



Department of Mathematical Physics
Institute of Physics, Nicolaus Copernicus University
Open Systems & Information Dynamics, The Editors
Reports on Mathematical Physics, The Editors

52nd Symposium on Mathematical Physics

Toruń, Poland, June 14–17, 2021

Lectures take place on Zoom platform

Monday, June 14, 2021

Morning session

- 9.00-9.40 *Opening & memorial dedicated to professor Andrzej Kossakowski*
 Chairman: A. Jamiolkowski
- 9.45-10.25 G. Marmo (Napoli): *Groupoids, channels, and probabilities*
- 10.30-11.10 M. D'Ariano (Pavia): *No purification ontology, no quantum paradoxes*
- 11.15-11.55 S. Maniscalco (Helsinki): *Learning to measure: a new adaptive approach to extract information in quantum algorithms for near-term quantum computers*
- 12.00-12.40 S. Pascazio (Bari): *Bound states of artificial atoms in open and closed waveguides*
- 12.45-13.25 F. Benatti (Trieste): *Asymptotic transport properties in open quantum spin chains*
- 13.25-14.30 *Break*

Afternoon session

Chairman: M. Ziman

- 14.30-15.10 P. Zanardi (Los Angeles): *Quantum scrambling of observable algebras*
- 15.15-15.55 S. Huelga (Ulm): *Memory effects and the efficiency of bio-molecular switches*
- 16.00-16.40 P. Horodecki (Gdańsk): *No-signalling assemblages beyond quantum mechanics: when quantum theory can generate extremal points in a post-quantum framework*
- 16.45-17.25 G. Adesso (Nottingham): *Mixing indistinguishable systems leads to a quantum Gibbs paradox*
- 17.30-18.10 F. Fagnola (Milano): *Quantum Markov semigroups on a one-mode Fock space: irreducibility and normal invariant states*
- 18.15-18.55 M. Merkli (St. John's): *Markovian approximation for the dynamics of correlated initial system-reservoir states*

Tuesday, June 15, 2021

Morning session

Chairman: F. Benatti

- 9.00-9.40 K. Modi (Melbourne): *Markovianization with approximate unitary designs*
- 9.45-10.25 D. Burgarth (Sydney): *Eternal adiabaticity and KAM-stability*
- 10.30-11.10 F. Petruccione (Durban): *Open quantum systems on NISQ computers*
- 11.15-11.55 A. Rivas (Madrid): *Strong coupling thermodynamics of open quantum systems*
- 12.00-12.40 W. Strunz (Dresden): *Dynamical phase transition in dissipative quantum dynamics*
- 12.45-13.25 G. Chiribella (Oxford): *Quantum operations with indefinite direction of time*
- 13.25-14.30 *Break*
- OSID & ROMP Editorial Board Meeting*

Afternoon session

Chairman: J. Piilo

- 14.30-15.10 P. Verrucchi (Firenze): *There is only one time*
- 15.15-15.55 L. Accardi (Roma): *The quantum mechanics canonically associated to free probability*
- 16.00-16.40 K. Luoma (Turku): *Diffusive limit of non-Markovian quantum jumps*
- 16.45-17.25 A. Smirne (Milano): *Rate-operator quantum jumps: continuous-measurement interpretation and non-Markovian dynamics*
- 17.30-18.10 S. Alipour (Helsinki): *Trajectory-based GKLS equation and its energetics*
- 18.15-18.55 N. Megier (Milano): *On the relation between time local and non-local master equations*

Wednesday, June 16, 2021

Morning session

Chairman: V. Karamipour

- 9.00-9.40 B.C. Hiesmayr (Wien): *Free versus bound entanglement: machine learning tackling a NP-hard problem*
- 9.45-10.25 L. Memarzadeh (Teheran): *Quantum capacity of bosonic dephasing channel*
- 10.30-11.10 A. Rezakhani (Teheran): *Correlation-picture approach to open-quantum-system dynamics*
- 11.15-11.55 S. Campbell (Dublin): *Quantum Darwinism and classical objectivity: a collision model viewpoint*
- 12.00-12.40 M. Paternostro (Belfast): *Informational steady-states and conditional entropy production in continuously monitored systems*
- 12.45-13.25 J. Bae (Daejeon): *Mitigating detection crosstalk errors with local unitaries*
- 13.25-14.30 *Break*

Afternoon session

Chairman: S. Huelga

- 14.30-15.10 M. Lewenstein (Barcelona): *Storage capacity and learning capability of quantum neural networks*
- 15.15-15.55 M. Ziman (Bratislava): *Probabilistic storing of quantum dynamics*
- 16.00-16.40 M. Palma (Palermo): *Quantum correlations in PT-symmetric systems*
- 16.45-17.25 R. Lo Franco (Palermo): *Recovering entanglement through spatial deformation of identical particle wave functions*
- 17.30-18.10 T. Schulte-Herbrüggen (Munich): *Exploring the limits of open quantum dynamics: motivation, results from toy models to applications*
- 18.15-18.55 M. El Baz (Rabat): *Discrete phase space techniques in quantum spin chains*

Thursday, June 17, 2021

Morning session

Chairman: B. Hiesmayr

- 9.00-9.40 N. Watanabe (Noda): *On complexities for quantum compound systems*
- 9.45-10.25 G. Kimura (Tokyo): *Universal constraint for relaxation rates for quantum dynamical semigroup - physical manifestation of completely positive condition*
- 10.30-11.10 F. Buscemi (Nagoya): *The "thermodynamic reverse bound" and the role of retrodiction in statistical mechanics*
- 11.15-11.55 B. Vacchini (Milano): *Non-Markovianity and information backflow in terms of entropic quantities*
- 12.00-12.40 J. Goold (Dublin): *Taking the temperature of a pure quantum state*
- 12.45-13.25 V. Karimipour (Teheran): *Quasi-inversion of quantum channels*
- 13.25-14.30 *Break*

Afternoon session

Chairman: B. Vacchini

- 14.30-15.10 A. Sanpera Trigueros (Barcelona): *Copositive maps as entanglement witnesses*
- 15.15-15.55 D. Bruss (Düsseldorf): *Quantifying necessary quantum resources for nonlocality*
- 16.00-16.40 S. Denisov (Oslo): *Dissipative quantum chaos in Floquet systems*
- 16.45-17.25 F. Mukhamedov (Al Ain): *Open quantum random walks and quantum Markov chains on trees*
- 17.30-18.10 J. M. Pérez-Pardo (Madrid): *Controllability of infinite dimensional quantum systems based on quantum graphs*
- 18.15-18.55 R. Augusiak (Warszawa): *Self-testing within the stabilizer formalism*