

Curriculum Vitae

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Present address **Institute for Nuclear Research and Nuclear Energy,**
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Date of Birth: 7th January 1947

Place of Birth: Stara Zagora, Bulgaria

Nationality: Bulgarian

Marital Status: Married, two children

Education and Scientific Qualifications:

Doctor of Science: 1987 – Doctor of Science Thesis "Generating Operators of Soliton-Type Non-Linear Evolution Equations, Related to the Semi-Simple Lie Algebras"
Laboratory of Theoretical Physics of the Joint Institute for Nuclear Research, Dubna, USSR.

Ph. D. : 1974 – Ph. D. thesis "On the infrared singularities of the Quantum Electrodynamics"
Physics Department of Leningrad State University, Leningrad, USSR.
Supervised by Prof. L.D.Faddeev, Leningrad Division of Steklov Institute of Mathematics.

B. Sc. Graduated the Physics Department of the University of Sofia, 1964 – 1969.
Master Thesis fulfilled in 1969 at Goteborg Techniska Hogskolan, Sweden, under the supervision of Prof. K.E. Eriksson.

Languages: Russian, English.

Fellowships: 1971 – 1974 – Graduate Student at the Leningrad State University, Leningrad, USSR.

Positions: 1970 – 71 – physicist at the Institute of Physics of the Bulgarian Academy of Sciences, Sofia, Bulgaria
1971 – 74 – Graduate student at Leningrad State University.
1975 – 76 – Research associate at INRNE, Sofia.
1977 – 83 – Research associate and senior research associate at the Laboratory of Theoretical Physics at the Joint Institute for Nuclear Research, Dubna.
1984 – 1996 Research associate and senior research associate at the Institute for Nuclear Research and Nuclear Energy, Sofia.
1996 – 2015 Professor at the Institute for Nuclear Research and Nuclear Energy, Sofia.
2002 – 2015 Leader of Laboratory "Solitons, coherence and geometry"

2004 – 2008 Member of the General assembly of the Bulgarian academy of sciences
2004 – 2008 Member of the Executive council of the Bulgarian academy of sciences
2005 – 2008 deputy director of the Institute for Nuclear Research and Nuclear Energy
2015 – Editor of the International Journal of Geometric Methods in Modern Physics <http://ijgmmp.edmgr.com/>
2015 – Associated member of:
the Institute of mathematics and informatics
the Institute for Nuclear Research and Nuclear Energy
the Institute for Advanced Studies in Physics, New Bulgarian University, Sofia.

Publications: more than 200 scientific publications, including:
1 monograph and Editor of five proceedings;
123 papers in scientific journals;
105 published reports in proceedings of international conferences;

More than 1 000 independent references. Impact factor > 120.

Awards: Prize of the Institute for Nuclear Research and Nuclear Energy for best work in theoretical physics for 1998 (team-leader);
Prize of the Institute for Nuclear Research and Nuclear Energy for best work in theoretical physics for 2007 (team-leader)

References: **Prof. V. E. Zakharov**, Landau Institute for Theoretical Physics, 2 Kosygina street, Moscow, 117940 Russia, zakharov@itp.ac.ru and Department of Mathematics, University of Arizona, Tucson, AZ 85721, zakharov@math.arizona.edu
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Delivered lectures on:

1. Theory of solitons and their interactions, Faculty of physics, University of Sofia, Sofia, 1998.

2. Theory of solitons and their interactions, Faculty of Physics, University of Sofia, Sofia, 2004.
3. Simple Lie Algebras and Applications to Integrable Systems, Department of Physics, University of Salerno, Salerno, Italy, 2004.
4. Lectures on simple Lie algebras, INRNE, Bulgarian academy of sciences, Sofia, 2005.
5. Algebraic and analytical approach to integrable systems, Faculty of Mathematics and Informatics, University of Sofia, Sofia, 2005.
6. Simple Lie Algebras and Applications to Integrable Systems, Department of Physics, University of Salerno, Salerno, Italy, 2006.
7. Simple Lie Algebras and Applications to Integrable Systems, Department of Physics, University of Salerno, Salerno, Italy, March 2008.
8. Simple Lie Algebras and Applications, INRNE, Sofia, April-June 2007.
9. Algebraic and analytical approach to integrable systems, Faculty of Mathematics and Informatics, University of Sofia, Sofia, March - June 2008.
10. Algebraic and analytical approach to integrable systems, Faculty of Mathematics and Informatics, University of Sofia, Sofia, April - June 2009.

Leader of the Seminar on Soliton theory at the Institute of Nuclear Energy and Nuclear Research since 1993.

Leader of Laboratory "Solitons, coherence and geometry" at INRNE since 2002.

Organizer of:

1. First Symposium on Nonlinear Phenomena and Solitons, Sofia, Bulgaria, June 21 - 22, 1994.
2. Second Symposium on Nonlinear Phenomena and Solitons, Sofia, Bulgaria, June 19 - 20, 1995.
3. International conference on Geometry, integrability and nonlinearity in condensed matter and soft condensed matter physics, Bansko, Bulgaria, July 15-20, 2001.
4. Eighth International conference on Geometry, Integrability and Quantization, June 9-14, 2006, Varna, Bulgaria.
5. Eighth International Workshop on Complex Structures and Vector Fields, August 21-26, 2006, Sofia, Bulgaria.
6. Ninth International conference on Geometry, integrability and quantization, Varna, 8-13 June 2007, Bulgaria
7. Tenth International conference on Geometry, integrability and quantization, Varna, 6-11 June 2008, Bulgaria
8. Ninth International Workshop on Complex Structures, Integrability and Vector Fields, August 25-29, 2008, Sofia, Bulgaria.
9. Eleventh International conference on Geometry, integrability and quantization, Varna, 5-10 June 2009, Bulgaria
10. International workshop "Innovative approaches to physical problems" Bachinovo, Blagoevgrad, April 12 - 15, 2010
11. Twelfth International conference on Geometry, integrability and quantization, Varna, 4-9 June 2010, Bulgaria
12. Symmetries and Integrability of Difference Equations, SIDE-9 14-18 June 2010, VARNA, BULGARIA
13. Tenth International Workshop on Complex Structures, Integrability and Vector Fields, September 13 - 17, 2010, Sofia, Bulgaria.

Supervisor of Diploma Theses:

1. Evstati G. Evstatiev. On the N -soliton interactions of higher nonlinear Schrödinger equations.
Diploma thesis defended at the Faculty of Physics, Sofia University, Sofia, Bulgaria in 1995.
2. Georgi G. Grahovski. On the nonlinear Schrödinger equation with nonvanishing boundary conditions.
Diploma thesis defended at the Faculty of Physics, Sofia University, Sofia, Bulgaria in 1996.
3. Victor A. Atanasov. Integration of Einstein-Hilbert-Grossman equations by the inverse scattering method and construction of exact soliton solutions.
Bachelor of Arts thesis defended at the Faculty of Physics, Sofia University, Sofia, Bulgaria in 2004.
4. Victor A. Atanasov. On the multicomponent nonlinear Schrödinger equation with constant boundary conditions
Magister thesis defended at the Faculty of Physics, Sofia University, Sofia, Bulgaria in 2005.

Supervisor of PhD Theses:

1. Mikhail I. Ivanov. Hamiltonian structures of the modified nonlinear Schrödinger equations.
PhD thesis defended at the Joint Institute for Nuclear Research, Dubna, USSR in 1982.
2. Alexander B. Yanovski. Gauge covariant approach to the theory of the operators generating nonlinear evolution equations of soliton type.
PhD thesis defended at the Joint Institute for Nuclear Research, Dubna, USSR in 1987.
3. Yordan S. Vaklev. Gauge transformations of the classes of nonlinear equations related to two generalizations of the Zakharov-Shabat system.
PhD thesis defended at the Institute for Nuclear Research and Nuclear Energy, Sofia, Bulgaria in 1989.
4. Georgi G. Grahovski. Reductions and Hierarchies of Hamiltonian Structures for N -wave type Equations
PhD thesis defended at the Institute for Nuclear Research and Nuclear Energy, Sofia, Bulgaria in 2003.
5. Tihomir I. Valchev. Reductions of Nonlinear evolution equations of soliton type on homogeneous and symmetric spaces. (In Bulgarian: Редукции на нелинейни уравнения от солитонен тип върху хомогенни и симетрични пространства).
PhD thesis defended on February 5, 2009 at INRNE, Sofia.
6. Victor A. Atanasov. I. Curvature-Induced Effects in Quantum Mechanics: Applications in Nano-Systems; II. Fordy-Kulish models and Bose-Einstein Condensation.
PhD thesis supervised jointly with prof. Rossen Dandoloff, Cergy Pontoise University, Paris, France on March 27 2009.
7. Aleksander Alexiev Stefanov. Non-linear dynamical systems and infinite dimensional Lie algebras
PhD thesis supervised jointly with prof. Dimitar Magdalinov Mladenov, Sofia University. Submitted on December 2015. Defended on 21 March 2016.
8. Stanislav Krasimirov Varbev. Integrable systems related to the affine Kac-Moody algebras of type A
PhD thesis supervised jointly with prof. Dimitar Magdalinov Mladenov, Sofia University. submitted on January 2016. Defended on 18 March 2016.

Sofia, March 22, 2016.

Prof. Dr. V. S. Gerdjikov.

LIST

of the scientific papers of DSc. V. S. Gerdjikov

I. Monographs and Editorials.

- [1] R. Balakrishnan, R. Dandoloff, V. Gerdjikov, D. Pushkarov, A. Saxena. *Editorial: Topical issue on geometry, integrability and nonlinearity in condensed matter physics*. European J. Phys. **29B**, 155 (2002).
- [2] V. Gerdjikov, M. Tsvetkov and P. Fiziev. Foreword. In: Prof. G. Manev's Legacy in Contemporary Aspects of Astronomy, Theoretical and Gravitational Physics Eds.: V. Gerdjikov and M. Tsvetkov, Heron Press Ltd, Sofia, 2005. pp. 5-6.
- [3] V. S. Gerdjikov, G. Vilasi, A. B. Yanovski. *Integrable Hamiltonian Hierarchies. Spectral and Geometric Methods* Lecture Notes in Physics **748**, Springer Verlag, Berlin, Heidelberg, New York (2008). ISBN: 978-3-540-77054-1.
- [4] Editors: Kouei Sekigawa, Vladimir S. Gerdjikov and Stancho Dimiev. *Trends in Differential Geometry, Complex Analysis and Mathematical Physics*. World Scientific (2009).
- [5] Complex Structures, Integrability and Vector Fields. Editors: Kouei Sekigawa, Vladimir S. Gerdjikov, Yasuo Matsushita, Ivanlo M. Mladenov AIP Conference Proceeding, vol. **1340**, (2011).
- [6] "Symmetries and Integrability of Difference Equations (SIDE-9)". Special issue of SIGMA. Editors: Boyka Aneva, Vladimir Gerdjikov, Plamen Iliev, Vassilis Papageorgiou. (2011)
- [7] Editors: Boyka Aneva, Georgi Grahovski, Rossen Ivanov, Dimitar Mladenov. *Integrability, Recursion Operators and Soliton Interactions*. Avangard Prima (2014). ISBN: 978-619-160-313-8.

II. Articles in journals.

- [1] K. A. Edin, K.-E. Eriksson, V. S. Gerdjikov, L. Matsson. *Infrared end-point singularities*. Physica Scripta **2**, n. 6, 237–241, (1970).
- [2] V. S. Gerdjikov, P. P. Kulish. *On the low-energy photon theorems and the infrared divergencies*. Theor. Math. Phys. **18**, n. 1, 51 – 55, (1974). (In Russian).
- [3] V. S. Gerdjikov, P. P. Kulish. *The low-energy structure of the Feynman S-matrix*. Theor. Math. Phys. **21**, No.2, 183–194, (1974), (In Russian).
- [4] V. S. Gerdjikov. *The low-energy asymptotics of the Feynman amplitudes*. Bulgarian J. Phys. **2**, No.3, 183–193, (1975). (In Russian).
- [5] V. S. Gerdjikov, D. A. Trifonov. *Normal coordinates for the non-stationary quadratic quantum systems*. Compt. rendue of the Bulgarian acad. sci. **30**, No.4, 503–506, (1977). (In Russian).
- [6] V. S. Gerdjikov, P. P. Kulish. *Complete integrable Hamiltonian systems related to the non-self-adjoint Dirac operator*. Bulgarian J. Phys. **5**, No.4, 337–349, (1978), (In Russian).
- [7] V. S. Gerdjikov, P. P. Kulish. *A method for the derivation of the Bäcklund transformation in the formalism of the inverse scattering method*. Theor. Math. Phys. **39**, No.1, 69–74, (1979), (In Russian).
Gerdzhikov, VS, Kulish, PP. *Derivation of the Bäcklund transformation in the formalism of the inverse scattering problem*. Theoretical and Mathematical Physics **39** no. 1, 327-331 (1979).

- [8] V. S. Gerdjikov, E. Kh. Khristov. *On the expansions over the products of solutions of two one-dimensional Dirac systems.*
 Matem. zametki **28**, No.4, 501–512, (1980) (In Russian).
 Translated in: V. S. Gerdzhikov, E. Kh. Khristov. *Expansions in products of solutions of two dirac systems.*
 Mathematical Notes **28**, No 4, 710 - 716 (1980).
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 Theor. Math. Phys. **44**, No.3, 342–357, (1980). (In Russian);
 English translation: V. S. Gerdzhikov, M. I. Ivanov and P. P. Kulish. *Quadratic bundle and nonlinear equations.* Theoretical and Mathematical Physics **44**, No. 3, 784-795, (1980).
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 Bulgarian J. Phys. **7**, No.1, 28–41, (1980). (In Russian). <http://ccdb5fs.kek.jp/cgi-bin/img/allpdf?198002041>
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 Bulgarian J. Phys. **7**, No.2, 119–133, (1980) (In Russian). <http://ccdb5fs.kek.jp/cgi-bin/img/allpdf?198002041>
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 Sci. Notes of LOMI seminars *101*, 46–63, (1981), (In Russian).
 Translated in J. Sov. Math. **23**, No. 4, 2400 - 2412 (1983).
- [13] V. S. Gerdjikov, P. P. Kulish. *The generating operator for the $n \times n$ linear system.*
 Physica **3D**, n. 3, 549–564, (1981).
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- [15] V. S. Gerdjikov, M. I. Ivanov, P. P. Kulish. *Complete integrability of the difference evolution equations.*
 JINR preprint E2–80–882, (1980), Dubna, USSR.
- [16] V. S. Gerdjikov, M. I. Ivanov. *The block discrete Zakharov–Shabat system. I. Generalized Fourier transforms.*
 JINR communication E2–81–811, (1981), Dubna.
- [17] V. S. Gerdjikov, M. I. Ivanov. *The block discrete Zakharov–Shabat system. II. The Hamiltonian structures.*
 JINR communication E2–81–812, (1981), Dubna.
- [18] V. S. Gerdjikov, M. I. Ivanov. *The Hamiltonian structure of the difference multicomponent non-linear Schrödinger equations.*
 Theor. Math. Phys. **52**, n. 1, 89–104, (1982). (In Russian).
 Gerdzhikov, VS, Ivanov, MI. Hamiltonian-structure of multicomponent non-linear Schrodinger-equations in difference form Theor Math Phys-engl Theor. Math. Phys. **52** no. 1, 676-685 (1982).
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 Lett. Math. Phys. **6**, n. 6, 315–324, (1982).
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 Sci. Notes of LOMI seminars **120**, 55–68, (1982). (In Russian).
 English translation in: I. T. Gadjiev, V. S. Gerdzhikov and M. I. Ivanov. *Hamiltonian structures of nonlinear evolution equations connected with a polynomial pencil.*

- Journal of Mathematical Sciences. **34**, No. 5, 1923 - 1932 (1986).
Translated in J. Sov. Math. **37**, No. 4, 1186 - 1194 (1987).
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JINR communication P5-82-412, (1980), Dubna. (In Russian).
- [22] V. S. Gerdjikov, M. I. Ivanov. *The quadratic bundle of general form and the nonlinear evolution equations. I. Expansions over the “squared” solutions are generalized Fourier transforms.*
Bulgarian J. Phys. **10**, No.1, 13-26, (1983). (In Russian).
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Bulgarian J. Phys. **10**, No.2, 130-143, (1983). (In Russian).
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Sci. Notes of LOMI seminars **131**, 34-46, (1983), (In Russian).
English translation: V. S. Gerdzhikov, P. P. Kulish. *Multicomponent nonlinear Schrödinger equation in the case of nonzero boundary conditions.*
Journal of Mathematical Sciences **30**, No 4, 2261-2269 (1985).
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Journ. Math. Phys. **25**, n. 1, 25-34, (1984).
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Phys. Lett. A, **103A**, n. 5, 232-236, (1984). <http://ccdb5fs.kek.jp/cgi-bin/img/allpdf?198403108>
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Phys. Lett. A, **110A**, n. 2, 53-58, (1985).
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Inverse Problems **2**, n. 4, 413-432, (1986).
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Inverse Problems **2**, n. 1, 51-74, (1986).
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JINR communication P5-85-505, (1985), Dubna. (In Russian). http://ccdb5fs.kek.jp/cgi-bin/img_index?198601028
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Phys. Lett. A, **126A**, n. 3, 184-188, (1987).

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An extended version of this paper is available in R[34].
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