Albert Samoilenka

Curriculum Vitae

PERSONAL DETAILS

Birth	15.11.1994, Minsk, Belarus
Nationality	Belarus
Address	lane Dubravinski 5-18, Minks, Belarus, 220089
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EDUCATION

Gymnasium 12 2001-2010
Minsk, Belarus

Gymnasium 29 2010-2012
Minsk, Belarus

Belarusian State University, The Faculty of Physics 2012-2017
Minsk, Belarus, Graduated with summa cum laude
5-year "Physicist" diploma (equivalent to Master degree)

WORK EXPERIENCE

Part time school physics teacher 2012-2013
Gymnasium 29, Minsk, Belarus
Pupils preparation for International Physics Olympiad (Optional course)

Part time physics teacher Summer 2013
NCC "Zubrenok", Belarus
Pupils preparation for Physics Olympiad

One of the organizers of "SciFun" club at BSU 2016-present
Belarusian State University
Hobby

SKILLS

Languages	Russian (native) Belarusian (native) English (fluent)
Software	C++, C#, JavaScript, Unity3D, Delphi, Mathematica, LaTeX, FreeFem, Mayavi
Systems	LINUX, MS Windows, macOS, Android

RESEARCH SUMMARY

Main research area of my studies is related with Mathematical Physics, Numerical Methods in Field Theory, Topological Solitons and their applications in condensed matter physics and High energy physics. I have studied numerically and analytical various problems of Nonlinear Physics.

In 2015-2017 I studied gauged planar Skyrmions with and without Chern-Simons term (results were published in two papers in PRD [1, 2]), we showed that coupling to the magnetic field strongly affects the pattern of interaction between the constituents. Next, we constructed fractional Hopfions in Faddeev-Skyrme model and introduced new position curve for them (published in JHEP [3], conference proceedings [4]). Recently, we have found new class of regular soliton solutions of the gauged planar Skyrme model with fractional topological charges and finite energy – gauged merons, we also found a new relation between the quantization of the magnetic flux of the solitons and the Poincare index of gauged components of the scalar field (published in PRD [5]). Now we are finishing another work on Hopfions in gauged Faddeev-Skyrme model, where we have implement ideas from [5] to show that magnetic flux on zeros of gauged components of the scalar field becomes quantized. Another direction of my work is related with study of the gauged domain walls on a cylinder and construction of the bound for Hopfions in frustrated magnets. The above mentioned works were carried out under supervision of Prof. Dr. Jakov Shnir.

I want to highlight that apart from analytical studies, which were closely connected to the topology, all above mentioned works I studied numerically. Simulated annealing algorithm served as a basis for my algorithm of numerical minimization of the energy functional, which I wrote on C++. When considering different models I adapted my algorithm accordingly, so that now it can successfully find solutions in 1, 2 or 3 dimensional models with more than 200^3 grid points and 5 fields in the last case. Also I modified it so that it's possible to find saddle points for non-positively defined functionals. It was successfully used for 2-d baby Skyrmions, Hopfins and 3-d Skyrmions.

AWARDS

- First Prize of Special Funds of the President of the Republic of Belarus for XIX Republic Young Physicists' Tournament, 2011
- Second Prize of Special Funds of the President of the Republic of Belarus for XX Republic Young Physicists' Tournament, 2012
- Gold medal on Belarusian Physics Olympiad, Belarus, 2012
- **Gold medal on 43rd International Physics Olympiad (IPhO), Estonia 2012**
- First Prize of Special Funds of the President of the Republic of Belarus for 43rd IPhO with Delivery of the Breastplate of the Laureate
- **Enlisted in the fund of talented youth of Republic of Belarus, 2012**
- **Silver medal on 2nd World Physics Olympiad (WoPhO), Indonesia 2012**
- Gold medal on Xth International Engineering Mechanics Contest, Belarus, 2014
- Prize of Special Funds of the President of the Republic of Belarus for Xth International Engineering Mechanics Contest, 2014

- Silver medal on XIth International Engineering Mechanics Contest, Belarus 2015
- **2nd place on JINR Youth Prize Competition of The XX International Scientific Conference of Young Scientists and Specialists, Dubna 2016**
- 1st place in 3 Minute Thesis competition, Belarus-Ivanovo-Karaganda 2017
- 1st category on the Republican competition of scientific works of students, Minsk, Belarus, 2017.
- **Ministry of education grant at BSU, Minsk, 2018**

ATTENDED CONFERENCES, SCHOOLS AND PRACTICES

- I participated in international physics Olympiads, namely: 43 IPhO, Estonia 2012 and 2 WoPhO, Indonesia 2012.
- Student Practice in JINR Fields of Research (3rd stage) Dubna, Russia, September 7 - 25, 2015
- Visit to Department of Physics at the School of Mathematics and Natural Sciences of the University of Oldenburg within the Ostpartnerschafts-Programme, 30. November - 7. December, 2016.
- Report on the XX International Scientific Conference of Young Scientists and Specialists, Dubna, 14-18 March, 2016
- The Helmholtz International School "Cosmology, Strings, New Physics" organized by the Bogoliubov Laboratory of Theoretical Physics, JINR, in the framework of the program DIAS-TH, Dubna, Russia, 28 August- 10 September, 2016
- 50-th Annual Winter School St.Petersburg Nuclear Physics Institute NRC KI 29 February – 5 March, 2016
- Poster on XXIV International Seminar Nonlinear Phenomena in Complex Systems, Joint Institute for Power and Nuclear Research - Sosny of the National Academy of Sciences of Belarus, Minsk, Belarus, May 16-19, 2017
- Report on SIG VI - Topological Solitons: from kinks to Skyrmions, the Institute of Physics, Jagiellonian University, Krakow, Poland, 19-22 June 2017
- Poster on V International School - Symmetry in Integrable systems and Nuclear Physics (SISNP-V), Yerevan State University, Tsakhkadzor, Armenia, July 16 - 22, 2017
- MITP Summer School 2017 - Joint Challenges for Cosmology and Colliders, The Mainz Institute for Theoretical Physics, Mainz, Germany, 6-25 August 2017
- Graduate program of the Research Training Group (RTG) 1523 "Quantum- and Gravitational Fields" at Theoretisch-Physikalisches Institut Astronomisch-Physikalische-Fakultat Friedrich-Schiller-Universitat Jena, Germany, January 10 - March 7, 2018.

PUBLICATIONS

[1] Samoilenka, A. Gauged multisoliton baby skyrme model / A. Samoilenka, Ya. Shnir // Physical Review D. "— 2016. "— Vol. 93. "— P. 065018. "— arXiv:1512.06280.

[2] Samoilenka, A. Gauged baby skyrme model with a chern-simons term / A. Samoilenka, Ya. Shnir // Physical Review D. "— 2017. "— Feb. "— Vol. 95. "— P. 045002. "— arXiv:1610.01300.

[3] Samoilenka, A. Fractional hopfions in the faddeev-skyrme model with a symmetry breaking potential / A. Samoilenka, Ya. Shnir // Journal of High Energy Physics. "— 2017. "— Vol. 2017. "— P. 29. "— arXiv:1707.06608.

[4] Samoilenka, A. Multisoliton solutions of models of the skyrme family / A. Samoilenka // Conference materials, Collection of works of the 74th scientific conference of students and post-graduate students of the BSU. "— 2017.

[5] Samoilenka, A. Gauged merons / A. Samoilenka, Ya. Shnir // Phys. Rev. D. "— 2018. "— Feb. "— Vol. 97. "— P. 045004. "— https://link.aps.org/doi/10.1103/PhysRevD.97.045004.