IWW International Wigner Workshop 2023

Casa Convalescencia, Barcelona, Spain
11-12 June 2013

Program

Chair, Stefano Olivares
University of Milan

Co-Chair, Josef Weinbub
TU Wien

Program Committee
- Wolfgang Belzig, *Universität Konstanz*
- David K. Ferry, *Arizona State University*
- Irena Knezevic, *University of Wisconsin*
- Mihail Nedjalkov, *TU Wien and Bulgarian Academy of Sciences*
- Franco Nori, *RIKEN*
- Xavier Oriols, *Universitat Autónoma de Barcelona*
- Siegfried Selberherr, *TU Wien*

Local Arrangements
- Xavier Oriols, *Universitat Autónoma de Barcelona*

Version: June 5, 2023

Sunday, June 11

8:30 Registration opens in main entrance of “Casa Convalescencia”

Workshop room: *Aula 11-13, on the first floor*

9:00 *Opening Remarks*
Stefano Olivares and Josef Weinbub

9:10 *Optics and Electrodynamics*
Chair: Irena Knezevic

9:10 **Invited:** "The Wigner formalism in high-energy electrodynamics,"
Christian Kohlfürst, *Helmholtz-Zentrum Dresden Rossendorf e.V*,

9:50 "Gauge-invariant Wigner particle model for linear electromagnetic fields,"
Mauro Ballicchia, Mihail Nedjalkov, and Josef Weinbub, *TU Wien*

10:10 "Full counting statistics of ultrafast quantum transport," Matthias Hübler and Wolfgang Belzig, *Universität Konstanz*

10:30 "Mitigating phase diffusion through a realistic optical parametric oscillator," Stefano Olivares, *Università degli Studi di Milano and Istituto Nazionale di Fisica Nucleare*

10:50 *Coffee*

11:10 **Invited:** "Wigner approach to optimal control in quantum and classical wave propagation," Omar Morandi, *University of Florence*

11:50 "Functional calculus in phase-space with applications to quantum fluid dynamics," Luigi Barletti, *Università degli Studi di Firenze*

12:10 *Tunneling*
Chair: Mihail Nedjalkov

12:10 "Electrothermal signed particle Monte Carlo simulation of a resonant tunneling diode," Orazio Muscato, *Università di Catania*

12:30 "Interaction time of Schrödinger cat state with amplitude-varying Gaussian potential," Darius Woźniak, Maciej Kalka, Marta Wleklińska, Damian Kołaczek, Maciej Wołoszyn, and Bartlomiej J. Spisak, *AGH University of Science and Technology and University of Agriculture in Kraków*

12:50 *Lunch*

15:00 *Condensed Matter and Transport 1*
Chair: Stefano Olivares

15:00 **Invited:** "Scaling laws of the thermal conductivity of solids: the role of topological, geometrical, and compositional disorder," Michele Simoncelli, *University of Cambridge*

15:40 "Scattering in the Wigner equation," Samuel W. Belling and Irena Knezevic, *University of Wisconsin – Madison*

16:00 "Real-space treatment of polar-optical phonons with Wigner functions," David K. Ferry, *Arizona State University*

16:20 *Coffee*

16:40 **Invited:** "Minimum uncertainty states with Wigner: quantum hydro-thermodynamics," Nezihe Uzun, *Polish Academy of Sciences*

17:20 "Overcoming the numerical sign problem in the Wigner dynamics via adaptive particle annihilation," Yunfeng Xiong, *Beijing Normal University*

17:40 "Towards the intuitive understanding of the quantum world: Sonification of Wigner function," Reiko Yamada, Eloy Pinol Jimenez, and Maciej Lewenstein, *ICFO – The Institute of Photonic Sciences and ICREA*

20:00 *Reception at restaurant "Ca la Nuria" (close to "Plaça Catalunya")*

Monday, June 12

9:00 *Condensed Matter and Transport 2*
Chair: David K. Ferry

9:00 "Investigation of a staggered grid formulation of the Wigner transport equation for complex band structures," Mathias Pech, Alan Abdi, and Dirk Schulz, *TU Dortmund*

9:20 "A new approach to real-time phase-space path integrals," Ian Welland, *Naval Research Laboratory*

9:40 "Operational phase-space distribution functions through consecutive weak and strong measurements," Xavier Oriols and Carlos F. Destefani, *Universitat Autònoma de Barcelona*

10:00 Coffee

10:20 *Wigner Quantum Systems*
Chair: Josef Weinbub

10:20 **Invited:** "Dynamics-based certification of quantumness," Lin Htoo Zaw, Pooja Jayachandran, Clive Cenxin Aw, and Valerio Scarani, *National University of Singapore*

11:00 "Phase-space representation of time-frequency as quantum continuous variables: universal quantum computing, metrology, and the quantum-classical frontier," Pérola Milman, Eloi Descamps, Nicolas Fabre, and Arne Keller, *Université Paris Cité, CNRS, Télecom ParisTech, and Université Paris-Saclay*

11:20 "Tunneling process of symmetrical state – phase-space approach based on the time evolution of the Wigner distribution function," Maciej Kalka, Dariusz Woźniak, Marta Wleklińska, Damian Kołaczek, Maciej Wołoszyn, and Bartlomiej J. Spisak, *AGH University of Science and Technology, University of Agriculture in Kraków*

11:40 "Correlation functions in Calogero Sutherland Model," Grigory E. Astrakharchik, Andrea Colcelli, and Andrea Trombettoni, *Universitat Politècnica de Catalunya, Universitat de Barcelona, and Dipartimento di Fisica - Strada Costiera*

12:00 *Closing Remarks*

12:15 *Lunch & Coffee*