

CURRICULUM VITAE

Prof. Vitalii Dugaev

<http://www.prz.edu.pl/~vdugaev/>

Current positions:

Associate Professor, Department of Physics, Rzeszów University of Technology, Rzeszów (Poland)

Invited Professor, Department of Physics, Instituto Superior Técnico, Lisbon (Portugal)

Permanent address:

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Education:

Doctor of Science (Habilitation) in Physics – 1996. Chernovtsy State University (Ukraine). Thesis: "Correlations and impurities in narrow gap semiconductors and low dimensional structures"

Senior Research Fellow – 1989. Academy of Sciences of the USSR, Moscow (Russia)

Ph.D. in Physics – 1980. Chernovtsy State University (Ukraine). Thesis: "Theory of impurity states in narrow gap semiconductors". Advisor: Corr. member of Ukrainian Academy of Sciences Prof. K.D. Tovstyuk. Referees: Prof. V.L. Bonch-Bruevich (Moscow University, Russia), Prof. S.V. Melnichuk (Chernovtsy)

M.S. in Electronic Engineering – 1968. Technical University of Lvov (Ukraine). Thesis: "Theoretical study of the gas phase composition of the system Al-Cl". Advisor: Dr. E.L. Dolgov.

Career/Employment:

Since 1/10/2006: Associate Professor (Professor Nadzwyczajny), Department of Physics, Rzeszów University of Technology, Rzeszów (Poland).

Since 1/11/2004: Invited Full Professor (Professor Catedrático Convidado), Department of Physics and Center for Physics of Fundamental Interactions (CFIF), Instituto Superior Técnico, Lisbon (Portugal).

10/2000 – 06/2001; 11/2002 – 10/2004: Scientist, Max-Planck-Institut für Mikrostrukturphysik, Halle (Germany). Theory of localization corrections in ferromagnets, anomalous Hall effect (with Prof. P. Bruno, Theory Department).

10/2001 – 09/2002: Scientist, Instituto Superior de Engenharia de Lisboa (Portugal). Spintronic applications of photoelectronic devices (with Prof. M. Vieira).

Since 1977: Research Associate and Head of Theory Group (since 1997), Frantsevich Institute for Problems of Materials Science, National Academy of Sciences of Ukraine, Chernovtsy (Ukraine). Electronic and magnetic properties of narrow-gap and layered semiconductors. Theory of impurity states in semiconductors, electron energy spectrum in quantum wells, ferroelectric phase transitions, magnetic interactions, weak localization.

1970 – 1977: Research Associate and Head of Theory Group, Technical University of Lvov (Ukraine). Computer simulations of transport properties of semiconductors. R & D of semiconductor sensors of temperature and pressure. Teaching *Semiconductor Physics* at graduate level.

Special Appointments:

07/2008 – 09/2008: Visiting Scientist, European Synchrotron Radiation Facility, Grenoble (France). (Theory group of Prof. P. Bruno).

06/2007 – 09/2007: Visiting Scientist, Max-Planck-Institut für Mikrostrukturphysik, Halle (Germany). Theory of localization corrections in conductivity, anomalous Hall effect (with Prof. P. Bruno, Theory Department).

06/2006 – 09/2006: Visiting Scientist, Institut Néel, CNRS/UJF, Grenoble (France). (Theory group of Prof. C. Lacroix).

01/2004 – 04/2004: Invited Professor, Joseph Fourier Université and Laboratoire Louis Néel, CNRS, Grenoble (France). Anomalous Hall effect (Theory group of Prof. C. Lacroix)

03/2000 – 05/2000: Visiting Scientist, Center of Theoretical Physics, Polish Academy of Sciences, Warsaw (Poland). Transport properties of magnetic structures with domain walls (group of Prof. L. Turski)

1996 – 2002: Visiting Scientist. Short-term visits (6 months in total) to Institute of Physics, Polish Academy of Sciences (Warsaw), Technical University of Poznań and A. Mickiewicz University in Poznań (Poland). Theory of magnetic and disordered semiconductors (Prof. W. Dobrowolski, Prof. J. Barnaś, and Prof. R. Gałazka).

1992 – 1994: Part-time Research Associate, Chernovtsy State University (Ukraine). Electrical properties of interfaces and heterojunctions. Teaching *Solid State Physics* at graduate level.

1983 – 1984: Visiting Scientist, one-year stage in Landau Institute for Theoretical Physics, Moscow (Russia). Localization theory (with Prof. D.E. Khmel'nitskii, group of Prof. A.I. Larkin).

Teaching:

- 1974 – 1977 Lecture course "Semiconductor Physics", graduate level. Technical University in Lvov (Ukraine)
- 1975 – 1977 Advisor of Master thesis (9 students). Technical University in Lvov (Ukraine)
- 1987 – 1990 Consulting classes for graduate students (5 students). University of Chernovtsy (Ukraine)
- 1988 – 1990 Advisor of Master thesis. University of Chernovtsy (Ukraine)
- 1992 – 1993 Lecture course "Solid State Physics", graduate level. University of Chernovtsy (Ukraine)
- 1993 – 1994 Lecture course "Semiconductor Physics", graduate level. University of Chernovtsy (Ukraine)
- 2000 – 2001 Advisor of PhD student (A. Slobodskyy). Institute for Problems of Materials Science, Chernovtsy (Ukraine).
- 2001 – 2002 Advisor of Master thesis (1 student). University of Chernovtsy (Ukraine)
- 2002 – 2005 Advisor of PhD student (V. Ivanov). Institute for Problems of Materials Science, Chernovtsy (Ukraine).
- 2004 – 2005 Lecture course "Topics in Condensed Matter Physics", graduate level. Instituto Superior Técnico, Lisboa (Portugal)
- 2005 – 2006 Lecture course "Advanced Condensed Matter Physics I", Doutoramento em Física. Instituto Superior Técnico, Lisbon (Portugal).
- 2006 – 2007 Lecture course "Physics I". Rzeszów University of Technology, Rzeszów (Poland).
- 2007 – 2008 Lecture courses "Physics I", "Solid State Physics", Computer modelling. Rzeszów University of Technology, Rzeszów (Poland).
- 2008 – 2009 Lecture courses "Physics I", "Solid State Physics", Computer modelling. Rzeszów University of Technology, Rzeszów (Poland).

Research interests:

Solid state theory, methods of quantum field theory in statistical physics, magnetism, disordered systems, spintronics, semiconductor theory, heterostructures, nanostructures.

Publications:

- 100 major publications in refereed journals (Physical Review B, Physical Review Letters, et al.)
- 20 invited talks at international conferences
- 100 contributed talks at international conferences
- 700 citations

Invited lectures and seminar talks:

- Institute of Physics, Polish Academy of Sciences, Warsaw, June 1999
- Toruń University, Poland, June 1999
- Warsaw University, Poland, December 17, 1999
- Jagiellonian University, Kraków, Poland, March 2000

Adam Mickiewicz University, Poznań, Poland, July 2000
 Universität Regensburg, December 2000
 Max-Planck-Institut für Mikrostrukturphysik, Halle, Germany, January 2001
 Universität Graz, Austria, April 2001
 Max-Planck-Institut für Physik Komplexer Systeme, Dresden, Germany, April 2001
 Instituto Superior de Engenharia de Lisboa, Portugal, October 24 2001
 Instituto Superior Técnico, Lisbon, Portugal, January 2002
 Humboldt-Universität, Berlin, January 2003
 Universität Würzburg, Würzburg, Germany, February 2003
 Institute of Molecular Physics, Polish Academy of Sciences. Poznań, Poland, October 2003
 Institut Laue-Langevin, Grenoble, France, February 2004
 Institute of Molecular Physics, Physics Polish Academy of Sciences, Poznań, Poland, May 2004
 Rzeszów University, Poland, May 2004
 Max-Planck-Institut für Mikrostrukturphysik, Halle, Germany, August 2004
 Instituto Superior Técnico, Lisbon, Portugal, November 2004
 Universidade de Lisboa, Lisbon, Portugal, March 2005
 Rzeszów University of Technology, January 2006
 Universidade do Minho, Braga, Portugal, May 2006
 Universität Regensburg, Germany, July 2007
 Adam Mickiewicz University, Poznań, Poland, November 2007
 Poznań University of Technology, Poland, December 2007
 Institut Laue-Langevin/ESRF, Grenoble, France, September 2008
 SPINTEC Research Laboratory, Grenoble, France, September 2008
 Adam Mickiewicz University, Poznań, Poland, November 2008
 Instituto Superior Técnico, Lisbon, Portugal, December 2008
 Martin-Luther-Universität Halle-Wittenberg, May 2009

Membership of committees and physical societies:

Qualification Board of Chernovtsy National University, Ukraine (1998 – 2002)
 Ukrainian Physical Society and American Physical Society

Awards:

Two awards of the International Science (Soros) Foundation – 1992 and 1993
 Mianowski Science Fellowship (Poland) – 2000
 NATO Science Fellowship (Portugal) – 2001
 Gulbenkian Professorship (Portugal) – 2004
 1st Degree Award, Rzeszów University of Technology (Poland) – 2008.

Research projects:

"Magnetic interactions in alloy low-dimensional structures ferromagnet-semiconductor EuS-PbS". Cooperative research Grant No. 2 P03B 109 12 of the Polish Committee for Scientific Research. With Institute of Physics, Polish Academy of Sciences (Warsaw, Poland). 1/01/1997 – 31/12/1999

"Development of physical principles of the molecular nanotechnologies of layered crystals". Research Grant of the Science and Technology Center in Ukraine (sponsored by USA) No. 591. 1/09/1998 – 30/08/2000. 120000 USD

"Magnetic and electrical properties of rare earth based IV-VI semimagnetic semiconductors". Cooperative research Grant No. 2 P03B 154 18 of the Polish Committee for Scientific Research. Institute of Physics, Polish Academy of Sciences (Warsaw, Poland). 1/07/1998 – 1/07/2001

"*Spin-polarized electron transport and magnetic properties of magnetic nanostructures*". Research Grant of Polish Committee for Scientific Research No. 5 P03B 091 20. In cooperation with A. Mickiewicz University (Poznań, Poland). 10/02/2001 – 09/02/2003. 119600 PLN

"*New generation of microthermometers and multifunctional sensors for use in cryogenic engineering and low-temperature physics*". European Research Grant INTAS No. 2000-0476. In cooperation with Instituto de Metrologia in Torino, Italy, Institute of Cryogenics in Southampton, UK, and Institute of Semiconductor Physics in Kiev, Ukraine. 1/07/2001 – 30/09/2004. 150000 EUR

"*Spin dependent transport in semiconducting and metallic magnetic multilayers*". NATO Collaborative Linkage Grant No. PST.CLG.977615. In cooperation with Institute of Physics, Polish Academy of Science, Warsaw, and A. Mickiewicz University, Poznań (Poland), 3/04/2001 – 3/04/2002. 5000 EUR

"*Spin electronics*". Special project (projekt zamowiany) of Polish Committee for Scientific Research No. PBZ/KBN/044/P03/2001. 15/07/2002 – 14/07/2005. In cooperation with Institute of Physics, Polish Academy of Sciences (Warsaw, Poland), Institute of Molecular Physics, Polish Academy of Sciences and A. Mickiewicz University (Poznań, Poland)

"*Theory and computer simulation of new spintronic devices*". Research Grant of Fundação para a Ciência e a Tecnologia in Portugal (FACC) No. 440.02, 2003. 1500 EUR. With Instituto Superior de Engenharia de Lisboa (Portugal)

"*Development of space technology of materials processing using directional crystallization*". Research Grant of the Science and Technology Center in Ukraine (sponsored by NASA, USA) No. NN-36, 1/06/2003 – 31/05/2004. In cooperation with Chernovtsy National University (Ukraine)

"*Transport properties of magnetic semiconductors and nanostructures with domain walls*". Research Grant of the Ministry of Science and Information in Poland No. 2 P03B 053 25. 17/09/2003 – 16/09/2006. 99376 PLN (25150 EUR). In cooperation with Institute of Physics, Polish Academy of Sciences, Warsaw and Adam Mickiewicz University, Poznań (Poland)

"*Non-linear optic effects in wide-gap semiconductors*". Research Grant of Fundação para a Ciência e a Tecnologia (FCT) in Portugal No. POCTI/FAT/48822/2002, 1/06/2004 – 31/05/2007, 108000 EUR. In cooperation with Instituto Superior de Engenharia de Lisboa, Universidade de Aveira and Universidade de Algarve (Portugal)

"*Manipulation of spin and charge currents in magnetic nanostructures*". Research Grant of Fundação para a Ciência e a Tecnologia (FCT) in Portugal No. POCI/FIS/58746/2004, 1/01/2005 – 31/12/2006. 80000 EUR. In cooperation with Instituto Superior de Engenharia de Lisboa and Évora University (**Principal investigator**)

"*Advanced semiconductor spintronics: Technology, theory and devices*". Research Grant of the Science and Technology Center in Ukraine (sponsored by European Union) No. 3098, 1/08/2006 – 31/07/2008. \$ 83550. In cooperation with Chernovtsy University

"*Spin-dependent transport and electronic correlations in nanostructures*". European Project No. ESF/8/2006 (EUROCORES) in field of Fundamentals of Nanoelectronics (FoNE). 2006 – 2009. In cooperation with UAM in Poznań (Poland) and Universidad Autonoma de Madrid (Spain).

"*Electronic transport and current-indexed spin dynamics in magnetic mesoscopic structures*". Research Grant of the Ministry of Science and High Education in Poland No. N202 142 31/2598. 2006 – 2009. In cooperation with Adam Mickiewicz University, Poznań (Poland).

"*Electronic transport and magnetic dynamics in low-dimensional magnetic systems and nanostructures*". Research Grant of Fundação para a Ciência e a Tecnologia (FCT) in Portugal No. PTDC/FIS/70843/2006, 1.09.2007 – 31.08.2010. 109188 EUR. In cooperation with Instituto Superior Técnico, Évora University and Instituto Superior de Engenharia de Lisboa (Portugal).

"*Magnetic interactions and the spin polarized electric current in graphene*". Research Grant of the Ministry of Science and High Education in Poland No. N N202 3689 33. 2.11.2007 – 1.11.2010. 94600 PLN (**Principal investigator**).

Cooperation:

European Synchrotron Radiation Facility, Grenoble, France (P. Bruno)

Max-Planck-Institut für Mikrostrukturphysik, Halle, Germany (A. Ernst)

Adam Mickiewicz University, Poznań, Poland (J. Barnaś)

Institute of Molecular Physics, Polish Academy of Sciences, Poznań, Poland (S. Krompiewski)

Institute of Physics, Polish Academy of Sciences, Warsaw, Poland (R. Gałazka, W. Dobrowolski)

Institut Néel, CNRS/UJF, Grenoble, France (C. Lacroix)

Martin-Luther-Universität Halle-Wittenberg, Germany (J. Berakdar)

Instituto Superior de Engenharia de Lisboa, Portugal (M. Vieira)

Universidade de Évora, Portugal (M. Araújo)

Chernovtsy University, Ukraine (P. Gorley)

WaveBand/Sierra Nevada Corporation, Irvine, CA, USA (**consulting fellow**, V. Litvinov)

Universidad Autonoma de Madrid, Spain (F. Aliev)

Universidad del País Vasco, Bilbao, Spain (E. Sherman)

Additional information

Areas of expertise:

- semiconductors (energy spectrum, impurity states, transport properties)
- narrow-gap semiconductors (Dirac, Luttinger and Kane models, $k \cdot p$ theory)
- spin-orbit interactions in semiconductors and structures
- magnetism (ferromagnetism and spin glass), magnetic semiconductors, exchange interaction
- low-dimensional systems and structures (quantum wells, wires, dots, superlattices, multilayers)
- disordered systems, localization, mesoscopics

Skills in methods of theoretical physics:

- many-body theory (Green functions, Feynman diagrams, functional integrals)
- Keldysh technique of nonequilibrium processes
- bosonization
- supersymmetry methods in condensed matter theory
- renormalization group technique
- kinetic equation
- application of slave bosons, constrained theories, non-linear σ -models, topology terms

Computer skills:

- Fortran, Matlab, Mathematica

Organization of conferences:

- 11th All-Union Conference on Physics of Ferroelectricity, Chernovtsy, USSR, September 1986 (member of organizing committee)
- 2nd All-Union School-Seminar of Young Scientists on Physics and Materials Science of Semiconductors with Deep Levels, Chernovtsy, USSR, May 1988 (member of organizing committee)
- School-Conference on Theoretical Physics, Chernovtsy – Moscow, USSR, May 1990 (**chairman**)
- 3rd All-Union Conference on Materials Science of Chalcogenide Semiconductors, Chernovtsy, Ukraine, October 1991 (member of organizing committee)
- 1st International Conference on Materials Science of Chalcogenides and Semiconductors with a Structure of Diamond, Chernovtsi, Ukraine, October 1994 (member of organizing committee)
- International Conference on Materials Science of Semiconductors, Chernovtsy, Ukraine, September 1995 (member of organizing committee)
- 2nd International Conference on Physical Problems in Materials Science and Semiconductors, Chernovtsy, Ukraine, September 1997 (member of organizing committee)
- 3rd International School-Conference on Physical Problems in Materials Science of Semiconductors, Chernovtsy, Ukraine, September 1999 (member of organizing committee)

Refereeing:

- Physical Review Letters, Physical Review B, etc.

Languages:

- fluent in English, French, Polish, German, and Portuguese
- Ukrainian and Russian (native)

Personal information:

Born in Krasnodar (Russia), November 1, 1945. Citizen of Ukraine

Married to Tetyana Dugaeva, 10/06/67

Two children (Sergey, born 11/02/69 and Mikhail, born 3/01/72)

Home address: Strzelnicza 23/19, 35-103 Rzeszów, Poland. Tel: +48-17-859 5704

References:

Prof. Dr. Patrick Bruno, European Synchrotron Radiation Facility, BP 220, 38043 Grenoble Cedex, France. Tel: +33-476-88 2354; Fax: +33-476-88 2416; E-mail: patrick.bruno@esrf.fr

Prof. dr hab. Robert Gałazka, Institute of Physics, Polish Academy of Sciences, al. Lotników 32/46, 02-668 Warszawa. Tel: +48-22-843 5626, Fax: +48-22-843 0926; E-mail: galaz@ifpan.edu.pl

Prof. dr hab. Józef Barnaś, Department of Physics, Adam Mickiewicz University, Umultowska 85, 61-614 Poznań, Poland. Tel: 48-61-829 5298; Fax: 48-61-829 5070; E-mail: barnas@amu.edu.pl

Prof. Dr. Vítor Vieira, Department of Physics and CFIF, Instituto Superior Técnico, Av. Rovisco Pais, 1049-001 Lisbon, Portugal. Tel: 351-21-841 9088; Fax: 351-21-841 9143; E-mail: vrv@cfif.ist.utl.pt

Prof. Dr. David Khmel'nitskii, Cavendish Laboratory, University of Cambridge, Cambridge CB3 0HE, UK. Tel: 44-1223-337 289, Fax: 44-1223-337 356, E-mail: dek12@cam.ac.uk