CURRICULUM VITAE
JUANSHER CHKAREULI

PERSONAL INFORMATION

Name Family Name	Juansher Chkareuli
Date and place of birth	13/01/1940 Tbilisi Georgia
Contact Information	Ilia State University S710, 3 George Tsereteli Str, 0162 Tbilisi, Georgia Tel: (+99532) 236 30 90 , (+995) 574 006 620 E-mail: j.chkareuli@iliauni.edu.ge

EDUCATION & QUALIFICATION AWARDED

• Dates (from – to)	**1985**
• Institution	**Tbilisi State University**
• Type of qualification awarded	Doctor of physical-mathematical sciences
• Dates (from – to)	**1966 - 1970**
• Institution	**Tbilisi State University & Joint Institute for Nuclear Research (Dubna, Russia)**
• Type of qualification awarded	PhD in Nuclear and Particle Physics
• Dates (from – to)	**1959 - 1965**
• Institution	**Tbilisi State University & P. Lebedev Physics Institute (Moscow)**

• Faculty	Physics Faculty / Theoretical Physics Department
• Type of qualification awarded	MSc in Theoretical Physics

AREA OF EXPERTISE

Unified Theories of Quarks and Leptons, Flavor Mixing and Family Symmetries, Rare Processes in Standard Model and Beyond, Grand Unification and Superunification, Superstring Inspired Models, Spontaneous Lorentz violation and Origin of Symmetries, Emergent Gauge and Gravity Theories, Topological Defects in Particle Physics and Cosmology, Extra Space-Time Dimensions

PROFESSIONAL HISTORY

• Dates (from – to)	**1991 - present**
• Employer	**E. Andronikashvili Institute of Physics**
• Rank/Position held	**Tbilisi State University**
	Head of Particle Physics Department
• Dates (from – to)	**2006 – present**
• Employer	**Ilia Chavchavadze State University**
	Professor of Theoretical Physics
• Rank/Position held	Emeritus Professor (2009)
• Dates (from – to)	**1991 - 2012**
• Rank/Position held	Visiting Professor / Senior Research Scientist in
	European Center for Nuclear Research (CERN),
	University of Sussex, Royal Holloway University of London,
	University of Glasgow, International Center for Theoretical Physics (ICTP),
	Max-Planck Institute, University of Maryland, University of Melbourne,
	Institute of High Energy Physics (Beijing)
• Dates (from – to)	**1986 - 1990**
• Employer	**Tbilisi State University**
• Rank/Position held	Professor of Theoretical Physics
• Dates (from – to)	**1970 - 1991**
• Employer	**E. Andronikashvili Institute of Physics**
• Rank/Position held	Senior & Leading Research Scientist

RESEARCH

2000 – present :

New development of emergent QED, Yang-Mills and gravity theories with dynamical generation of local internal and spacetime symmetries through the spontaneous violation of relativistic invariance. Introduction of emergent SUSY gauge theories in which all gauge fields appear as Goldstone bosons triggered by spontaneously broken supersymmetry occurring in the visible sector. Study their observationalmanifestations in high energy physics and astrophysics.

1990-2000 :

Non-chiral extensions of the SM and MSSM with vectorlike split-multiplet particle spectra which naturally appear in the higher SU(N) type Grand Unified Theories were proposed that considerably modifies the desert physics and lead to the realistic (string-scale) grand unification. The new missing VEV mechanism emerging in SUSY SU(8) GUT that leads to the simultaneous solution to the gauge hierarchy (doublet-triplet splitting) problem and problem of unification of flavor was suggested.

1980-1990 :

Introduction of the horizontal chiral SU(3) symmetry for quark-lepton families and its applications to the flavor mixing of quarks and leptons, CP violation, neutrino masses and oscillations and rare processes. Another sector of applications was related with a new type of topological defects - non-abelian cosmic strings appearing during the spontaneous breaking of the SU(3) that was considered as a possible candidate for the cold dark matter in the Universe. Many other problems of flavor physics were also considered – among them the first extension of the Kobayashi-Mascawa model to four quark-lepton generation was suggested.

SCIENTIFIC PUBLICATIONS

- **FEATURED PUBLICATIONS**

1. J.L. Chkareuli, UNIFICATION OF ELEMENTARY FORCES IN GAUGE SL(2N,C) THEORIES, Phys. Lett. B 834 (2022) 137 417.
2. J.L. Chkareuli, GAUGE FIELDS AS CONSTRAINED COMPOSITE BOSONS, Phys. Lett. B 817 (2021) 136 281
3. J.L. Chkareuli, Z. Kepuladze, ON THE LIGHTLIKE LORENTZ VIOLATION, Phys. Lett. B 810 (2020) 135625.
4. J.L. Chkareuli, THE SU(8) GUT WITH COMPOSITE QUARKS AND LEPTONS, Nucl. Phys. B941 (2019) 425.
5. J.L. Chkareuli, J. Jejelava, Z. Kepuladze, LORENTZIAN GOLDSTONE MODES SHARED AMONG PHOTONS AND GRAVITONS, Eur. Phys. J. 78 (2018) 2, 156.
6. J.L. Chkareuli, POINCARE GAUGE GRAVITY: AN EMERGENT SCENARIO, Phys. Rev. D 95 (2017) 084051 .
7. J.L. Chkareuli, ON THE ORIGIN OF POINCARE GAUGE GRAVITY, Phys. Lett. B769 (2017) 377.
8. J.L. Chkareuli, Z. Kepuladze, ON GAUGE SYMMETRIES EMERGING FROM EXTRA DIMENSIONS, Phys. Rev. D 94 (2016) 065013.
9. J.L. Chkareuli, GAUGE FIELDS AS GOLDSTONE BOSONS TRIGGERED BY SPONTANEOUSLY BROKEN SUPERSYMMETRY, Phys. Rev. D90 (2014) 065015.
10. J.L. Chkareuli, PHOTON AND PHOTINO AS NAMBU-GOLDSTONE ZERO MODES IN AN EMEERGENT SUSY QED, Eur.Phys. J. C74 (2014) 2906.

11. J.L.Chkareuli, EMERGENT GAUGE THEORIES AND SUPERSYMMETRY: A QED PRIMER, Phys.Lett. B721 (2013) 146- 150.
12. J.L. Chkareuli, Z. Kepuladze, STANDARD MODEL WITH PARTIAL GAUGE INVARIANCE, Eur. Phys. J. C72 (2012) 1954-1972.
13. J.L. Chkareuli, C.D. Froggatt, H.B. Nielsen, SPONTANEOUS TENSOR FIELD GRAVITY, Nucl. Phys. B 848 (2011) 498-522.
14. J.L. Chkareuli, ON EMERGENT GAUGE AND GRAVITY THEORIES, In: "Low dimensional physics and gauge principles", pp 80-92, World Scientific, 2011.
15. J.L. Chkareuli, J.G. Jejelava, G. Tatishvili, GRAVITON AS A GOLDSTONE BOSON: NONLINEAR SIGMA MODEL FOR TENSOR FIELD GRAVITY, Phys. Lett. B696 (2011) 124-130.
16. J.L. Chkareuli, Archil Kobakhidze, Raymond R. Volkas, VECTOR- FIELD DOMAIN WALLS, Phys. Rev. D80:065008, 2009.
17. J.L. Chkareuli, C.D. Froggatt, H.B. Nielsen, DERIVING GAUGE SYMMETRY AND SPONTANEOUS LORENTZ VIOLATION, Nucl. Phys. B 821:65-73,2009
18. J.L. Chkareuli, Z. Kepuladze, G. Tatishvili, SPONTANEOUSLORENTZ VIOLATION VIA QED WITH NON-EXACT GAUGE INVARIANCE, Eur. Phys. J. C 55:309-316, 2008.
19. J.L. Chkareuli, C.D. Froggatt, J.G. Jejelava, H.B. Nielsen, CONSTRAINED GAUGE FIELDS FROM SPONTANEOUS LORENTZ VIOLATION, Nucl. Phys. B 796: 211-223, 2008.
20. J.L. Chkareuli, J.G. Jejelava, SPONTANEOUS LORENTZ VIOLATION: NON-ABELIAN GAUGE FIELDS AS PSEUDO-GOLDSTONE VECTOR BOSONS, Phys. Lett. B659: 754-760, 2008.
21. J.L. Chkareuli, Z.G. Kepuladze, NONLINEAR MASSIVE QED AND PHYSICAL LORENTZ INVARIANCE, Phys. Lett. B644: 212-217, 2007.
22. A.T. Azatov, J.L. Chkareuli, NONLINEAR QED AND PHYSICAL LORENTZ INVARIANCE, Phys. Rev. D73:065026 (2006).
23. J.L. Chkareuli, ON THE ORIGIN OF SYMMETRIES, In : *From integrable models to gauge theories* 125-141, World Scientific, 2003.
24. J.L. Chkareuli, C.D. Froggatt, H.B. Nielsen, MINIMAL MIXING OF QUARKS AND LEPTONS IN THE SU(3) THEORY OF FLAVOR, Nucl.Phys. B626:307-343, 2002.
25. M. Chaichian, J.L. Chkareuli, A. Kobakhidze, COMPOSITE QUARKS AND LEPTONS IN HIGHER SPACE-TIME DIMENSIONS, Phys.Rev.D66:095013, 2002
26. J.L. Chkareuli, C.D. Froggatt, H.B. Nielsen, LORENTZ INVARIANCE AND ORIGIN OF SYMMETRIES, Phys.Rev.Lett. 87:091601, 2001.
27. J.L. Chkareuli, C.D. Froggatt, H.B. Nielsen, SPONTANEOUSLY GENERATED GAUGE INVARIANCE, Nucl.Phys. B609:46-60, 2001.
28. J.L. Chkareuli, C.D. Froggatt, I.G. Gogoladze, A.B. Kobakhidze, FROM PROTOTYPE SU(5) TO REALISTIC SU(7) SUSY GUT, Nucl.Phys. B594:23-45, 2001.
29. J.L. Chkareuli, C.D. Froggatt, LEPTON NUMBER VIOLATION IN SUPERSYMMETRIC GRAND UNIFIED THEORIES, Phys.Lett.B484:87-97, 2000.
30. J.L. Chkareuli, I.G. Gogoladze, A.B. Kobakhidze, M.G. Green, D.E. Hutchcroft, ON SUSY INSPIRED MINIMAL LEPTON NUMBER VIOLATION, Phys.Rev. D62:015014, 2000.
31. J.L.Chkareuli, C.D.Froggatt, WHERE DOES FLAVOR MIXING COME FROM?, Phys.Lett.B450:158-164,1999.
32. J.L. Chkareuli, I.G. Gogoladze, A.B. Kobakhidze, SU(N) SUPERSYMMETRIC GRAND UNIFIED THEORIES: NATURAL PROJECTION TO LOW-ENERGY, Phys.Rev.Lett. 80:912-915,1998.

- AN EXTENSIVE LIST OF PUBLICATIONS

https://inspirehep.net/literature?sort=mostrecent&size=25&page=1&q=f%20a%20chkareuli

SYMPOSIAS AND SEMINARS

International Workshops « What comes beyond the Standard Model ? » (Bled, Slovenia, 2013, 2014, 2017)

20th International Conference on Supersymmetry and Unification of Fundamental Interactions « SUSY-2012 » (Beijing, 2012)

International Workshop "Low Dimensional Physics and Gauge Principles" (Tbilisi, 2011)

International School on Subnuclear Physics, 47th course (Erice, Italy, 2009)

International Conference « Physics at Future Colliders» (Tbilisi, 2009)

International Seminars "Quarks" (S-Petersburg 2000, Moscow 2006)

International Schools on Physics and Mathematics (Tbilisi, 2002 - 2005)

International International Conference "SUSY-2001"((Dubna, Russia, 2001)

Seminars at CERN, ICTP, JINR, ITEP, Universities of Pisa, Rome, Bologna, Padova,Bern, Munich, Dortmund, Cambridge, Oxford, London Royal Holloway, Sussex, Glasgow, Minnesota, Delaware, Maryland, Melbourne, New South Wales, Adelaide, Madrid, Barcelona, Lisbon (2000 - 2018)

PHD STUDENTS

I.V. Paziashvili, Ph.D. in 1976
Z.G. Berezhiani (Aquila U. & Gran Sasso), Ph.D. in 1984
G.R. Dvali (NYU & LMU & MPI), Ph.D. in 1992
A.B. Kobakhidze (Tbilisi, Inst. Phys. & U. of Sydney), Ph.D. in 1997
I.B. Gogoladze (Tbilisi, Inst. Phys. & U. of Delaware), Ph.D. in 1998
Z.Ia. Tavartkiladze (Tbilisi, Inst. Phys. & Ilia State Universitya), Ph.D. in 1999
J.G. Jejejlava (Tbilisi, Inst. Phys. & Ilia State Universitya), PhD in 2011
Z.R. Kepuladze (Tbilisi, Inst. Phys. & Ilia State Universitya), PhD in 2012

GRANTS RECEIVED

Georgian National Science Foundation Grants (2007 - 2016)
Georgian - US Bilateral Grants - GRDF (2003 - 2005)
Particle Physics and Astronomy Research Council Grants, UK (2001 - 2003)
Royal Society Joint Project Grants, UK (1999 - 2000)
INTAS Grants (1993 - 2001)

SCIENTIFIC COLLABORATION

1. Professor Holger Nielsen
   Niels Bohr Institute, Blegdamsvej 17-21, DK 2100 Copenhagen, Denmark

2. Professor Rabindra Mohapatra
   Department of Physics, University of Maryland, College Park, MD-020742, USA

3. Professor Colin Froggatt
   Department of Physics and Astronomy, Glasgow University, Glasgow G12 8QQ, Scotland, UK

4. Professor Raymond Volkas
   School of Physics, The University of Melbourne, Victoria 3010, Australia

5. Professor Harald Fritzsch
   Department fur Physik Ludwig-Maximilians-Universit, Munchen, Germany

OTHER ACTIVITIES AND AWARDS	Since 2000 - Fellow of British Institute of Physics Since 1994 - Member of the American Physical Society 1993 – 1999 - President of Georgian Physical Society 2008 - Visiting Scholar Award from University of Melbourne 1993– 94 –Royal Society Fellowship (UK)
OTHER INFORMATION	« 2000 Outstanding Scientists 2008/2009 », IBC, Cambridge, 2010 «Who is Who in Science and Engineering », Marquis Publishing, NY, 2007 https://en.wikipedia.org/wiki/Juansher_Chkareuli

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