

Doppler Institute

for Mathematical Physics and Applied Mathematics

2018 List of Publications

(a) Research papers in journals

(a1) Accepted and published in 2018

1. Fedor Bakharev, Pavel Exner: Geometrically induced spectral effects in tubes with a mixed Dirichlet-Neumann boundary, *Rep. Math. Phys.* **81** (2018), 213-231
2. Jussi Behrndt, Matthias Langer, Vladimir Lotoreichik, Jonathan Rohleder: Spectral enclosures for non-self-adjoint extensions of symmetric operators, *J. Funct. Anal.* **275** (2018), 1808–1888
3. Denis Borisov: Absence of gaps in a lower part of the spectrum of a Laplacian with frequent alternation of boundary conditions in a strip, *Theor. Math. Phys.* **195** (2018), 690-703
4. Denis Borisov: On spectral gaps of a Laplacian in a strip with a bounded periodic perturbation, *Ufa Math. J.* **10** (2018), 14-30
5. Denis Borisov, Matthias Täufer, Ivan Veselič: Spectral localization for quantum Hamiltonians with weak random delta interaction, *Comptes Rendus Mathématique* **356** (2018), 686-691
6. Bekir Can Lütfüoğlu, Jiří Lipovský, Jan Kříž: Scattering of Klein-Gordon particles in the background of mixed scalar-vector generalized symmetric Woods-Saxon potential, *Eur. Phys. J. Plus* **133** (2018), 17
7. Ľubomíra Dvořáková, Tereza Velká: Fixed points of morphisms among binary generalized pseudostandard words, *El. J. Combin. Number Theory* **18** (2018), A21
8. Pavel Exner, Tomáš Kalvoda, Matěj Tušek: A geometric Iwatsuka type effect in quantum layers, *J. Math. Phys.* **59** (2018), 042105 (19pp)

9. Pavel Exner, Andrii Khrabustovskyi: Gap control by singular Schrödinger operators in a periodically structured metamaterial, *Journal of Mathematical Physics, Analysis, and Geometry* **14** (2018), 270-285
10. Pavel Exner, Sylwia Kondej: Aharonov and Bohm *vs.* Welsh eigenvalues, *Lett. Math. Phys.* **108** (2018), 2153-2167
11. Pavel Exner, Aleksey Kostenko, Mark Malamud, Hagen Neidhardt: Spectral theory of infinite quantum graphs, *Ann. H. Poincaré* **19** (2018), 3457-3510
12. Pavel Exner, Jiří Lipovský: Smilansky-Solomyak model with a δ' -interaction, *Phys. Lett.* **A382** (2018), 1207-1213
13. Pavel Exner, Vladimir Lotoreichik, Axel Pérez-Obiol: On the bound states of magnetic Laplacians on wedges, *Rep. Math. Phys.* **82** (2018), 161-185
14. Pavel Exner, Ondřej Turek, Miloš Tater: A family of quantum graph vertex couplings interpolating between different symmetries, *J. Phys. A: Math. Theor.* **51** (2018), 285301 (22pp)
15. Luca Fanelli, David Krejčířík, Luis Vega: Absence of eigenvalues of two-dimensional magnetic Schrodinger operators, *J. Funct. Anal.* **275** (2018), 2453-2472
16. Marie Fialová, Vít Jakubský, Matěj Tušek: Qualitative analysis of magnetic waveguides for two-dimensional Dirac fermions, *Ann. Phys.* **395** (2018), 219-237
17. Miloslav Havlíček, Jan Kotrbatý, Patrick Moylan, Severín Pošta: Construction of representations of Poincaré group using Lie fields, *J. Math. Phys.* **59** (2018), 021702
18. Markus Holzmann, Vladimir Lotoreichik: Spectral analysis of photonic crystals made of thin rods, *Asympt. Anal.* **110** (2018), 83–112
19. Natalia G. Inozemtseva, Jaroslav Dittrich, Vladimir I. Inozemtsev: On the solution to the separated equation in the 3-particle Calogero-Moser problem, *Adv. Pure Math.* **8** (2018), 266-271
20. Artur Ishkhanyan, Vít Jakubský: Two-dimensional Dirac fermion in presence of an asymmetric vector potential, *J. Phys. A: Math. Theor.* **51** (2018), 495205
21. Orsolya Kálmán, Tamás Kiss, Igor Jex: Sensitivity to initial noise in measurement-induced nonlinear quantum dynamics, *J. Russ. Laser Res.* **39** (2018), 382-388

22. Bernd Kawohl, David Krejčířík: From symmetry to monotonicity, *Math. Intelligencer* **40** (2018), 12-13
23. Werner Kirsch, David Krejčířík, Georgi Raikov: Lifshits tails for randomly twisted quantum waveguides, *J. Stat. Phys.* **171** (2018), 383-399
24. Karel Klouda, Kateřina Medková, Edita Pelantová, Štěpán Starosta: Fixed points of Sturmian morphisms and their derivated words, *Theor. Comput. Sci.* **743** (2018), 23-37
25. David Krejčířík, Rafael Tiedra de Aldecoa: Ruled strips with asymptotically diverging twisting, *Ann. H. Poincaré* **19** (2018), 2069-2086
26. Antonella Marchesiello, Libor Šnobl: An infinite family of maximally superintegrable systems in a magnetic field with higher order integrals, *SIGMA* **14** (2018), 092 (11pp)
27. Thomas Nitsche, Sonja Barkhofen, Regina Kruse, Linda Sansoni, Martin Štefanák, Aurél Gábris, Václav Potoček, Tamás Kiss, Igor Jex, Christine Silberhorn: Probing measurement-induced effects in quantum walks via recurrence, *Science Advances* **4** (2018), eaar6444
28. Jaroslav Novotný, Jiří Maryška, Igor Jex: Asymptotics of quantum Markov processes: From algebraic structure to characterization of asymptotic states, *Eur. Phys. J. Plus* **133** (2018), 310
29. Pavlo V. Pyshkin, Aurel Gabris, Orsolya Kálmán, Igor Jex, Tamás Kiss: Quantum state identification of qutrits via a nonlinear protocol, *J. Russ. Laser Res.* **39** (2018), 456-464
30. Mohamed Sabri, Etsuo Segawa, Martin Štefanák: Conditional limit measure of a one-dimensional quantum walk with an absorbing sink, *Phys. Rev.* **A98** (2018), 012136
31. Jiří Tolar: On Clifford groups in quantum computing, *J. Phys.: Conf. Series* **1071** (2018), 012022
32. Miloslav Znojil: Hermitian-non-Hermitian interfaces in quantum theory, *Advances in High Energy Physics* **2018** (2018), 7906536 (12pp)
33. Miloslav Znojil: Admissible perturbations and false instabilities in PT-symmetric quantum systems, *Phys. Rev.* **A97** (2018), 032114 (13pp)
34. Miloslav Znojil: Hermitian-to-quasi-Hermitian quantum phase transitions, *Phys. Rev.* **A97** (2018), 042117 (10pp)
35. Miloslav Znojil: Complex symmetric Hamiltonians and exceptional points of order four and five, *Phys. Rev.* **A98** (2018), 032109

36. Miloslav Znojil: Broken Hermiticity phase transition in Bose-Hubbard model, *Phys. Rev.* **A98** (2018), 052102
37. Miloslav Znojil, Denis Borisov: Two patterns of \mathcal{PT} -symmetry breakdown in a non-numerical six-state simulation, *Ann. Phys.* **394** (2018), 40-49
38. Miloslav Znojil, Iveta Semorádová: Quantum square well with logarithmic central spike, *Mod. Phys. Lett.* **A33** (2018), 1850009 (13pp)
39. Miloslav Znojil, Iveta Semorádová: Log-anharmonic oscillator and its large-N solution, *Mod. Phys. Lett.* **A33** (2018), 1850223 (11pp)

(a2) Accepted earlier, published in 2018, or shortly before

1. Girish Agarwal, Roland E. Allen, Iva Bezděková, Robert W. Boyd, Gongong Chen, Ronald Hanson, Dean L. Hawthorne, Philip Hemmer, Olga Kocharovskaya, Harald Losert, Moochan B. Kim, David M. Lee, Sebastian K. Lidstrom, Suzy Lidstrom, Helmut Maier, John W. Neuberger, Miles J. Padgett, Mark Raizen, Surjeet Rajendran, Ernst Rasel, Gavriil Shchedrin, Wolfgang P. Schleich, Marlan O. Scully, Gennady Shvets, Alexei Sokolov, Ronald L. Walsworth, Rainer Weiss, Frank Wilczek, Alan E. Willner, Eli Yablonovich and Nikolay Zheludev: Light, the universe, and everything — 12 Herculean tasks for quantum cowboys and black diamond skiers, *J. Mod. Optics* **65** (2018), 1261-1308
2. Jussi Behrndt, Pavel Exner, Markus Holzmann, Vladimir Lotoreichik: On the spectral properties of Dirac operators with electrostatic delta-shell interactions, *J. Math. Pures Appl.* **111** (2018), 47-78
3. Jussi Behrndt, David Krejčířík: An indefinite Laplacian on a rectangle, *J. d'Anal. Math.* **134** (2018), 501-522
4. Denis I. Borisov, Francisco Hoecker-Escuti, Ivan Veselič: Expansion of the spectrum in the weak disorder regime for random operators in continuum space, *Comm. Cont. Math.* **20** (2018), 1750008
5. Pavel Exner, Sylwia Kondej, Vladimir Lotoreichik: Asymptotics of the bound state induced by δ -interaction supported on a weakly deformed plane, *J. Math. Phys.* **59** (2018), 013501 (17pp)
6. Pavel Exner, Miloš Tater: Quantum graphs with vertices of a preferred orientation, *Phys. Lett.* **A382** (2018), 283-287

7. Luca Fanelli, David Krejčířík, Luis Vega: Spectral stability of Schrodinger operators with subordinated complex potentials, *J. Spect. Theory* **8** (2018), 575-604
8. Christiane Frougny, Edita Pelantová: Two applications of the spectrum of numbers, *Acta Math. Hungarica* **156** (2018), 391-407
9. Kevin Hare, Zuzana Masáková, Tomáš Vávra: On the spectra of Pisot-cyclotomic numbers, *Lett. Math. Phys.* **108** (2018), 1729-1756
10. David Krejčířík, Vladimir Lotoreichik: Optimisation of the lowest Robin eigenvalue in the exterior of a compact set, *J. Convex Anal.* **25** (2018), 319-337
11. David Krejčířík, Nicolas Raymond, Julien Royer, Petr Siegl: Reduction of dimension as a consequence of norm-resolvent convergence and applications, *Mathematika* **64** (2018), 406-429
12. Danial Saadatmand, Denis I. Borisov, Panayotis G. Kevrekidis, Kun Zhou, Sergey V. Dmitriev: Resonant interaction of $\phi(4)$ kink with PT-symmetric perturbation with spatially periodic gain/loss coefficient, *Comm. Nonlin. Sci. Num. Sim.* **56** (2018), 62-76
13. Wolfgang P. Schleich, Iva Bezděková, M.B. Kim, P.C. Abbott, H. Maier, H. Montgomery, J.W. Neuberger: Equivalent formulations of the Riemann hypothesis based on the lines of constant phase, *Physica Scripta* **93** (2018), No. 6

(b) Accepted for publication in 2018

1. Diana Barseghyan, Andrii Khrabustovskyi: Spectral estimates for Dirichlet Laplacian on tubes with exploding twisting velocity, *Operators and Matrices*, to appear (arXiv:1804.07197 [math.SP])
2. Diana Barseghyan, Françoise Truc: Magnetic Schroedinger operators with radially symmetric magnetic field and radially symmetric electric potential, *Operator Theory: Advances and Applications*, to appear (arXiv:1711.09754 [math-ph])
3. Bekir Can Lütfüoğlu, Jan Kříž: A comparative interpretation of the thermodynamic functions of a relativistic bound state problem proposed with an attractive or a repulsive surface effect, *Eur. Phys. J. Plus*, to appear (arXiv:1811.00380 [nucl-th])

4. Pavel Exner: Singular Schrödinger operators and Robin billiards. Spectral properties and asymptotic expansions, *Afrika Matematika*, to appear (arXiv:1807.06835 [math-ph])
5. Luca Fanelli, David Krejčířík: Location of eigenvalues of three-dimensional non-self-adjoint Dirac operators, *Lett. Math. Phys.*, to appear (arXiv:1809.07580 [math.SP])
6. Jaroslav Hančl, Ondřej Turek: One-sided Diophantine approximations, *J. Phys. A: Math. Theor.*, to appear (arXiv:1809.01013 [math.NT])
7. David Krejčířík, Gian Paolo Leonardi, Petr Vlachopoulos: The Cheeger constant of curved tubes, *Arch. Math.*, to appear (arXiv:1811.12095 [math.OC])
8. David Krejčířík, Vladimir Lotoreichik, Miloslav Znojil: The minimally anisotropic metric operator in quasi-Hermitian quantum mechanics, *Proc. Roy. Soc. A*, to appear (arXiv:1804.06766 [math-ph])
9. David Krejčířík, Petr Siegl: Pseudomodes for Schrödinger operators with complex potentials, *J. Funct. Anal.*, to appear (arXiv:1705.01894 [math.SP])
10. David Krejčířík, Matěj Tušek: Location of hot spots in thin curved strips, *J. Diff. Eqs*, to appear (arXiv:1709.01279 [math.AP])
11. Vladimir Lotoreichik: Spectral isoperimetric inequalities for singular interactions on open arcs, *Appl. Anal.*, to appear (arXiv:1609.07598 [math.SP])
12. Marilena Mitrouli, Ondřej Turek: Determinantal properties of generalized circulant Hadamard matrices, *Electron. J. Linear Algebra*, to appear
13. Radek Novák, Xue Ping Wang: On the Kramers-Fokker-Planck equation with decreasing potentials in dimension one, *J. Spect. Theory*, to appear (arXiv:1712.01660 [math.AP])
14. Ondřej Turek: Gaps in the spectrum of a cuboidal periodic lattice graph, *Rep. Math. Phys.*, to appear (arXiv:1801.02572 [math-ph])
15. Miloslav Znojil: On some aspects of unitary evolution generated by non-Hermitian Hamiltonians (a unitary way towards quantum collapse), *J. Phys.: Conf. Ser.*, to appear
16. Miloslav Znojil: Nonlinearity of perturbations in \mathcal{PT} -symmetric quantum mechanics, *J. Phys.: Conf. Ser.*, to appear

**(c) Other papers, published and accepted in 2018,
or shortly before**

1. Pavel Exner: On the spectrum of leaky surfaces with a potential bias, in “Non-Linear Partial Differential Equations, Mathematical Physics, and Stochastic Analysis. The Helge Holden Anniversary Volume” (F. Gesztesy et al. eds.), EMS, Zürich 2018, pp. 169-181.
2. Pavel Exner: Schrödinger operators with a switching effect, to appear in Proceedings of the “International Conference in conjunction with 14th Biennial Conference of ISIAM” (A. Siddiqi, P. Manchanda, eds.; Amritsar 2018)
3. Pavel Exner, Sylwia Kondej: Scattering on leaky wires in dimension three, to appear in “Analysis and Operator Theory – In Honor of Tosio Kato’s 100th Birthday” (Th. Rassias and V. Zagrebnov, eds.) (arXiv:1811.04802 [math-ph])
4. Pavel Exner, Vladimir Lotoreichik: Optimization of the lowest eigenvalue for leaky star graphs, in *Proceedings of the conference “Mathematical Results in Quantum Physics” (QMath13, Atlanta 2016; F. Bonetto, D. Borthwick, E. Harrell, M. Loss, eds.)*, Contemporary Mathematics, AMS, Providence, R.I., 2018; p. 187-196.
5. Maryna Nesterenko, Severín Pošta: Equivalence of vector field realizations of Lie algebras from the Lie group point of view, in *Quantum Theory and Symmetries with Lie Theory and Its Applications in Physics* (V. Dobrev, ed.), Springer, Singapore 2018; pp. 421-427

(d) Submitted in 2018, not yet accepted

1. Petr Ambrož, Ondřej Kadlec, Zuzana Masáková, Edita Pelantová: A note on palindromic length of Sturmian sequences, submitted (arXiv:1812.00711 [math.CO])
2. Petr Ambrož, Zuzana Masáková, Jan Mazáč: Linear mappings as self-similarities of mathematical models of quasicrystals, submitted to *Proceedings of Group 32*
3. Petr Ambrož, Edita Pelantová: Palindromic length of words and morphisms in class P, submitted (arXiv:1808.08879 [math.CO])
4. Philippe Briet, Hamza Abdou Soimadou, David Krejčířík: Spectral analysis of sheared nanoribbons, submitted (arXiv:1807.10006 [math-ph])

5. Biagio Cassano, Fabio Pizzichillo: Self-adjointness for the Dirac operator with Coulomb-type spherically symmetric perturbations via boundary conditions, submitted (arXiv:1810.01659 [math.AP])
6. Biagio Cassano, Fabio Pizzichillo, Luis Vega: A Hardy-type inequality and some spectral characterizations for the Dirac-Coulomb operator, submitted (arXiv:1810.01309 [math.SP])
7. Lucrezia Cossetti, David Krejčířík: Absence of eigenvalues of non-self-adjoint Robin Laplacians on the half-space, submitted (arXiv: 1812.05348 [math.SP])
8. Pavel Exner, Vladimir Lotoreichik: Spectral asymptotics of the Dirichlet Laplacian on a generalized parabolic layer, submitted (arXiv: 1805.12448 [math.SP])
9. Luca Fanelli, David Krejčířík, Ari Laptev, Luis Vega: On the improvement of the Hardy inequality due to singular magnetic fields, submitted (arXiv:1807.04430 [math.SP])
10. Josef Florian, Tereza Velká, Ľubomira Dvořáková: Normalization of ternary generalized pseudostandard words, submitted to *Theor. Comput. Sci.* (arXiv:1807.07248 [math.CO])
11. Emil Horozov, Boris Shapiro, Miloš Tater: In search of higher Bochner theorem, submitted (arXiv:1807.01558 [math-ph])
12. David Krejčířík: Complex magnetic fields: An improved Hardy-Laptev-Weidl inequality and quasi-self-adjointness, submitted (arXiv:1802.05586 [math-ph])
13. Lennart Lorz, Evan Meyer-Scott, Thomas Nitsche, Václav Potoček, Aurél Gábris, Sonja Barkhofen, Igor Jex, Christine Silberhorn: A photonic quantum walk with a four-dimensional coin, submitted (arXiv: 1809.00591 [quant-ph])
14. Vladimir Lotoreichik: Spectral isoperimetric inequality for the δ' -interaction on a contour, submitted (arXiv:1810.05457 [math.SP])
15. Martin Malachov, Igor Jex, Orsolya Kálmán, Tamás Kiss: Phase transition in iterated quantum protocols for noisy inputs, submitted (arXiv:1809.00140 [quant-ph])
16. Jan Mareš, Jaroslav Novotný, Igor Jex: Percolated quantum walks with a general shift operator: From trapping to transport, submitted to *Phys. Rev. A* (arXiv:1812.02519 [quant-ph])

17. Kateřina Medková, Edita Pelantová, Laurent Vuillon: Derivated sequences of complementary symmetric Rote sequences, submitted (arXiv: 1812.03748 [math.CO])
18. Wei Wen, Ondřej Kajínek, Siamak Khatibi, Goce Chadzitaskos: A common assessment apace for different sensor structures, submitted to *Physical Sensors*