



CURRICULUM VITAE

1. Personal Information

Name: Zaza
Surname: Osmanov
Private address: Amagleba 45
0105 Tbilisi, Georgia
Current work addresses: Free University of Tbilisi

Phone number (home): +995322983106
Mobile: +995579910862
E-mail: z.osmanov@freeuni.edu.ge z.osmanov@astro-ge.org
Place and date of birth: Tbilisi (Georgia), November 29, 1970
Nationality: Georgian
Marital status: Married
Gender: Male
General Scientific Interests: Astrophysics, fluid dynamics,
plasma physics, high energy physics,
general relativity and gravitation
Current Scientific Interests: High energy astrophysics, particle acceleration, non-thermal
emission, astrophysical waves and instabilities in non relativistic
and relativistic plasmas, solar physics, chromospheric heating
Side interests: Philosophy, classic and rock music, power lifting

2. Qualifications

2.1 University education

2004-2007

University: Università degli Studi di Torino
Diploma: Ph.D in Physics
Obtained in: 05/02/2007
Thesis: On the acceleration and stability of astrophysical outflows

1988-1993

University: Tbilisi State University
Diploma: M.S. in Elementary Particle Physics
Obtained in: 04/07/1993
Thesis: "1+1 Quantum gravity"

2.2 Knowledge of languages

Georgian (Mother tongue) - very good knowledge

English - very good knowledge

Russian - very good knowledge

Italian - very good knowledge

3. Computer skills

Programming: C, Fortran77, Turbo Pascal

Software: IDL, Matlab, Maple, Mathematica,

Code: PLUTO-a numerical finite volume, shock-capturing, fluid dynamical code designed to integrate a system of conservation laws.

4. Employment

From 2012: Associate professor

Physics school coordinator

Free University of Tbilisi

Bedia str. 0183-Tbilisi, Georgia

2011-2012: Invited professor

Physics school coordinator

Free University of Tbilisi

Bedia str. 0183-Tbilisi, Georgia

2011-2012: Associate professor

Centre for Theoretical Astrophysics, ITP

Ilia State University

Chavchavadze Ave. 32, 0176-Tbilisi, Georgia

2008-2011: Assistant professor

Centre for Theoretical Astrophysics, ITP

Ilia State University

Chavchavadze Ave. 32, 0176-Tbilisi, Georgia

2004-2009: Research Scientist

Department of Theoretical Astrophysics

Georgian National Astrophysical Observatory

Kazbegi str, 2^a, 0160 – Tbilisi, Georgia

2002-2004: Invited Junior Researcher

Department of Theoretical Astrophysics

Georgian National Astrophysical Observatory

Kazbegi str, 2^a, 0160 – Tbilisi, Georgia

2001-2002: Invited Assistant

Georgian National Astrophysical Observatory

Kazbegi str, 2^a, 0160 – Tbilisi, Georgia

1999-2004: Supervisor of the young student's team of Georgia

International Physics Olympiad (IPhO)

1999-2000: Supervisor of the young physicist's team of Georgia,

International Young Physicist's Tournament (IYPT)

1994-2004: Physics teacher

42nd School of Physics and Mathematics, Tbilisi, Georgia

5. Courses taught

- General physics (Mechanics, Thermodynamics, Electricity and magnetism, Optics)
- Astrophysics of compact objects
- Introductory course of physics
- Mathematical methods of general physics

6. Conferences and Meetings attended

- 25-29 Oct. 2015:** “The Time Machine Factory”
University of Turin, Turin, Italy
- 30 Sep.-03 Oct. 2015:** “The Modern Physics of Compact Stars and Relativistic Gravity”
Armenian Academy of Sciences, Yerevan, Armenia (Invited speaker)
- 18-22 Jul. 2011:** “Black Hole Astrophysics: Tales of Power and Destruction”
Winchester, UK
- 07-11 Oct. 2009:** “Radiation of cosmic objects: from radio to gamma astronomy”
International Conference dedicated to
100th anniversary of M. Vashakidze
Chavchavadze State University, Abastumani, Georgia (LOC)
- 17-23 Sep. 2008:** “The Modern Physics of Compact Stars”
Armenian Academy of Sciences, Yerevan, Armenia (Invited speaker)
- 07-11 Jul. 2008:** “High Energy Gamma-Ray Astronomy”
Max-Planck Institut für Kernphysik, Heidelberg, Germany
- 15-26 Oct. 2007:** “School on Astrophysical Fluid Dynamics”, Abdus Salam
International Centre for Theoretical Physics, Trieste, Italy
- 12-17 Aug. 2007:** “40 years of Pulsars: Millisecond Pulsars,
Magnetars and More”
McGill University, Montreal, Quebec, Canada
- 08-13 Jan. 2007:** “Jetset School and Workshop”
Numerical MHD and instabilities, Sauze d’Oulx, Italy
- 04-05 Dec. 2006:** “9th MHD days 2006”
Max-Planck-Institut für Astronomie
Heidelberg, Germany
- 19-23 June 2006:** “EPS- 33, Conference on Plasma Physics”
Rome, Italy
- 05-30 Sep. 2005:** “Autumn College on Plasma Physics”, Abdus Salam
International Centre for Theoretical Physics, Trieste, Italy

7. Fellowships and Grants

- **2016-2019: DI-2016-14**
“Relativistic effects of rotation and the nonlinear plasma phenomena in rotating systems”
Granted by the Shota Rustaveli National Science Foundation
- **2013-2015: N31/49**
“*Cosmic Ultra High Energies and their Realization Mechanisms*”
Granted by the Shota Rustaveli National Science Foundation
- **2007-2010: GNSF/ST07/4-193**
“*Interactive Dynamics of Plasma Flows and Collective Phenomena in the Sun and Solar-type Stars*”
Granted by the Georgian National Science Foundation
- **2006-2009: GNSF/ST06/4-096**
“*Electrodynamics of relativistic plasma flows emanating from rotating compact astrophysical objects: from pulsars to active galactic nuclei*”
Granted by the Georgian National Science Foundation
- **2003-2006**
Assegno di Ricerca e Collaborazioni, INFN, Italy
- **2001-2003**
“*The investigation of pulsar magnetospheres*”
Research grant of Georgian Academy of Sciences

8. Awards

- **2002**

The presidential award of honor for the success in the pedagogical activity (preparation of Georgian teams for IPhO and IYPT)

9. List of publications

Refereed journals

1. Osmanov Z., Mahajan S. & Machabeli G.
“*On the rotationally driven pevatron in the centre of the Milky Way*”
ApJ, (accepted for publication) (astro-ph/1612.05591)
2. Osmanov Z. & Rieger F.
“*Pulsed VHE emission from the Crab pulsar in the context of magnetocentrifugal particle acceleration*”
MNRAS, **464**, 1347 (2017) (astro-ph/1609.05844)
3. Osmanov Z.
“*New mechanism of acceleration of particles by stellar black holes*”
IJMPD, (2017) Online Ready
(<http://www.worldscientific.com/doi/abs/10.1142/S0218271817500341>)
(astro-ph/1608.04889)
4. Machabeli G., Rogava A., Chkheidze N., Osmanov Z. & Shapakidze D.
“*The Crab nebula energy origin and its high frequency radiation spectra*”
Journal of Plasma Physics, **82**, 21 (2016)
5. Osmanov Z.
“*On the search for artificial Dyson-like structures around pulsars*”
Int. J. Ast. Bio., **15**, 127 (2016) (astro-ph/1505.05131)
6. Osmanov Z.
“*Very high energy emission of Crab-like pulsars driven by the Cherenkov drift radiation*”, MNRAS, **455**, 3820 (2016) (astro-ph/1511.01833)
7. Osmanov Z., Mahajan S., Machabeli G. & Chkheidze N.
“*Millisecond newly born pulsars as efficient accelerators of electrons*”
Nature Scientific Reports, **5**, 14443 (2015)
8. Osmanov Z., Rogava A. & Poedts S.
“*Electrostatic ion perturbations in kinematically complex shear flows*”
New J. Phys. **17**, 043019 (2015)
9. Gudavadze I., Osmanov Z. & Rogava A.
“*On the role of rotation in the outflows of the Crab pulsar*”
Int. J. Mod. Physics D, **24**, 1550042 (2015) (astro-ph/1411.7241)
10. Osmanov Z., Mahajan S., Machabeli G., & Chkheidze N.
“*Extremely efficient Zevatron in rotating AGN magnetospheres*”
MNRAS, **445**, 4155 (2014) (astro-ph.HE/1404.3176)
11. Osmanov Z.
“*Radio emission of magnetars driven by the quasi-linear diffusion*”
MNRAS, **444**, 2494 (2014) (astro-ph.HE/1407.7688)
12. Osmanov Z.

- “On the Role of the Curvature Drift Instability in the Dynamics of Electrons in Active Galactic Nuclei”*
IJMPD, **22**, 1350081 (2013)
13. Chkheidze N., Machabeli G. & Osmanov Z.
“On the spectrum of the pulsed gamma-ray emission from 10MeV to 400GeV of the Crab pulsar”
Astrophysical Journal, **773**, 143, (2013) (astro-ph./1206.3660)
 14. Mahajan S., Machabeli G., Osmanov Z. & Chkheidze N.
“Ultra High Energy Electrons Powered by Pulsar Rotation”
Nature Scientific Reports, **3**, 1262 (2013)
 15. Osmanov Z. & Chkheidze N.
“Synchrotron Emission Driven by the Cherenkov-drift Instability in Active Galactic Nuclei”
Astrophysical Journal, **764**, 59, (2012)
 16. Osmanov Z., Rogava A. & Poedts S.
“Self-heating in kinematically complex magnetohydrodynamic flows”
Physics of Plasmas, **19**, 012901-012901-6 (2012)
 17. Chkheidze N. & Osmanov Z.
“On the mechanism of the pulsed high-energy emission from the pulsar PSR B1509-58”
MNRAS, **419**, 2391, (2012)
 18. Osmanov Z.
“The generation of connected high and very high energy gamma-rays and radio emission in active galactic nuclei”
Astronomy and Astrophysics, **530**, 75, (2011) (astro-ph.HE/1104.1553)
 19. Chkheidze N., Machabeli G. & Osmanov Z.
“On the Very High Energy Spectrum of the Crab Pulsar”
Astrophysical Journal, **730**, 62, (2011) (astro-ph.HE /1012.3275)
 20. Osmanov Z.
“The influence of corotation on high-energy synchrotron emission in Crab-like pulsars”
MNRAS, **411**, 973, (2011) (astro-ph.HE /1009.4183)
 21. Osmanov Z.
“On the Simultaneous Generation of High-energy Emission and Submillimeter/Infrared Radiation from Active Galactic Nuclei”
Astrophysical Journal, **721**, 318, (2010) (astro-ph.HE /1012.3578)
 22. Osmanov Z. & Machabeli G.
“Quasi-linear diffusion driving the synchrotron emission in active galactic nuclei”
Astronomy and Astrophysics, **516**, 12, (2010) (astro-ph.GA /0910.3943)
 23. Rogava A.D., Osmanov Z. & Poedts S.
“Self-heating and its possible relationship to chromospheric heating in slowly rotating stars”
MNRAS, **404**, 224, (2010) (astro-ph.SR/0909.5400)
 24. Osmanov Z.
“Is very high energy emission from the BL Lac 1ES 0806+524 centrifugally driven”
New Astronomy, **15**, 351-355, (2010) (astro-ph.HE /0901.1235)
 25. Machabeli G., Osmanov Z.
“On the very high energy pulsed emission in the Crab pulsar”
Astrophysical Journal, **709**, 547-551, (2010) (astro-ph.HE/0907.1385)

26. Machabeli G. & Osmanov Z.
"On the synchrotron emission mechanism in the recently detected VHE radiation from the Crab pulsar"
 Astrophysical Journal Letters, **700**, 114-117, (2009) (astro-ph.HE/0901.3470)
27. Osmanov Z., Shapakidze D., Machabeli G.
"Dynamical feedback of the curvature drift instability on its saturation process"
 Astronomy and Astrophysics, **503**, 19-24, (2009), (astro-ph /0711.0295)
28. Osmanov Z. & Rieger F.
"On particle acceleration and very high energy gamma-ray emission in Crab-like pulsars"
 Astronomy and Astrophysics, **502**, 15-20, (2009), (astro-ph.HE/0906.1691)
29. Osmanov Z., Mignone A., Massaglia S., Bodo G., Ferrari A.
"On the linear theory of Kelvin-Helmholtz instabilities of relativistic magnetohydrodynamic planar flows"
 Astronomy and Astrophysics, **490**, 493-500, (2008), (astro-ph/0802.2607)
30. Osmanov Z.
"Efficiency of the centrifugally induced curvature drift instability in AGN winds"
 Astronomy and Astrophysics, **490**, 487-492, (2008), (astro-ph/0803.0395)
31. Osmanov Z.
"Centrifugally driven electrostatic instability in extragalactic jets"
 Physics of Plasmas, **15**, 032901-032901-7, (2008), (astro-ph/0706.0392)
32. Osmanov Z., Dalakishvili G., Machabeli G.
"On the reconstruction of a magnetosphere of pulsars nearby the light cylinder surface" MNRAS, **383**, 1007-1014, (2008), (astro-ph/0705.4574)
33. Osmanov Z., Rogava A.D., Bodo G.
"On the efficiency of particle acceleration by rotating magnetospheres in AGN"
 Astronomy and Astrophysics **470**, 395-400, (2007) (astro-ph/0609327)
34. Machabeli G., Osmanov Z. & Mahajan S.
"Parametric mechanism of the rotation energy pumping by a relativistic plasma"
 Physics of Plasmas **12**, 062901-062901-6 (2005)
35. Rogava A.D., Poedts S. & Osmanov Z.:
"Transient shear instability of differentially rotating and self-gravitating dusty plasma"
 Physics of Plasmas **11**, 1655-1662, (2004).
36. Rogava A.D., Bodo G., Massaglia S. & Osmanov Z.
"Amplification of MHD waves in swirling astrophysical flows"
 Astronomy and Astrophysics **408**, 401-408, (2003)
37. Rogava A.D., Dalakishvili G., Osmanov Z.
"Centrifugally driven relativistic dynamics on curved trajectories"
 General Relativity and Gravitation **35**, pp.1133-1152, (2003).
38. Osmanov Z., Machabeli G., Rogava A. D.
"Electromagnetic waves in a rigidly rotating frame"
 Physical Review A **66**, 042103 (2002).

10. Conference proceedings

- Osmanov Z.
“Centrifugally induced curvature drift instability in AGN”
Proceedings of Conf. “High energy Gamma-Ray Astronomy”,
Heidelberg, Germany, AIPC, Vol. **1085**, pp.463-466, (2008)
- Osmanov Z., Dalakishvili G., Machabeli G.
“On the reconstruction of a magnetosphere of pulsars nearby the
light cylinder surface”
Proceedings of Conf. “40 Years of Pulsars: Millisecond Pulsars, Magnetars and
More”, AIPC, vol. **983**, pp. 127-129, (2008)
- Osmanov Z., Massaglia S., Mignone A., Bodo G.
“Linear analysis of the Kelvin-Helmholtz instability for relativistic
magnetohydrodynamics”
Proceedings of “Conference on Plasma Physics, EPS-33rd”, (2006)
(http://eps2006.frascati.enea.it/papers/pdf/P1_059.pdf)

11. International collaborations

Prof. George Melikidze: Institute of Astronomy, Zielona Gora University, Lubuska
2, 65-265, Zielona Gora, Poland

Prof. Swadesh Mahajan: Institute of Fusion Studies, The University of Texas at Austin,
Austin, TX 78712, USA

Dr. Frank Rieger: Zentrum für Astronomie (ZAH), Institut für Theoretische Astrophysik,
Universität Heidelberg, Philosophenweg 12, D-69120 Heidelberg, Germany; Max-Planck-
Institut für Kernphysik, PO Box 103980, D-69029 Heidelberg, Germany

Prof. Stefaan Poedts: Centre for Plasma Astrophysics, Katholieke Universiteit Leuven,
Celestijnenlaan 200B, bus 2400 B-3001, Belgium

Prof. Silvano Massaglia, Prof. Attilio Ferrari & Dr. Andrea Mignone: Dipartimento di Fisica
Generale, Università degli Studi di Torino, via Pietro Giuria 1, 10125 Torino, Italy

Prof. Gianluigi Bodo: Osservatorio Astronomico di Torino, Strada Osservatorio 20, 10025
Pino Torinese, Italy