

Oleksandr Dobrovolskiy

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Curriculum vitae

Personal

Birth date & place 16.01.1984 in Kharkiv, Ukraine
Languages English and German: Full professional proficiency (C1)
Ukrainian and Russian: Native



Research experience

- Since 06.2013 **Research Associate and Lecturer**, *Physikalisches Institut d. J.-W.-Goethe-Universität Frankfurt am Main.*
- Execution of self-applied for third-party-funded research projects
 - Organisation of the international Workshop FEBIP-2014
 - Combined dc measurements and microwave spectroscopy of nanostructures
 - Co-tutoring of 2 PhD students [one defence took place on 17.02.2015]
 - Synthesis (MBE) and characterization (XRD) of MnSi thin films
 - Lectures: Introduction to superconductivity, Electronic properties of nanostructures
 - Master for seminars to the lectures on Introduction to superconductivity
 - Coordination of 14 exercise groups on Mechanics, Thermodynamics, E-Dynamics and Optics
- 06.2011–05.2013 **Research project director**, *Physikalisches Institut d. J.-W.-Goethe-Universität Frankfurt am Main.*
- Investigation of the nonlinear vortex dynamics in nanostructured superconductors
 - Designing and assembling of a high-frequency sample probe for microwave spectroscopy
 - Discovery of long-ranged superconducting proximity effects in low-dimensional hybrid systems
 - Fabrication (MBE) and structural characterization of organic charge-transfer salts
 - Coordination of international research projects
 - Supervision of 3 Bachelor projects
- 08.2009–05.2011 **Postdoc**, *Physikalisches Institut d. J.-W.-Goethe-Universität Frankfurt am Main.*
- Development of focused electron beam-induced deposition and focused ion beam milling (FEBID and FIB) as mask-less methods for the fabrication of pinning nanostructures
 - Discovery of the superconducting “clean limit” in epitaxial Nb thin films
 - Employment of various methods for the fabrication and characterization of nanoscale systems: XRD, XRS, EDX, RHEED, AFM, MFM, MOKE, SQUID, SEM, MBE, UV- and e-Lithography
- 11.2005–07.2009 **PhD student and Lecturer**, *Physics Department, V. Karazin Kharkiv National University, Ukraine.*
- Simulations: Nonlinear molecular dynamics based on the Langevin equation
 - Development of the matrix continued fractions technique for the solution of the Langevin equation
 - Lecture courses: Introduction to crystallography, Introduction to materials science
- 07.2004–07.2009 **Developer**, *Private entertainment Speztechnika Kharkiv, Ukraine.*
- Development of hardware for information security
 - Reduction of electromagnetic radiation from printed circuit boards

Education

- 10.2016 **Habilitation**, *J.-W.-Goethe-Universität, FB Physik, Frankfurt am Main*, Speciality: Physics. Habilitation topic: Superconductivity and Vortex Dynamics in Nanostructures. Conferment with the academic title **Privatdozent** and teaching privileges in Physics.
- 07.2016 **Doctor of Physical and Mathematical Sciences**, *B. Verkin-Institut for Low Temperature Physics and Engineering of the National Academy of Sciences of Ukraine, Kharkiv, Ukraine*, Speciality: Superconductivity. Title of the Habilitation: Nonlinear vortex dynamics in superconducting Nb films with anisotropic pinning nanostructures (in Ukrainian). **Calling** for a full professorship at the chair of Low Temperature Physics of V. Karazin KhNU Kharkiv, Ukraine.
- 07.2009 **PhD**, *B. Verkin-Institut for Low Temperature Physics and Engineering of the National Academy of Sciences of Ukraine, Kharkiv, Ukraine*, Speciality: Superconductivity. Title of the PhD thesis: Guided vortex motion and the Hall effect in superconductors with a washboard pinning potential (in Russian). Rector's award for outstanding research achievements.
- 06.2005 **Magister**, *Physics Department of the V. Karazin Kharkiv National University, Ukraine*. Title of the Magister thesis: Influence of point disorder on the nonlinear vortex dynamics in superconductors with anisotropic pinning. Graduated with honours.
- 06.2004 **Bachelor**, *Physics Department of the V. Karazin Kharkiv National University, Ukraine*. Title of the Bachelor thesis: Jump-like deformation in aluminium. Graduated with honours.
- 06.2000 **Secondary Education**, *Gymnasium N144 of the city of Kharkiv, Ukraine*. General Secondary Education certificate with honours.

Research projects

Intra-university projects

- 2014-2015 Vereinigung von Freunden und Förderern der J.-W.-Goethe-Universität, principal investigator, *Nonlinear vortex dynamics in Nb microstrips with anisotropic pinning nanostructures*
- 2013-2014 Stabstelle Forschung und wissenschaftlicher Nachwuchs, principal investigator, *Nonlinear vortex dynamics in superconductors with anisotropic pinning nanostructures*
- 2008-2009 Association of alumni, academics, and friends, V. Karazin KhNU, principal investigator, *Guiding of vortices in superconducting films with a periodic pinning potential*

Regional and national projects

- 2015-2015 DFG, DO1511, principal investigator, *Flux transport at microwaves in nanostructured niobium microstrips*
- 2013-2015 Beilstein Institut Frankfurt am Main, NanoBiC, responsible project executor, *Superconducting proximity effects in nanowires and structures*
- 2011-2013 DFG, DO1511, principal investigator, *Nonlinear vortex dynamics in superconductors with pinning nanostructures*
- 2010-2011 Beilstein Institut Frankfurt am Main, NanoMag, responsible project executor, *Spin-dependent scattering in magnetic and Kondo nanowires*

European and worldwide projects

- 2012-2016 Research group leader in EU-Projekt COST MP1201 *Nanoscale superconductivity: Novel functionalities through optimized confinement of condensate and fields*
- 2016 Hebrew University of Jerusalem, Israel, STSM-MP1201-190316-071932, *Magnetic flux penetration dynamics in nanostructured and as-grown Nb cylinders*
- 2015 Hebrew University of Jerusalem, Israel, STSM-MP1201-190915-066972, *Avalanche-like magnetic response in as-grown and nanostructured Nb cylinders*
- 2014 Hessian Ministry of Economics, Energy, Transport and Regional Development *NANORA, Transnational Interactive Nanotechnology Competence Atlas – TINCA*

- 2013 Hebrew University of Jerusalem, Israel, STSM-MP1201-250515-059981,
Stochastic resonance of vortices in nanostructured Nb films and cylinders
- 2009-2010 German Academic Exchange Service A/08/96378, responsible project executor,
Fabrication of anisotropic pinning structures by focused particle beams

Supervision of students

Co-tutored PhD projects

- 2011–2015 *Superconducting proximity effects in ferro- and diamagnetic nanowire structures*
Maksym Kompaniiets
- 2010–2014 *Co magnetic nanostructures fabricated by focused electron beam induced deposition*
Evgenia Begun

Supervised Bachelor projects

- WS 2016/17 *Fabrication and characterization of stress-induced changes of magnetic phases' boundaries in epitaxial MnSi thin films*, Sebastian Kölsch
- SS 2014 *Superconducting properties of epitaxial Nb thin films after Ga implantation*, Lukas Köhs
- WS 2013/14 *Thickness-dependent suppression of superconductivity in thin Nb films*, Markus Zörb
- SS 2013 *Flux-flow instabilities in thin niobium films*, Marc Hanefeld

Publication and presentation summary

- 50+ peer-reviewed papers in journals
- 3 review and book chapters
- 20+ invited talks and lectures
- 110+ conference contributions
- H index 11, Source: [GoogleScholar](#)
- Citations ca. 330, Source [GoogleScholar](#)

Contributions to the research Community

- Reviewer for Journals: Nature Science Reports, Physical Review (B und E), Applied Physics Letters, Physica C, Journal of Low Temperature Physics, Thin Solid Films, Journal of Superconductivity and Magnetism, Measurement, IEEE Transactions on Applied Superconductivity
- Review for conference proceedings: EUCAS, ICSM, Metamaterials
- Reviewer for European research funding agencies
- Member
 - of the steering committee in the COST-Action MP1201 on superconductivity
 - of the programme, advisory and local committees at international conferences
 - of the German Physical Society (DPG)
 - of the European Society for Applied Superconductivity

EDV

- Operation systems Windows, Linux
- Office & Textsatz MS Office, \LaTeX
- Mathematics Maple, Origin
- Programming C, Java, Python
- CAD P-CAD, Accel EDA

Top 15 publications

- [1] *Abrikosov fluxonics in washboard nanolandscapes*
O. V. Dobrovolskiy
Physica C, invited review (2016)
- [2] *Interplay of flux guiding and Hall effect in Nb films with nanogrooves*
O. V. Dobrovolskiy, M. Hanefeld, M. Zörb, M. Huth, and V. A. Shklovskij
Supercond. Sci. Technol. **29**, 065009–1-7 (2016)
- [3] *Alternating current-driven microwave loss modulation in a fluxonic metamaterial*
O. V. Dobrovolskiy, M. Huth, and V. A. Shklovskij
Appl. Phys. Lett. **107**, 162603–1-5 (2015)
- [4] *Tunable magnetism on the lateral mesoscale by post-processing of Co/Pt heterostructures*
O. V. Dobrovolskiy, M. Kompaniets, F. Porrati, R. Sachser, Ch. Gspan, H. Plank, and M. Huth,
Beilstein J. Nanotechnol. **6**, 1082–1090 (2015)
- [5] *Dual cut-off direct current-tunable microwave low-pass filter on superconducting Nb microstrips with asymmetric nanogrooves*
O. V. Dobrovolskiy and M. Huth
Appl. Phys. Lett. **106**, 142601–1-5 (2015)
- [6] *⁴He sample probe for combined microwave and dc electrical transport measurements*
O. V. Dobrovolskiy, J. Franke, and M. Huth
Meas. Sci. Technol. **26**, 035502–1-9 (2015)
- [7] *Post-growth purification of Co nanostructures prepared by focused electron beam induced deposition*
E. Begun, O. V. Dobrovolskiy, M. Kompaniets, R. Sachser, Ch. Gspan, H. Plank, and M. Huth
Nanotechnol. **26**, 075301–1-11 (2015)
- [8] *Magnetization reversal assisted by half antivortex states in nanostructured circular Co disks*
A. Lara, O. V. Dobrovolskiy, J. L. Prieto, M. Huth, and F. G. Aliev
Appl. Phys. Lett. **105**, 182402–1-5 (2014)
- [9] *Long-range superconducting proximity effect in polycrystalline Co nanowires*
M. Kompaniets, O. V. Dobrovolskiy, C. Neetzel, F. Porrati, J. Brötz, W. Ensinger, and M. Huth
Appl. Phys. Lett. **104**, 052603–1-4 (2014)
- [10] *Vortex ratchet reversal in an asymmetric washboard pinning potential subject to combined dc and ac stimuli*
V. A. Shklovskij, V. V. Sosedkin, and O. V. Dobrovolskiy
J. Phys.: Condens. Matter **26**, 025703–1-12 (2014)
- [11] *Electrical transport and pinning properties of Nb thin films patterned with focused ion beam-milled washboard nanostructures*
O. V. Dobrovolskiy, E. Begun, M. Huth, and V. A. Shklovskij
New J. Phys. **14**, 113027–1-27 (2012)
- [12] *Crossover from dirty to clean superconducting limit in dc magnetron-sputtered thin Nb films*
O. V. Dobrovolskiy and M. Huth
Thin Solid Films **520**, 5985–5990 (2012)
- [13] *Frequency-dependent ratchet effect in superconducting films with a tilted washboard pinning potential*
V. A. Shklovskij and O. V. Dobrovolskiy
Phys. Rev. B **84**, 054515–1-12 (2011)
- [14] *AC-driven vortices and the Hall effect in a superconductor with a tilted washboard pinning potential*
V. A. Shklovskij and O. V. Dobrovolskiy
Phys. Rev. B **78**, 104526–1-12 (2008)
- [15] *Influence of point-like disorder on the guiding of vortices and the Hall effect in a washboard planar pinning potential*
V. A. Shklovskij and O. V. Dobrovolskiy
Phys. Rev. B **74**, 104511–1-14 (2006)