF Electromagnetic Wavy Structures in F-region of the Spherical Ionosphere Caused from Inhomogeneity of the Geomagnetic Field // *Proceedings of ISAP'04.*, Sendai, Japan. P.257-260. 2004.
17. Aburjania G.D., Chargazia Kh.Z., Jandieri G.V., Khantadze A.G. On the mechanism of generation of te vrtex electric field in E-region of the ionosphere// *Plasma Phys. Rep.* V.30. Issue.1. P. 88-95. 2004.
18. Aburjania G.D., Chargazia Kh.Z., Jandieri G.V., Khantadze A.G., Kharshiladze O.A. On the new modes of planetary-scale electromagnetic waves in the ionosphere// *Annales Geophysicae*. V.22. No 4. P. 508-517. 2004.

19. Aburjania G.D., Khantadze A.G., Jandieri G.V., Chargazia Kh. Z. On the mechanism of vortex electric field generation in E-region of the ionosphere // *Fizika Plazmy*. V.30. № 1. P. 88-95. 2004.

### 2003

20. Aburjania G.D., Chargazia Kh. Z. Low-frequency planetary-scale electromagnetic waves in E-region of the ionosphere// *Bulleten of Georgian Academy of Sciences*. V. 167. No 3. P. 428-431. 2003.
21. Aburjania G.D., Chargazia Kh. Z., Jandieri G.V., Khantadze A.G., Kharshiladze O.A. Dynamics of the new modes of the low-frequency planetary-scale electromagnetic wave structures in the ionosphere// *Recent Research Development in Geophysics*. V. 5. P. 211-246. 2003.
22. Khantadze A.G., Aburjania G.D., Chargazia Kh. Z. Large-scale waves of electromagnetic nature at ionospheric levels // *Izvestya, Atmospheric and Oceanic Physics*. V. 39. № 4. P. 476-481. 2003.
23. Aburjania G.D., Chargazia Kh. Z., Jandieri G.V., Khantadze A.G., Kharshiladze O.A., Machabeli G.Z. Theoretical model for conjugate fotoelectron energy transfer and related to them night sky airglow enhancement in the local midlatitude ionospheric F-region// *Recent Research Development in Geophysics*. V. 5. P. 247-261. 2003.
24. Aburjania G.D., Khantadze A.G., Chargazia Kh.Z., Kharshiladze O.A. Dynamics of the new modes of the low-frequency planetary-scale electromagnetic wave structures in the ionosphere. *Recent Research Development in Geophysics (Research Signpost, Karala, India)*, V. 5, pp.157-192, 2003.
25. Aburjania G.D., Chargazia Kh.Z., Kaladze T.D., Khantadze A.G., Kharshiladze O.A. New generation mechanism of the planetary-scale internal vortical electric field in the Eart's ionosphere // *Journal of the Georgian Geophysical Society. Issue B. Physics of Atmosphere, Ocean and Space Plasma*. V.8B. P.122-135. 2003.
26. Aburjania G.D., Chargazia Kh.Z., Khantadze A.G. On the large-scale waves of electromagnetic nature at ionospheric levels // *Izvestia of RAS. Physics of Atmosphere and Ocean*. V. 39. № 4. P. 536-541. 2003.

### 2002

27. Chargazia Kh.Z - Ultra-Low-Frequency Large-Scale Electromagnetic Wave Structures In the Ionospheric E-Region. *Journal of the GGS, Issue (b), Physics of Atmosphere, Ocean and Space Plasma*, v. 7, pp. 78-87, 2002
28. Chargazia Kh.Z - Dynamics of nonlinear electromagnetic vortex structures in the ionospheric F-layer. *Journal of the GGS, Issue (b) Physics of Atmosphere, Ocean and Space Plasma*, v. 7, pp. 69-77, 2002
29. Aburjania G.D., Chargazia Kh. Z. Propagation of the Planetary-Scale wave Disturbances in the Ionosphere // *Applied Mathematics and Informatics*. Tbilisi University Press. V.7. № 2. P. 1-17. 2002.
30. Aburjania G., Chargazia Kh., Jandieri G., Khantadze A. Nonlinear Evolution of Ultra-Low-Frequency Electromagnetic Waves in the Ionosphere Connected with the Earthquakes for a Spherical Earth Model // *Reports of Enlarged Session of the Seminar of VIAM*. V.17. № 17. P. 3-6. 2002.

### 1999

31. N. Dikhaminjia, Kh. Chargazia. – On an investigation of a class of economy finite-difference schemes for initial-boundary problem stated for parabolic equations. *Proceedings of scientific conference among the students and aspirants concerned to 20<sup>th</sup> univesary of Sokhumi Unioversity*, 1999.