

Doppler Institute
for Mathematical Physics and Applied Mathematics

2014 List of Publications

(a) Edited volumes, book chapters

1. Pavel Exner, Wolfgang König, Hagen Neidhardt, eds.: *Mathematical Results in Quantum Mechanics*, Proceedings of the QMath12 conference held in Berlin, September 10–13, 2013; xii+383 p.; World Scientific, Singapore 2014.
2. Georgios M. Nikolopoulos, Igor Jex, eds.: *Quantum State Transfer and Network Engineering*, in the series “Quantum Science and Technology”; x+250 p.; Springer, Heidelberg 2014.
3. Miloslav Znojil: *Non-selfadjoint operators in quantum physics: ideas, people and trends*, in “Non-Selfadjoint Operators in Quantum Physics: Mathematical Aspects” (F. Bagarello, J.-P. Gazeau, F.H. Szafraniec, and M. Znojil, eds.), J. Wiley & Sons 2015; pp. 1–57.
4. Pavel Exner: *Functional analysis*, in “Mathematical Tools for Physicists” (M. Grinfeld, ed.), Wiley Wiley, Weinheim 2015; pp. 449–474.

(b) Research papers in journals

(b1) Accepted and published in 2014

1. Diana Barseghyan, Pavel Exner: A regular version of Smilansky model, *J. Math. Phys.* **55** (2014), 042104

2. Jussi Behrndt, Pavel Exner, Vladimir Lotoreichik: Schrödinger operators with δ and δ' -interactions on Lipschitz surfaces and chromatic numbers of associated partitions, *Rev. Math. Phys.* **26** (2014), 1450015
3. Jussi Behrndt, Pavel Exner, Vladimir Lotoreichik: Schrödinger operators with δ -interactions supported on conical surfaces, *J. Phys. A: Math. Theor.* **47** (2014), 355202
4. Sabine Bögli, Petr Siegl: Remarks on the convergence of pseudospectra, *Integral Equations and Operator Theory* **80** (2014), 303–321.
5. Philippe Briet, Jaroslav Dittrich, Eric Soccorsi: Scattering through a straight quantum waveguide with combined boundary conditions, *J. Math. Phys.* **55** (2014), 112104
6. Daniel Dombek, Zuzana Masáková, Volker Ziegler: On distinct unit generated fields that are totally complex, *J. Number Theory* **148** (2015), 311–327.
7. Pavel Exner, Michal Jex: Spectral asymptotics of a strong δ' interaction supported by a surface, *Phys. Lett.* **A378** (2014), 2091–2095.
8. Pavel Exner, Stepan S. Manko: Approximations of quantum-graph vertex couplings by singularly scaled rank-one operators, *Lett. Math. Phys.* **104** (2014), 1079–1094.
9. Pavel Exner, Alexander Minakov: Curvature-induced bound states in Robin waveguides and their asymptotical properties, *J. Math. Phys.* **55** (2014), 122101
10. Pavel Exner, Alexander Minakov, Leonid Parnovski: Asymptotic eigenvalue estimates for a Robin problem with a large parameter, *Portugal. Math.* **71** (2014), 141–156.
11. Pavel Exner, Hagen Neidhardt, Miloš Tater, Valentin A. Zagrebnov: Non-equilibrium current via geometric scatterers, *J. Phys. A: Math. Theor.* **47** (2014), 395301
12. Christiane Frougny, Pavel Heller, Edita Pelantová, Milena Svobodová: k -block versus 1-block parallel addition in non-standard numeration systems, *Theor. Comp. Sci.* **543** (2014), 52–67.
13. Holger Frydrych, Antonín Hoskovec, Igor Jex, Gernot Alber: Selective dynamical decoupling for quantum state transfer, *J. Phys. B: At. Mol. Opt. Phys.* **48** (2014), 025501
14. Lenka Háková, Agnieszka Tereszkievicz: On immanant functions related to Weyl groups of A_n , *J. Math. Phys.* **55** (2014), 113509

15. Craig S. Hamilton, Regina Kruse, Linda Sansoni, Christine Silberhorn, Igor Jex: Driven quantum walks, *Phys. Rev. Lett.* **113** (2014), 083602
16. Tatiana Jajcayová, Edita Pelantová, Štěpán Starosta: Palindromic closure using multiple antimorphisms, *Theor. Comp. Sci.* **533** (2014), 37–45.
17. Vít Jakubský, David Krejčířík: Qualitative analysis of trapped Dirac fermions in graphene, *Ann. Phys.* **349** (2014), 268–287.
18. Vít Jakubský, S. Kuru, J. Negro: Carbon nanotubes in almost homogeneous transverse magnetic field: exactly solvable model, *J. Phys. A: Math. Theor.* **47** (2014), 115307
19. Daniel Jezbera, Jan Kříž, Filip Studnička, Petr Šeba : Geometric approach to biomedical signal processing: ballistocardiographic monitoring of vital functions, *Int. J. Circuits, Systems and Signal Processing* **8** (2014), 147–153.
20. Daniel Jezbera, Jan Kříž, Jiří Rajsner, Filip Studnička, Petr Šeba : Results of geometric ballistocardiography, *Int. J. Circuits, Systems and Signal Processing* |8 (2014), 211–217.
21. Bálint Kollár, Jaroslav Novotný, Tamás Kiss, Igor Jex: Discrete time quantum walks on percolation graphs, *European Physics Journal Plus* **129** (2014), 103
22. Oksana Kuriksha, Severín Pošta, Olena Vaneeva: Group analysis of variable coefficient generalized fifth-order KdV equations, *Physics of Particles and Nuclei Letters* **11** (2014), 990–995.
23. David Krejčířík, Nicholas Raymond: Magnetic effects in curved quantum waveguides, *Ann. Henri Poincaré* **15** (2014), 1993–2024.
24. Géza Lévai, František Růžička, Miloslav Znojil: Three solvable matrix models of a quantum catastrophe, *Int. J. Theor. Phys.* **53** (2014), 2875–2890.
25. Satoshi Ohya: A simple derivation of finite-temperature CFT correlators from BTZ black hole, *Acta Polytechnica* **54** (2014), 142–148
26. Satoshi Ohya: Non-Abelian monopole in the parameter space of point-like interactions, *Ann. Phys.* **351** (2014), 900–913.
27. Satoshi Ohya: Supersymmetry and non-Abelian geometric phase for a free particle on a circle with point-like interactions, *J. Phys. Conf. Ser.* **563** (2014), 012021

28. Malgorzata Rajfur, Andrzej Klos, Jan Kříž: Translocation of cations during sorption of copper in the system solution-algae (*Spirogyra* sp.), *Ecol. Chem. Eng. S* **21** (2014), 425–433.
29. František Štampach, Pavel Štovíček: Orthogonal polynomials associated with Coulomb wave functions, *J. Math. Anal. Appl.* **419** (2014) 231–254.
30. František Štampach, Pavel Štovíček: The Hahn-Exton q -Bessel function as the characteristic function of a Jacobi matrix, *Spec. Matrices* **2** (2014), 131–147.
31. Martin Štefanák, Iva Bezděková, Igor Jex: Limit distributions of three-state quantum walks: The role of coin eigenstates, *Phys. Rev.* **A90** (2014), 012342
32. Martin Štefanák, Iva Bezděková, Igor Jex, Stephen M. Barnett: Stability of point spectrum for three-state quantum walks on a line, *Quantum Inf. Comput.* **14** (2014), 1213
33. Miloslav Znojil, Raymond F. Bishop: The coupled-cluster approach to quantum many-body problem in a three-Hilbert-space reinterpretation, *Acta Polytechnica* **54** (2) (2014), 85–92.
34. Miloslav Znojil: Solvable non-Hermitian discrete square well with closed-form physical inner product, *J. Phys. A: Math. Theor.* **47** (2014), 435302
35. Miloslav Znojil: The large- g observability of the low-lying energies in the strongly singular potentials $V(x) = x^2 + g^2/x^6$ after their \mathcal{PT} -symmetric regularization, *Int. J. Theor. Phys.* **53** (2014), 2549–2557.

(b2) Accepted earlier, published in 2014, or shortly before

1. Karel Břinda, Edita Pelantová, Ondřej Turek: Balances of m -bonacci words, *Fundamenta Informaticae* **132** (1) (2014), 33–61.
2. Goce Chadzitaskos, Lenka Háková, Ondřej Kájínek: Weyl group orbit functions in image processing, *Appl. Math.* **5** (2014), 501–511.
3. Pavel Exner, Diana Barseghyan: Spectral estimates for Dirichlet Laplacians on perturbed twisted tubes, *Operators and Matrices* **8** (2014), 167–183.
4. Pavel Exner, Ari Laptev, Muhammad Usman: On some sharp spectral inequalities for Schroedinger operators on semi-axis, *Commun. Math. Phys.* **326** (2014), 531–541.

5. Pavel Exner, Konstantin Pankrashkin: Strong coupling asymptotics for a singular Schrödinger operator with an interaction supported by an open arc, *Commun. PDE* **39** (2014), 193–212.
6. Pavel Exner, Christian Seifert, Peter Stollmann: Absence of absolutely continuous spectrum for the Kirchhoff Laplacian on radial trees, *Ann. Henri Poincaré* **15** (2014), 1109–1121.
7. Josef Hubeňák, Jan Šlégr: Lower ionosphere electron density profiling with data from VLF receivers, *J. Atmosph. Solar.-Terrestr. Phys.* **107** (2014), 85–88.
8. Martin Kolb, David Krejčířík: The Brownian traveller on manifolds, *J. Spectral Theory* **4** (2014), 235–281.
9. David Krejčířík: Spectrum of the Laplacian in narrow tubular neighbourhoods of hypersurfaces with combined Dirichlet and Neumann boundary conditions, *Math. Bohemica* **139** (2014), 185–193.
10. David Krejčířík, Zhiqin Lu: Location of the essential spectrum in curved quantum layers. *J. Math. Phys.* **55** (2014), 083520
11. David Krejčířík, Petr Siegl, Jakub Železný: On the similarity of Sturm-Liouville operators with non-Hermitian boundary conditions to self-adjoint and normal operators, *Complex Anal. Oper. Theory* **8** (2014), 255–281.
12. Oksana Kuriksha, Severín Pošta, Olena Vaneeva: Group classification of variable coefficient generalized Kawahara equation, *J. Phys. A.: Math. Theor.* **47** (2014), 045201
13. Stepan S. Manko: Quantum-graph vertex couplings: some old and new approximations, *Math. Bohemica* **139** (2014), 259–267.
14. Zuzana Masáková, Tomáš Vávra: Integers in number systems with positive and negative quadratic Pisot base, *RAIRO: Theor. Inf. Appl.* **48** (2014), 341–367.
15. Edita Pelantová, Štěpán Starosta: Palindromic richness for languages invariant under more symmetries, *Theor. Comp. Sci.* **518** (2014), 42–63.
16. Jiří Tolar: A classification of finite quantum kinematics, *J. Phys.: Conf. Series* **538** (2014), 012020
17. Matěj Tušek: Atoms confined by very thin layers, *J. Math. Phys.* **55** (2014), 112105

(c) Accepted for publication in 2014

1. Jussi Behrndt, David Krejčířík: An indefinite Laplacian on a rectangle, *J. d'Anal. Math.*, to appear
2. Pavel Exner, Ondřej Turek: Spectrum of a dilated honeycomb network, *Integral Equations and Operator Theory*, to appear
3. Francisco M. Fernández, Javier Garcia, Iveta Semorádová, Miloslav Znojil: Ad hoc physical Hilbert spaces in quantum mechanics, *Int. J. Theor. Phys.*, to appear
4. Pedro Freitas, David Krejčířík: Alexandrov's isodiametric conjecture and the cut locus of a surface, *Tohoku Math. J.*, to appear
5. Amru Hussein, David Krejčířík, Petr Siegl: Non-self-adjoint graphs, *Trans. AMS*, to appear
6. David Krejčířík, Nicholas Raymond, Matěj Tušek: The magnetic Laplacian in shrinking tubular neighbourhoods of hypersurfaces, *J. Geom. Anal.*, to appear
7. David Krejčířík, Matěj Tušek: Nodal sets of thin curved layers, *J. Diff. Eqs*, to appear
8. Zuzana Masáková, Kateřina Pastirčáková, Edita Pelantová: Description of spectra of quadratic Pisot units, *J. Number Theory*, to appear
9. Ondřej Turek: Abelian properties of Parry words, *Theor. Comput. Sci.*, to appear
10. Miloslav Znojil: Quantum star-graph analogues of PT-symmetric square wells. II: Spectra, *Can. J. Phys.*, to appear

**(d) Other papers, published and accepted in 2014,
or shortly before**

1. Vladislav Kosejk, Goce Chadzitaskos, Jaroslav Červený: The principle of the technology and design of the parabolic strip telescope, in *Proceedings of the Workshop "Progress In Electromagnetics Research Symposium"* (Guangzhou, August 25-18, 2014), pp. 471–476.
2. Goce Chadzitaskos, Jaroslav Červený, Vladislav Kosejk: Parabolic strip telescope, in *Proceedings of the Workshop "Progress In Electromagnetics Research Symposium"* (Guangzhou, August 25-18, 2014), pp. 1726–1729 .

3. Christiane Frougny, Pavel Heller, Edita Pelantová, Milena Svobodová: Parallel algorithms for addition in non-standard number systems, in *Proceedings of the IEEE Workshop Information Theory and Applications Workshop (ITA)* (2014); pp. 1–7.
4. Michal Jex: Spectral asymptotics for a δ' interaction supported by an infinite curve, in *Mathematical Results in Quantum Mechanics: Proceedings of the QMath12 Conference* (P. Exner, H. Neidhardt, W. König, eds.), World Scientific, Singapore 2014; pp. 259–265.
5. Daniel Jezbera, Jan Kříž, Jiří Rajsner, Filip Studnička, Petr Šeba: Geometric ballistography - vital functions monitoring, in *WSEAS Proceedings "Recent Advances In Energy, Environment, Biology And Ecology"* (V. Niola, ed.), 2014; pp. 65–69.
6. Daniel Jezbera, Jan Kříž, Jiří Rajsner, Filip Studnička, Petr Šeba: Unobtrusive monitoring of blood pressure variability and pulse wave velocity, in *WSEAS Proceedings "Recent Advances In Energy, Environment, Biology And Ecology"* (V. Niola, ed.), 2014; pp. 124–127.
7. Hynek Lavička, Tomáš Lichard, Jaroslav Novotný: Sand in the wheels or wheels in the sand? Tobin taxes and market crashes, *CERGE-EI Working paper*, March 2014
8. Stepan Manko: On δ' -couplings at graph vertices, in *Mathematical Results in Quantum Mechanics: Proceedings of the QMath12 Conference* (P. Exner, H. Neidhardt, W. König, eds.), World Scientific, Singapore 2014; pp. 305–313.

(e) Submitted in 2014, not yet accepted

1. Adrian Arancibia, Francisco Correa, Vít Jakubský, Juan Mateos Guiltarte, Mikhail S. Plyushchay: Soliton defects in one-gap periodic system and exotic supersymmetry, submitted ([arXiv:1410.3565](https://arxiv.org/abs/1410.3565) [[hep-th](#)])
2. Barbara Brandolini, Francesco Chiacchio, David Krejčířík, Cristina Trombetti: The Hardy inequality and the heat equation with magnetic field in any dimension, submitted ([\[arXiv:1410.0676](https://arxiv.org/abs/1410.0676) [[math.AP](#)]])
3. Philippe Briet, Hiba Hammedi, David Krejčířík: Hardy inequalities in globally twisted waveguides, submitted ([arXiv:1406.2841](https://arxiv.org/abs/1406.2841) [[math.SP](#)])
4. Martin Bureš, Petr Siegl: Hydrogen atom in space with a compactified extra dimension and potential defined by Gauss' law, submitted ([arXiv:1409.8530](https://arxiv.org/abs/1409.8530) [[quant-ph](#)])

5. Cristian Cazacu, David Krejčířík: The Hardy inequality and the heat equation with magnetic field in any dimension, submitted ([arXiv:1409.6433](#) [[math.SP](#)])
6. Francisco Correa, Vít Jakubský: Twisted kinks, Dirac transparent systems and Darboux transformations, submitted ([arXiv:1406.2997](#) [[hep-th](#)])
7. Pavel Exner, Sylwia Kondej: Strong coupling asymptotics for Schrödinger operators with an interaction supported by an open arc in three dimensions, submitted
8. Pavel Exner, Andrii Krabustovskyi: On the spectrum of narrow Neumann waveguide with periodically distributed δ' traps, submitted, ([arXiv:1405.1367](#) [[math.SP](#)])
9. Pavel Exner, Stepan S. Manko: Spectra of magnetic chain graphs: coupling constant perturbations, ([arXiv:1412.6089](#) [[math-ph](#)])
10. Pedro Freitas, David Krejčířík: The first Robin eigenvalue with negative boundary parameter, submitted ([arXiv:1403.6666](#) [[math.SP](#)])
11. Rostyslav Hryniv, Stepan Manko: Inverse scattering on the half-line for ZS-AKNS systems with integrable potentials, *Integral Equations and Operator Theory*, submitted
12. Vít Jakubský: Spectrally isomorphic Dirac systems: graphene in electromagnetic field, submitted ([arXiv:1412.1026](#) [[hep-th](#)])
13. Vladimir Kotlyarov, Alexander Minakov: Modulated elliptic wave and asymptotic solitons in a shock problem to the modified Korteweg-de Vries equation, submitted
14. David Krejčířík: Waveguides with asymptotically diverging twisting, submitted ([arXiv:1407.4028](#) [[math.SP](#)])
15. David Krejčířík, Petr Siegl, Miloš Tater, Joe Viola: Pseudospectra in non-Hermitian quantum mechanics, submitted ([arXiv:1402.1082](#) [[math.SP](#)])
16. Sébastien Labbé, Edita Pelantová: Palindromic sequences generated from marked morphisms, submitted ([arXiv:1409.7510](#) [[math.CO](#)])
17. Alexander Minakov: Riemann-Hilbert problem for Camassa-Holm equation with step-like initial data, submitted
18. Radek Novák: Bound states in waveguides with complex Robin boundary conditions, submitted ([arXiv:1409.0626](#) [[math-ph](#)])

19. Radek Novák: On the pseudospectrum of the harmonic oscillator with imaginary cubic potential, submitted ([arXiv:1411.1856](#) [math.SP])
20. Edita Pelantová, Štěpán Starosta: Constructions of word rich in palindromes and pseudopalindromes, submitted ([arXiv:1409.2354](#) [math.CO])