# Spectral Theory and Differential Operators

August 27–31, 2012

Technische Universität Graz

# Program

# Monday, August 27

| | |
|---|---|
| 9:00 - 9:05 | **Opening** |

| | |
|---|---|
| 9:05 - 9:50 | **Pavel Exner**<br>*Spectral estimates for Schrödinger operators with unusual semiclassical behaviour* |
| 9:50 - 10:35 | **Peter Stollmann**<br>*Spectral properties of quasicrystal Laplacians* |

*Coffee Break*

| | |
|---|---|
| 11:00 - 11:30 | **Daphne Gilbert**<br>*Spectral multiplicity for the one-dimensional Schrödinger operator on the line* |
| 11:30 - 12:00 | **Victor Vlasov**<br>*Spectral analysis and correct solvability of abstract integro-differential equations in a Hilbert space* |
| 12:00 - 12:30 | **Matthias Keller**<br>*Volume growth and spectra of Dirichlet forms* |

*Lunch Break*

| | **BE 01** Chair: M. Kaltenbäck | **AE 01** Chair: A. Motovilov |
|---|---|---|
| 14:00 - 14:30 | **Sergey Belyi**<br>*On sectorial classes of inverse Stieltjes functions* | **Hendrik Vogt**<br>*Large time behaviour of heat kernels and admissible potentials* |
| 14:30 - 15:00 | **Seppo Hassi**<br>*Some new subclasses of generalized Nevanlinna functions* | **Yiannis Christodoulides**<br>*Asymptotic generalized value distribution of solutions of the Schrödinger equation* |
| 15:00 - 15:30 | **Annemarie Luger**<br>*On the multiplicity of generalized poles* | **Nikita Artamonov**<br>*Estimate of the decay exponent of an operator semigroup associated with a second-order linear differential equation* |
| 15:30 - 16:00 | **Henrik Winkler**<br>*Extremal sectorial operators and relations* | **Constanza Rojas-Molina**<br>*Dynamical localization for Delone-Anderson operators* |

*Coffee Break*

| | | |
|---|---|---|
| 16:30 - 17:00 | **Karl-Heinz Förster**<br>*On the buckling operator of an unbounded operator* | **Fabian Schwarzenberger**<br>*Existence of the integrated density of states for Hamiltonians on Cayley graphs* |
| 17:00 - 17:30 | **Petr Zemanek**<br>*Friedrichs extension for operators associated with symplectic systems (and their special cases)* | **Martin Tautenhahn**<br>*Localization for non-monotone Anderson-type models* |
| 17:30 - 18:00 | **Markus Seidel**<br>*Approximation of spectra and pseudospectra of bounded linear operators on Banach spaces* | **Mohammad Shahriari**<br>*Uniqueness for inverse Sturm-Liouville problems using three spectra with a finite number of transmission conditions* |

*18:15*      *Walk to the Graz Burg, meeting point in front of* **BE 01**

*19:00*      *Reception by the State of Styria in the Graz Burg*

# Tuesday, August 28

| | |
|---|---|
| 9:00 - 9:45 | **Christiane Tretter** <br> *Spectral enclosures for block operator matrices* |
| 9:45 - 10:30 | **Mark Malamud** <br> *Spectral theory of Schrödinger operators with infinitely many point interactions and radial positive definite functions* |

*Coffee Break*

| | |
|---|---|
| 11:00 - 11:30 | **Vadym Adamyan** <br> *Local scattering theory and scattering matrices for quantum chains* |
| 11:30 - 12:00 | **Aurelian Gheondea** <br> *Triplets of closely embedded Hilbert spaces and Dirichlet type spaces on the unit polydisc* |
| 12:00 - 12:30 | **Alexander Komech** <br> *On global attractors of nonlinear hyperbolic PDEs* |

*Lunch Break*

| | **BE 01** Chair: K. Pankrashkin | **AE 01** Chair: M. Langer |
|---|---|---|
| 14:00 - 14:30 | **Sergey Simonov** <br> *Spectral multiplicity of Schrödinger operators on star-graphs* | **Boris Kats** <br> *The jump problem for holomorphic functions on non-rectifiable arc and $\bar{\partial}$-equation* |
| 14:30 - 15:00 | **Volodymyr Molyboga** <br> *Spectral gaps of the 1-d Schrödinger operators with periodic distributional potentials* | **Pavel Shabalin** <br> *Existence and set of solutions of the Riemann-Hilbert boundary value problem with a two-side curling at infinity of the order less than 1* |
| 15:00 - 15:30 | **Dmytro Puyda** <br> *Inverse spectral problems for Dirac operators with summable matrix-valued potentials* | **Elena Kopylova** <br> *On asymptotic stability of kinks for relativistic Ginzburg-Landau equation* |
| 15:30 - 16:00 | **Ian Wood** <br> *On the spectrum of waveguides in planar photonic bandgap structures* | **Christine Pfeuffer** <br> *Classification of non-smooth pseudodifferential operators* |

*Coffee Break*

| | | |
|---|---|---|
| 16:30 - 17:00 | **Vadim Tkachenko** <br> *A Schauder and Riesz basis criterion for non-self-adjoint Schrödinger operators with periodic and antiperiodic boundary conditions* | **Pedro José Miana Sanz** <br> *An extension problem for fractional powers of generators* |
| 17:00 - 17:30 | **Aleksey Kostenko** <br> *Spectral asymptotics for perturbed spherical Schroedinger operators and applications to quantum scattering* | **Marjeta Kramar Fijavz** <br> *Diffusion in networks with time-dependent coefficients* |
| 17:30 - 18:00 | **Stephan Schmitz** <br> *The operator $\operatorname{div} A \operatorname{grad}$ for sign-indefinite $A$* | **Bilel Krichen** <br> *Gamma-hypercyclic set of a bounded linear operator* |

18:00      *City Walking Tour, meeting point in front of* **BE 01**

# Wednesday, August 29

| 9:00 - 9:45 | **Wolfgang Arendt** <br> *Does diffusion determine the domain?* |
|---|---|
| 9:45 - 10:30 | **Gerd Grubb** <br> *Eigenvalue asymptotics for nonsmooth singular Green operators* |

*Coffee Break*

| 11:00 - 11:30 | **Rafael del Rio** <br> *Spectral measures of Jacobi operators with random potentials* |
|---|---|
| 11:30 - 12:00 | **Peter Yuditskii** <br> *Extremal $L^1$ problem for entire functions and spectral theory for canonical systems* |
| 12:00 - 12:30 | **Sergey Pyatkov** <br> *Existence of maximal semidefinite invariant subspaces and semigroup properties of some classes of ordinary differential operators* |

*Lunch Break*

| | **BE 01** Chair: O. Post | **AE 01** Chair: H. Winkler |
|---|---|---|
| 14:00 - 14:30 | **Matthias Langer** <br> *Spectral estimates and basis properties for block operator matrices* | **Jonathan Eckhardt** <br> *The inverse spectral transform for the dispersionless Camassa-Holm equation* |
| 14:30 - 15:00 | **Boulbeba Abdelmoumen** <br> *Essential spectra of some matrix operators by means of measures of noncompactness* | **Katrin Grunert** <br> *Global solutions of the two-component Camassa-Holm system* |
| 15:00 - 15:30 | **Victor Katsnelson** <br> *Spectral theory of the truncated Fourier operator* | **(BE 01)** |

| 15:30 - 16:00 | **Poster Presentation** | **(BE 01)** |
|---|---|---|
| 16:00 | **Poster Discussion** | **(Foyer)** |

*Coffee Break*

| 17:15 | **Walk to the Schloßberg** <br> *Meeting point in front of* **BE 01** |
|---|---|

| 18:00 - 22:00 | **Conference Dinner** <br> *Restaurant Schlossberg, Am Schloßberg 7, 8010 Graz* |
|---|---|

# Thursday, August 30

| 9:45 - 10:30 | **Simone Warzel** <br> *Resonant delocalization: the phase diagram of the Anderson model on trees* |
|---|---|

*Coffee Break*

| 11:00 - 11:30 | **Ricardo Weder** <br> *High and low energy analysis and Levinson's theorem for the self-adjoint matrix Schrödinger operator on the half line* |
|---|---|
| 11:30 - 12:00 | **Tom ter Elst** <br> *The Dirichlet-to-Neumann operator on rough domains* |
| 12:00 - 12:30 | **Laszlo Kerchy** <br> *On the Sz.-Nagy-Foias functional calculus* |

*Lunch Break*

| | **BE 01** Chair: M. Keller | **AE 01** Chair: C. Wyss |
|---|---|---|
| 14:00 - 14:30 | **Hagen Neidhardt** <br> *On the abstract Landauer-Buettiker formula and applications* | **Gyoergy Geher** <br> *Positive operators arising from contractions* |
| 14:30 - 15:00 | **Vadim Mogilevskii** <br> *On Titchmarsh-Weyl functions and eigenfunction expansions of first-order symmetric systems* | **Attila Szalai** <br> *Characterization of stability of contractions* |
| 15:00 - 15:30 | **Felix Schwenninger** <br> *Generators with a closure relation* | **Nadezda Rautian** <br> *Spectral analysis and representations of solutions of abstract integro-differential equations in a Hilbert space* |
| 15:30 - 16:00 | **Kerstin Ammann** <br> *Relative oscillation theory for Jacobi operators* | **Liudmila Sukhocheva** <br> *On matrices with the dominant main diagonal* |

*Coffee Break*

| 16:30 - 17:00 | **Friedrich Philipp** <br> *Eigenvalues in gaps of selfadjoint operators in Pontryagin spaces* | **Mechthild Thalhammer** <br> *Convergence analysis of high-order time-splitting pseudo-spectral methods for a class of nonlinear Schrödinger equations* |
|---|---|---|
| 17:00 - 17:30 | **Marcel Hansmann** <br> *Variation of discrete spectra of non-selfadjoint operators* | **Uta Freiberg** <br> *Spectral dimension of V-variable fractals* |
| 17:30 - 18:00 | **Leslie Leben** <br> *Variation of discrete spectra of self-adjoint operators in Krein spaces* | **Evgen Cheremnikh** <br> *On an analogue of formulae Sohotski-Plemelj* |
| 18:00 - 18:30 | **Vladimir Matsaev** <br> *Some estimates on rearrangements of functions belonging* **(BE 01)** <br> *to images of singular integral operators* | |

# Friday, August 31

| 9:00 - 9:45 | **Andrei Shkalikov**<br>*Spectral portraits of non-self-adjoint Sturm-Liouville operators with small physical parameter* |
|---|---|
| 9:45 - 10:30 | **Malcolm Brown**<br>*Scattering and inverse scattering for a left-definite Sturm-Liouville problem* |

*Coffee Break*

| 11:00 - 11:30 | **Alexander Motovilov**<br>*The a priori tan Θ theorem for spectral subspaces* |
|---|---|
| 11:30 - 12:00 | **Konstantin Pankrashkin**<br>*On the unitary equivalence between differential and finite-difference operators on graphs* |
| 12:00 - 12:30 | **Olof Staffans**<br>*Passive scattering systems* |

*Lunch Break*

| | **BE 01** Chair: A. Kostenko | **AE 01** Chair: I. Wood |
|---|---|---|
| 14:00 - 14:30 | **Olaf Post**<br>*Boundary pairs and Dirichlet-to-Neumann operators* | **Sascha Trostorff**<br>*On a class of boundary control systems* |
| 14:30 - 15:00 | **Christian Wyss**<br>*Hamiltonians and Riccati equations for unbounded control and observation operators* | **Marcus Waurick**<br>*A Hilbert space perspective on ordinary differential equations with memory term* |
| 15:00 - 15:30 | **Albrecht Seelmann**<br>*On an estimate in the subspace perturbation problem* | **Anton Lunyov**<br>*On completeness of the root vector system of boundary value problem for first order system* |

*Coffee Break*

| 16:00 - 16:30 | **András Bátkai**<br>*Product formulas for operator matrix semigroups* |
|---|---|
| 16:30 - 17:00 | **André Ran**<br>*The finite section method for infinite Vandermonde matrices* |

| 17:00 - 17:05 | **Closing** |
|---|---|

| *17:05* | *Farewell Party in front of* **BE 01** |
|---|---|

# Further information

## Registration and information

The registration for the conference is during the Welcome Reception on Sunday, 26th August, from 18:00 - 22:00 in the Aula of the TU Graz, Rechbauerstrasse 12, 8010 Graz, first floor, and on Monday, 27th August, from 8:00 - 11:00 at the conference venue Steyrergasse 30, 8010 Graz, foyer. For further information and assistance please contact:

| | |
|---|---|
| Barbara Pöltl | Phone:+43 (316) 873 - 8121 |
| Institut für Numerische Mathematik | E-Mail: barbara.poeltl@tugraz.at |
| Steyrergasse 30/III | Room **C 309**, third floor |
| 8010 Graz | |

## Internet

Internet access is available by WiFi in the whole building. Guest computers can be found in room **C 307**, third floor. A sheet with your login data is in your personal envelope.

## Discussion room

Room **A 111** (first floor) is available as a work and discussion room.

## Social program

| | | |
|---|---|---|
| Sunday, 26th August | 18:00 | **Registration and Welcome Reception** in the Aula of TU Graz, Rechbauerstrasse 12, first floor |
| Monday, 27th August | 19:00 | **Reception in the staterooms of Graz Burg** Hofgasse/Erzherzog-Johann-Allee |
| Tuesday, 28th August | 18:00 | **City Walking Tour** meeting point in front of **BE 01** |
| Wednesday, 29th August | 17:15 | **Walk to the Schloßberg** meeting point in front of **BE 01** |
| Wednesday, 29th August | 18:00 | **Conference Dinner** Restaurant Schlossberg, Am Schloßberg 7, 8010 Graz |

## Loss, Damage or Injury

The conference organisers and the TU Graz regret that they cannot accept any liability or responsibility whatsoever for any loss of, or damage to, persons, personal property, vehicles and contents.

## Emergency

Note that the Europe-wide general emergency number **112** can be called from any cell phone even without a valid subscription or prepaid SIM card inserted.

## Acknowledgement

We gratefully acknowledge the financial support by Austrian Airlines, AVL, City of Graz, Graz University of Technology, NAWI Graz, Österreichische Forschungsgemeinschaft (ÖFG), State of Styria, University of Vienna and Vienna University of Technology.