

# Doppler Institute

*for Mathematical Physics and Applied Mathematics*

## 2009 List of Publications

### (a) Research papers in journals

#### (a1) Accepted and published in 2009

1. Ľubomira Balková, Karel Klouda, Edita Pelantová: Repetitions in  $\beta$ -integers, *Lett. Math. Phys.* **87** (2009), 181–195.
2. Ľubomira Balková, Edita Pelantová, Štěpán Starosta: Palindromes in infinite ternary words, *RAIRO: Theoretical Informatics and Applications* **43** (2009), 687–702.
3. Hynek Bíla: Spectra of  $\mathcal{PT}$ -symmetric Hamiltonians on tobogganic contours, *PRAMANA – Journal of Physics* **73** (2009), 307–314.
4. Thomas Brougham, Erika Andersson, Stephen M. Barnett: Entropic uncertainties for joint quantum measurements, *Phys. Rev.* **A80** (2009), 042106.
5. Thomas Brougham, Goce Chadzitaskos, Igor Jex: Transformation design and nonlinear Hamiltonians, *J. Mod. Optics* **56** (2009), 1588–1597.
6. Thomas Brougham, Georgios M. Nikolopoulos, Igor Jex: Communication in quantum networks of logical bus topology, *Phys. Rev.* **A80** (2009), 052325.
7. Čestmír Burdík, Severín Pošta, Ondřej Navrátil: The adjoint representation of quantum algebra  $U_q(sl(2))$ , *J. Nonlinear Math. Phys.* **16** (2009), 63–75.
8. Taksu Cheon, Pavel Exner, Ondřej Turek: Spectral filtering in quantum Y-junction, *J. Phys. Soc. Japan* **78** (2009), 124004.
9. Jaroslav Dittrich, Vladimir I. Inozemtsev: Towards the proof of complete integrability of quantum elliptic many-body systems with spin degrees of freedom, *Regular and Chaotic Dynamics* **14** (2009), 218–222.

10. Raouf Dridi: On the geometry of the first and the second Painlevé equations, *J. Phys. A: Math. Theor.* **42** (2009), 125201.
11. Pavel Exner, Martin Fraas: On geometric perturbations of critical Schrödinger operators with a surface interaction, *J. Math. Phys.* **50** (2009), 112101.
12. Pavel Exner, Olaf Post: Approximation of quantum graph vertex couplings by scaled Schrödinger operators on thin branched manifolds, *J. Phys. A: Math. Theor.* **42** (2009), 415305.
13. Pavel Exner, Petr Šeba, Daniel Vašata: The distribution of landed property, *Physica* **A388** (2009), 4619–4623.
14. A.M. Grundland, A.M. Hariton, L. Šnobl: Invariant solutions of the supersymmetric sine-Gordon equation, *J. Phys. A: Math. Theor.* **42** (2009), 335203.
15. M. Grundland, J. Patera, Z. Masáková, N. Dodgson: Image Sampling with Quasicrystals, *SIGMA* **5** (2009), 075, 13pp.
16. P. Hájíček, J. Tolar: Intrinsic properties of quantum systems, *Found. Phys.* **39** (2009), 411–432.
17. Oleh Hul, Petr Šeba, Leszek Sirko: Investigation of parameter-dependent properties of quantum graphs, *Phys. Scripta* **T135** (2009), 014048.
18. Oleh Hul, Petr Šeba, Leszek Sirko: Departure of some parameter-dependent spectral statistics of irregular quantum graphs from random matrix theory predictions, *Phys. Rev.* **E79** (2009), 066204.
19. T. Kiss, L. Kecskes, M. Štefaňák, I. Jex: Recurrence in coined quantum walks, *Phys. Scripta* **T135** (2009), 014055.
20. Karel Klouda, Edita Pelantová: Factor complexity of infinite words associated with non-simple Parry numbers, *Integers – Electronic Journal of Combinatorial Number Theory* **9** (2009), 281–310.
21. Milan Krbálek, Petr Šeba: Spectral rigidity of vehicular streams (Random Matrix Theory approach), *J. Phys. A: Math. Theor.* **42** (2009), 345001.
22. Géza Lévai, Petr Siegl, Miloslav Znojil: Scattering in the  $\mathcal{PT}$ -symmetric Coulomb potential, *J. Phys. A: Math. Theor.* **42** (2009), 295201.
23. I. Marzoli, P. Tombesi, G. Ciaramicoli, G. Werth, P. Bushev, S. Stahl, F. Schmidt-Kaler, M. Hellwig, C. Henkel, G. Marx, I. Jex, E. Stachowska, G. Syawiola, A. Walaszyk: Experimental and theoretical challenges for the trapped electron quantum computer, *J. Phys. B: Atom. Mol. Opt. Phys.* **42** (2009), 154010.

24. Zuzana Masáková, Edita Pelantová: Relation between powers of factors and recurrence function characterizing Sturmian words, *Theoretical Computer Science* **410** (2009), 3589–3596.
25. Jaroslav Novotný, Gerd Alber, Igor Jex: Random unitary dynamics of quantum networks, *J. Phys. A: Math. Theor.* **42** (2009), 282003.
26. Václav Potoček, Aurél Gábris, Tamás Kiss, Igor Jex: Optimized quantum random-walk search algorithms on the hypercube, *Phys. Rev.* **A79** (2009), 012325.
27. Petr Šeba: Parking in the city: an example of limited resource sharing, *Acta Phys. Polonica* **A116** (2009), 779–782.
28. Petr Šeba: Parking and the visual perception of space, *J. Stat. Mech.* (2009), L10002.
29. Petr Siegl: The non-equivalence of pseudo-Hermiticity and presence of antilinear symmetry, *PRAMANA – Journal of Physics* **73** (2009), 279–287.
30. Libor Šnobl, Pavel Winternitz: All solvable extensions of a class of nilpotent Lie algebras of dimension  $n$  and degree of nilpotency  $n - 1$ , *J. Phys. A: Math. Theor.* **42** (2009), 105201.
31. Martin Štefanák, Tamás Kiss, Igor Jex: Recurrence of biased quantum walks on a line, *New J. Phys.* **11** (2009), 043027.
32. Jiří Tolar, Goce Chadzitaskos: Feynman’s path integral and mutually unbiased bases, *J. Phys. A: Math. Theor.* **42** (2009), 245306.
33. Miloslav Znojil: Three-Hilbert-space formulation of Quantum Mechanics, *SIGMA* **5** (2009), 045009.
34. Miloslav Znojil: Scattering theory using smeared non-Hermitian potentials, *Phys. Rev.* **D80** (2009), 001, 19pp.
35. Miloslav Znojil: Cryptohermitian picture of scattering using quasilocal metric operators, *SIGMA* **5** (2009), 085,
36. Miloslav Znojil: Fundamental length in quantum theories with  $\mathcal{PT}$ -symmetric Hamiltonians, *Phys. Rev.* **D80** (2009), 045022.
37. Miloslav Znojil: Fundamental length in quantum theories with  $\mathcal{PT}$ -symmetric Hamiltonians II: The case of quantum graphs, *Phys. Rev.* **D80** (2009), 105004.
38. Miloslav Znojil, Hendrik B. Geyer: Sturm-Schrödinger equations: formula for metric, *PRAMANA – Journal of Physics* **73** (2009), 299–306.

39. Miloslav Znojil, Vít Jakubský: Supersymmetric quantum mechanics living on topologically nontrivial Riemann surfaces, *PRAMANA – Journal of Physics* **73** (2009), 397–404.
40. Miloslav Znojil, Petr Siegl, Géza Lévai: Asymptotically vanishing  $\mathcal{PT}$ -symmetric potentials and negative-mass Schrödinger equations, *Phys. Lett.* **A373** (2009), 1921–1929.

**(a2) Accepted earlier, published in 2009 or shortly before**

1. Ľubomíra Balková, Zuzana Masáková: Palindromic complexity of infinite words associated with non-simple Parry numbers, *RAIRO: Theoretical Informatics and Applications* **43** (2009), 145–163.
2. Ľubomíra Balková, Edita Pelantová: A note on symmetries in the Rauzy graph and factor frequencies, *Theor. Comp. Sci.* **410** (2009), 2779–2783.
3. Claudio Cacciapuoti, Raffaele Carlone, Rodolfo Figari: Resonances in models of spin dependent point interactions, *J. Phys. A: Math. Theor.* **42** (2009), 035202.
4. C.S. Hamilton, H. Lavička, E. Andersson, J. Jeffers, I. Jex: Quantum public key distribution with imperfect device components, *Phys. Rev.* **A79** (2009), 023808.
5. Jiří Hrivnák, Petr Novotný: Twisted cocycles of Lie algebras and corresponding invariant functions, *Linear Algebra and its Applications* **430** (2009), 1384–1403.
6. Denis Kochan: Quantization of Non-Lagrangian systems, *Int. J. Mod. Phys.* **A24** (2009), 5319–5340.
7. Angela Mestre: Generating connected and biconnected graphs, *Journal of Graph Algorithms and Applications* **13** (2009), 251–281.
8. Petr Šeba, Daniel Vašata: Chaos in a one dimensional integrable quantum system, *Phys. Lett.* **A373** (2009), 826–831.

**(b) Accepted for publication in 2009**

1. Denis Borisov, Pedro Freitas: Asymptotics of Dirichlet eigenvalues and eigenfunctions of the Laplacian in thin domains, *J. Funct. Anal.* **258** (2010), to appear

2. Taksu Cheon, Pavel Exner, Ondřej Turek: Approximation of a general singular vertex coupling in quantum graphs, *Ann. Phys.* (2010), to appear
3. Daniel Jezbera, David Kordek, Jan Kříž, Petr Šeba, Petr Šroll: Walkers on the circle, *J. Stat. Mech.* (2010), to appear
4. David Krejčířík, Enrique Zuazua: The Hardy inequality and the heat equation in twisted tubes, *Journal de Mathématiques Pures et Appliquées* (2010), to appear
5. Miloslav Znojil: Topology-controlled spectra of imaginary cubic oscillators in the large-L approach, *Phys. Lett. A* (2010), to appear
6. Miloslav Znojil: Complete set of inner products for a discrete  $\mathcal{PT}$ -symmetric square-well Hamiltonian, *J. Math. Phys.* (2010), to appear

**(c) Other papers, published and accepted in 2009, or shortly before**

1. Jose M. Arrieta, David Krejčířík: Geometric versus spectral convergence for the Neumann Laplacian under exterior perturbations of the domain, *Proceedings of IMSE08*, to appear
2. Miloslav Havlíček, Edita Pelantová, Jiří Tolar: On representations of Lie algebras compatible with a grading, *SIGMA* (2010), to appear
3. Pavel Štoviček, Matěj Tušek: On the spectrum of a quantum dot with impurity in the Lobachevsky plane, in *Operator Theory: Advances and Applications*, vol. 198 (2009), 291–304.
4. Stanislav Vymětal, Tamás Kiss, Igor Jex, Gerd Alber, Aurél Gábris, Táňa Langrová: Chaos in the conditional dynamics of two qubits purification protocol, in *Let's Face Chaos through Nonlinear Dynamics*, AIP Conf. Proc, vol. 1076 (2008), 255–261.

**(d) Submitted in 2009, not yet accepted**

1. Bernhard Burgstaller: A KK-theoretical descent homomorphism for semimultiplicative sets, *submitted*
2. P. Ambrož, A. Frid, Z. Masáková, E. Pelantová: On the number of factors in codings of three interval exchange, [arXiv: 0904.2258](#) [[math.CO](#)]
3. Hynek Bíla: Adiabatic time-dependent metrics in  $\mathcal{PT}$ -symmetric quantum theories, [arXiv: 0902.0474](#) [[quant-ph](#)]

4. Pavel Exner, Hagen Neidhardt: Trotter-Kato product formula for unitary groups, *Integral Equations and Operator Theory*, *submitted*
5. Jiří Hrivnák, Jiří Patera, Lenka Motlochová, Jiří Patera: Two dimensional symmetric and antisymmetric generalizations of sine functions, [arXiv: 0912.0241 \[math-ph\]](#)
6. Petra Košťáková, Pavel Štoviček: Noncommutative Bloch analysis of Bochner Laplacians with nonvanishing gauge fields, *submitted*
7. H. Lavička, Lin Lin, J. Novotný: Employment, production and consumption model: patterns of phase transitions, *Physica A*, *submitted*
8. Daniel Lenz, Zuzana Masáková, Edita Pelantová: Note on powers in three interval exchange transformations, [arXiv: 0909.1109 \[math.CO\]](#)
9. Takuya Mine: Landau levels on the hyperbolic plane in the presence of Aharonov-Bohm fields, *Int. J. Math. Sci.*, *submitted*
10. Jaroslav Novotný, Gerd Alber, Igor Jex: Asymptotic evolution of random unitary operations, [arXiv:0908.4534 \[quant-ph\]](#)
11. A. Schreiber, K.N. Cassemiro, V. Potoček, A. Gabris, P. Mosley, E. Andersson, I. Jex, Ch. Silberhorn: Photons walking the line, [arXiv: 0910.2197 \[quant-ph\]](#)
12. Petr Šeba: Traffic and the visual perception of space, [arXiv: 0904.4835 \[physics.soc-ph\]](#)
13. Boris Shapiro, Kouichi Takemura, Miloš Tater: On spectral polynomials of the Heun equation II, [arXiv: 0904.0650 \[math-ph\]](#)
14. Petr Siegl: Surprising spectra of  $\mathcal{PT}$ -symmetric point interactions, [arXiv: 0906.0226 \[math-ph\]](#)