Curriculum Vitae

Andrii Khrabustovskyi

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Contents

Personal information

Birthdate and -place:	2.11.1984 in Kharkiv, Ukraine
Nationality:	Ukraine
Languages:	English, German, Ukrainian, Russian
Current affiliation:	Graz University of Technology
	Institute of Applied Mathematics
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Degrees and education

2019	Habilitation	Mathematics	Graz University of Technology, Austria
2017	Habilitation	Mathematics	Karlsruhe Institute of Technology, Germany
			Thesis: Spectral and asymptotic properties of periodic media
2010	Ph.D.	Mathematical Physics	B. Verkin Institute for Low Temperature Physics and Engineering of the National Academy of Sciences of Ukraine
			Thesis: Homogenization of spectral and evolution problems on Riemannian manifolds of complex microstructure
			Advisor: Prof. Evgen Khruslov
2006	Master	Applied Mathematics	V.N. Karazin Kharkiv National University, Ukraine
2005	Bachelor	Applied Mathematics	V.N. Karazin Kharkiv National University, Ukraine

Employment history

since 05/2018	FWF Senior Postdoc, Institute of Applied Mathematics, Graz University of Technology, Austria
11/2017 - 04/2018	Project assistant, Institute of Applied Mathematics, Graz University of Technology, Austria
07/2015 - 10/2017	Postdoctoral researcher, DFG Collaborative Research Centre 1173 "Wave phenomena: analysis and numerics", project B4 "Effective characterization of optical metamaterials beyond a local response", Karlsruhe Institute of Technology, Germany

11/2014 - 06/2015	Research assistant, Institute for Analysis, Karlsruhe Institute of Technology, Germany
11/2012 - 10/2014	Postdoctoral researcher, DFG Research Training Group 1294 "Analysis, Simulation and Design of Nanotechnological Processes", Karlsruhe Institute of Technology, Germany
11/2009 - 10/2012	Junior research fellow, B. Verkin Institute for Low Temperature Physics and Engineering of the National Academy of Sciences of Ukraine, Kharkiv

Grants, scholarships and other scientific honours

2018 - 2020	Lise Meitner fellowship, Austrian Science Fund (FWF) *Personnel costs: €142 180,00* *Additional project specific costs: €24 000,00*
2012	Best Poster Prize of the 6th European Congress of Mathematics
2011	M.V. Ostrogradsky scholarship for young mathematicians, Ukraine
2009	Scholarship of French Embassy in Ukraine
2009 - 2010	Scholarship of the President of Ukraine
2007 - 2008	Grant of the National Academy of Sciences of Ukraine
2007	Grant DAAD, Germany
2006	Grant of Akhiezer's Fund, Ukraine

Participation in research projects

since 2018	Principal investigator in the project M 2310-N32 "Periodic quantum graphs and open waveguides" funded by Austrian Science Fund (FWF)
2015 - 2017	Team member in the project "Effective characterization of optical metamaterials beyond a local response" within DFG Collaborative Research Centre 1173 "Wave phenomena: analysis and numerics"
2009 - 2011	Team member of the joint French-Ukrainian project "PICS 2009-2011. Mathematical Physics: Methods and Applications" (CNRS and NAS of Ukraine)

Research visits

07/2018, 12/2016	University of Trier (Department IV - Mathematics), Germany	1 week
03/2016	Aix-Marseille University (Center of Theoretical Physics), France	1 week

05/2015	Graz University of Technology (Institute of Numerical Mathematics), Austria	1 week
03/2014, 09/2014	University of Sannio (Department of Engineering), Benevento, Italy	1 week
11/2013	Nuclear Physics Institute of ASCR (Department of Theoretical Physics), Řež, Czech Republic	1 week
12/2009	Pierre and Marie Curie University (Jussieu Institute of Mathematics), Paris, France	1 month
11/2009	Weierstrass Institute for Applied Analysis and Stochastics (Research group "Numerical Mathematics and Scientific Computing"), Berlin, Germany	2 weeks
02/2007	Darmstadt University of Technology (Research Group "Analysis"), Germany	1 month

Organizational activities

07/2019	Organizer (together with O. Post and C. Trunk) of the special session "Spectral Theory and Differential Operators" on IWOTA 2019 at University of Lisbon, Portugal.
02/2019	Organizer (together with J. Behrndt) of the conference "Differential Operators on Graphs and Waveguides" at Graz University of Technology
11/2012 - 10/2014	Coordinator of the seminar of the Research Training Group 1294 at Karlsruhe Institute of Technology

Teaching activities

03/2019 - 06/2019	Partial Differential Equations *lecture course and exercise classes for bachelor students*	TU Graz
10/2018 - 01/2019	Advanced functional analysis *lecture course and exercise classes for bachelor students*	TU Graz
03/2018 - 06/2018	Asymptotic analysis *lecture course for master students*	TU Graz
04/2017 - 07/2017	Eigenvalue problems in complicated domains *lecture course for master students*	KIT Karlsruhe
04/2017 - 07/2017	Analysis *pro-seminar for bachelor students*	KIT Karlsruhe

10/2015 - 02/2016	Differential equations and Hilbert spaces	KIT Karlsruhe
	seminar for bachelor and master students	
10/2014 - 02/2015	Homogenization of PDEs	KIT Karlsruhe
	lecture course and exercise classes for master students	
10/2013 - 02/2014	Introduction to the homogenization theory	KIT Karlsruhe
	lecture course for master students	

Supervision of students

3 bachelor students were co-supervised at Karlsruhe Institute of Technology
1 bachelor student is currently supervised at Graz University of Technology

Conference talks

Plenary talks

08/2019	14th International Conference on Mathematical and Numerical Aspects of Wave Propagation (WAVES-2019), Vienna, Austria
09/2019	6th Najman Conference on Spectral Theory and Differential Equations, Sveti Martin na Muri, Croatia

Invited talks

11/2018	"Advances in Operator Theory with Applications to Mathematical Physics", Orange, US
05/2017	WTZ Workshop/Network Meeting "Schrödinger Operators and Boundary Value Problems", Graz, Austria
09/2016	Conference & summer school "Spectral Theory, Differential Equations and Probability", Mainz, Germany
05/2015	"Waveguides: asymptotic methods and numerical analysis", Naples, Italy
07/2014	Minisimposium "Asymptotic Analysis: Homogenization and Thin Structures" (in the framework of IMSE 2014), Karlsruhe, Germany
06/2013, 06/2014, 06/2016, 06/2017	"Analysis and Mathematical Physics" (AMPH 2013), Kharkiv, Ukraine

Contributed talks

07/2019	"International Workshop on Operator Theory and its Applications" (IWOTA 2018), Lisbon, Portugal
09/2018	"Analytic and Algebraic Methods in Physics XV", Prague, Czech Republic
08/2018	"Applications of Mathematics 2018", Prague, Czech Republic
07/2018	Conference on Mathematics of Wave Phenomena, Karlsruhe, Germany
09/2017	"Asymptotic Analysis and Spectral Theory" (Aspect'17), Trier, Germany
05/2016	"Operators, Operator Families and Asymptotic", Bath, UK
11/2015	"Asymptotic Analysis and Spectral Theory" (Aspect'15), Orsay, France
09/2015	4th Najman Conference on Spectral Problems for Operators and Matrices, Opatija, Croatia
07/2015	12th International Conference on Mathematical and Numerical Aspects of Waves (Waves 2015), Karlsruhe, Germany
07/2014	"International Workshop on Operator Theory and its Applications" (IWOTA 2014), Amsterdam, Netherlands
07/2014	"Operator Theory, Analysis and Mathematical Physics" (OTAMP 2014), Stockholm, Sweden
09/2013	"QMath12: Mathematical Results in Quantum Mechanics", Berlin, Germany
08/2013	"Equadiff 2013", Prague, Czech Republic
09/2012	International conference dedicated to the 120th anniversary of Stephan Banach, Lviv, Ukraine
08/2012	Spectral Theory and Differential Equations (International Conference in honor of Vladimir A. Marchenko's 90th birthday), Kharkiv, Ukraine
09/2011	"Partial Differential Equations", Caputh, Germany
01/2011	10th GAMM Seminar on Microstructures, Darmstadt, Germany
11/2009	International Conference on Elliptic and Parabolic Equations, Berlin, Germany
06/2009	"Geometry "in large", topology and applications", Kharkiv, Ukraine
02/2009	First Winter School at IMDEA on PDEs and Inequalities, Madrid, Spain

Poster presentations

11/2013	"New Trends in Calculus of Variations and PDEs", Naples, Italy
07/2012	6th European Congress of Mathematics, Krakow, Poland
08/2009	Ukrainian Mathematical Congress, Kyiv, Ukraine
08/2008	CIMPA-UNESCO School "Nonlinear Analysis, Geometrical PDE", Tsaghadzor, Armenia
07/2007	Liapunov Memorial International Conference, Kharkiv, Ukraine

List of publications

Articles in peer-reviewed journals

24. G. Cardone, A. Khrabustovskyi, δ'-interaction as a limit of a thin Neumann waveguide with transversal window, *Journal of Mathematical Analysis and Applications* 473(2) (2019), 1320–1342
    `https://doi.org/10.1016/j.jmaa.2019.01.024`

23. K. Mnasri, A. Khrabustovskyi, M. Plum, C. Rockstuhl, Retrieving effective material parameters of metamaterials characterized by nonlocal constitutive relations, *Physics Review B* 9 (3) (2019), 035442
    `https://doi.org/10.1103/PhysRevB.99.035442`

22. D. Barseghyan, A. Khrabustovskyi, Spectral estimates for Dirichlet Laplacian on tubes with exploding twisting velocity, *Operators and Matrices* 13 (2) (2019), 311–322.
    `http://dx.doi.org/10.7153/oam-2019-13-21`

21. A. Khrabustovskyi, O. Post, Operator estimates for the crushed ice problem, *Asymptotic Analysis* 110 (3-4) (2018), 137–161.
    `http://dx.doi.org/10.3233/ASY-181480`

20. P. Exner, A. Khrabustovskyi, Gap control by singular Schrödinger operators in a periodically structured metamaterial, *Journal of Mathematical Physics, Analysis, Geometry* 14(3) (2018), 270–285.
    `https://doi.org/10.15407/mag14.03.270`

19. J. Feis, K. Mnasri, A. Khrabustovskyi, C. Stohrer, M. Plum, C. Rockstuhl, Surface plasmon polaritons sustained at the interface of a nonlocal metamaterial, *Physical Review B* 98 (11) (2018), 115409
    `https://doi.org/10.1103/PhysRevB.98.115409.`

18. K. Mnasri, A. Khrabustovskyi, C. Stohrer, M. Plum, C. Rockstuhl, Beyond local effective material properties for metamaterials, *Physical Review B* 97 (7) (2018), 075439.
    `https://doi.org/10.1103/PhysRevB.97.075439`

17. G. Cardone, A. Khrabustovskyi, Spectrum of a singularly perturbed periodic thin waveguide, *Journal of Mathematical Analysis and Applications* 454 (2) (2017), 673–694.
    `http://dx.doi.org/10.1016/j.jmaa.2017.05.012`

16. G. Cardone, A. Khrabustovskyi, Example of periodic Neumann waveguide with gap in spectrum, in: *J. Dittrich, H. Kovarik, A. Laptev (Eds.), Functional Analysis and Operator Theory for Quantum Physics. The Pavel Exner Anniversary Volume*, Europ.

Math. Soc. Publ. House, 2017, pp.177-187.
`http://dx.doi.org/10.4171/175-1/9`

15. A. Khrabustovskyi, M. Plum, Spectral properties of elliptic operator with double-contrast coefficients near a hyperplane, *Asymptotic Analysis* 98 (1-2) (2016), 91-130.
`http://dx.doi.org/10.3233/ASY-161363`

14. D. Barseghyan, P. Exner, A. Khrabustovskyi, M. Tater, Spectral analysis of a class of Schrödinger operators exhibiting a parameter-dependent spectral transition, *Journal of Physics A: Mathematical and Theoretical* 49 (16) (2016), 165302.
`http://dx.doi.org/10.1088/1751-8113/49/16/165302`

13. P. Exner, A. Khrabustovskyi, On the spectrum of narrow Neumann waveguide with periodically distributed δ' traps, *Journal of Physics A: Mathematical and Theoretical* 48(31) (2015), 315301.
`https://doi.org/10.1088/1751-8113/48/31/315301`

12. G. Cardone, A. Khrabustovskyi, Neumann spectral problem in a domain with very corrugated boundary, *Journal of Differential Equations* 259(6) (2015), 2333-2367.
`http://dx.doi.org/10.1016/j.jde.2015.03.031`

11. D. Barseghyan, A. Khrabustovskyi, Gaps in the spectrum of a periodic quantum graph with periodically distributed δ'-type interactions, *Journal of Physics A: Mathematical and Theoretical* 48(25) (2015), 255201. `http://dx.doi.org/10.1088/1751-8113/48/25/255201`

10. A. Khrabustovskyi, Opening up and control of spectral gaps of the Laplacian in periodic domains, *Journal of Mathematical Physics* 55(12) (2014), 121502.
`http://dx.doi.org/10.1063/1.4902935`

9. A. Khrabustovskyi, E. Khruslov, Gaps in the spectrum of the Neumann Laplacian generated by a system of periodically distributed traps, *Mathematical Methods in the Applied Sciences* 38(1) (2015), 11-26. `http://dx.doi.org/10.1002/mma.3046`

8. A. Khrabustovskyi, Homogenization of spectral problem on Riemannian manifold consisting of two domains connected by many tubes, *Proceedings of the Royal Society of Edinburgh, Section: A Mathematics* 143(6) (2013), 1255-1289. `http://dx.doi.org/10.1017/S0308210510001927`

7. A. Khrabustovskyi, Periodic elliptic operators with asymptotically preassigned spectrum, *Asymptotic Analysis* 82(1-2) (2013), 1-37. `http://dx.doi.org/10.3233/ASY-2012-1131`

8

6. A. Khrabustovskyi, Periodic Riemannian manifold with preassigned gaps in spectrum of Laplace-Beltrami operator, *Journal of Differential Equations* 252(3) (2012), 2339-2369.
   `http://dx.doi.org/10.1016/j.jde.2011.10.011`

5. A. Khrabustovskyi, Homogenization of eigenvalue problem for Laplace-Beltrami operator on Riemannian manifold with complicated 'bubble-like' microstructure, *Mathematical Methods in the Applies Sciences* 32(16) (2009), 2123-2137. `http://dx.doi.org/10.1002/mma.1128`

4. A. Khrabustovskyi, On the spectrum of Riemannian manifolds with attached thin handles, *Journal of Mathematical Physics, Analysis, Geometry* 5(2) (2009), 145-169.
   `http://jmage.ilt.kharkov.ua/list.php?uid=jm05-0145e`

3. A. Khrabustovskyi, Asymptotic behaviour of spectrum of Laplace-Beltrami operator on Riemannian manifolds with complex microstructure, *Applicable Analysis* 87(12) (2008), 1357-1372.
   `http://dx.doi.org/10.1080/00036810802213249`

2. A. Khrabustovskyi, H. Stephan, Positivity and time behavior of a linear reaction-diffusion system, non-local in space and time, *Mathematical Methods in the Applied Sciences* 31(15) (2008), 1809-1834. `http://dx.doi.org/10.1002/mma.998`

1. A. Khrabustovskyi, Klein-Gordon equation as a result of wave equation averaging on the Riemannian manifold of complex microstructure, *Journal of Mathematical Physics, Analysis, Geometry* 3(2) (2007), 213-233.
   `http://jmage.ilt.kharkov.ua/list.php?uid=jm03-0213e`

Preprints

- A. Khrabustovskyi, I. Rassas, E. Soccorsi, The inverse problem of two-state quantum systems with non-adiabatic static linear coupling, arXiv:1811.07302 [math.AP].
  `https://arxiv.org/abs/1811.07302`

Proceedings

- A. Khrabustovskyi, Asymptotically predefined spectral gaps for the Neumann Laplacian in periodic domain, Mathematical Results in Quantum Mechanics: Proceedings of the QMath12 Conference, World Scientific, 2014. `http://dx.doi.org/10.1142/9789814618144_0022`