

**EUROPEAN
SCIENCE
FOUNDATION**

SETTING SCIENCE AGENDAS FOR EUROPE

**Minister of Science
and Higher Education (MSHE)
Republic of Poland**



RESEARCH CONFERENCES

ESF Mathematics Conferences in Poland
in partnership with MSHE and the
Institute of Mathematics (PAN)

Control, Constraints and Quanta

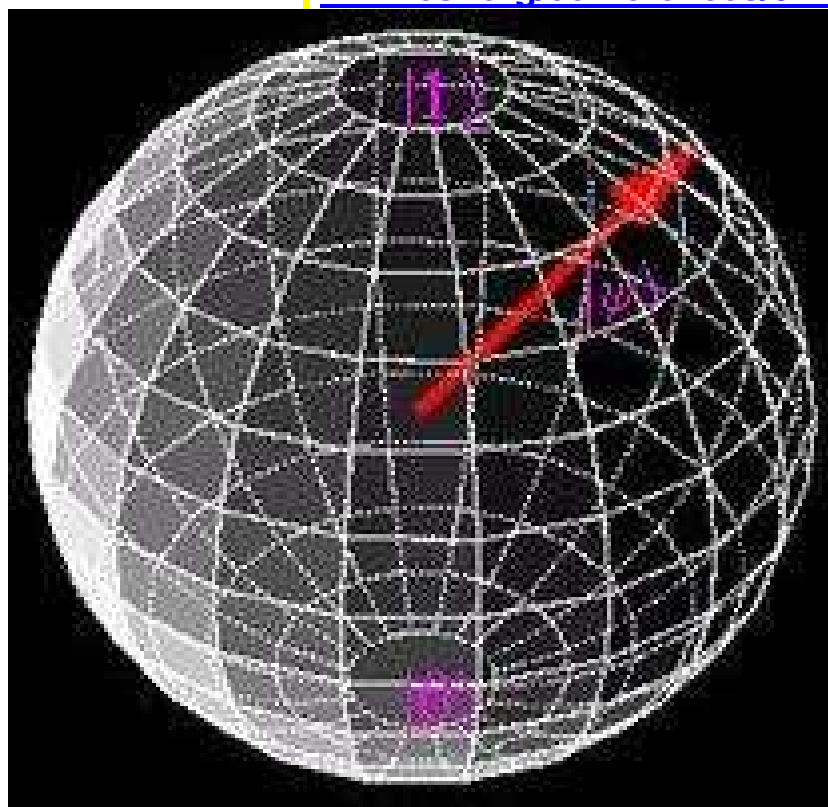
Mathematical Research and Conference Center,
Bedlewo ▪ Poland
10-16 October 2007

Chair: **Bronisław Jakubczyk**, Institute of Mathematics,
Polish Academy of Sciences, PL
Vice-Chair: **Marek Kuś**, Centre of Theoretical Physics,
Polish Academy of Sciences, PL

Organising Committee: **Witold Respondek**, INSA Rouen, FR
▪ **Paweł Urbański**, University of Warsaw, PL

Scientific Committee: **Ingemar Bengtsson**, Stockholm University, SE
▪ **Roger Brockett**, Harvard University, US ▪ **Steffen Glaser**, TU München,
DE ▪ **Nevin Khaneja**, Harvard University, US ▪ **Manuel de Leon**, Instituto
de Matematicas y Fisica Fundamental, CSIC, ES ▪ **Giuseppe Marmo**,
Universita Federico II di Napoli and Istituto Nazionale di Fisica Nucleare, IT

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Final Programme

Wednesday – 10 October

Late afternoon / early evening	Registration at the ESF-RC desk
19.45	Welcome Drink
20.30	Supper

Thursday – 11 October

Chairman: Bronislaw Jakubczyk, Institute of Mathematics, Polish Academy of Sciences, PL

09:00–09:15	Conference Opening
09:15-10:15	Ingemar Bengtsson Stockholm University, SE <i>Quantum states - some geometrical perspectives</i>
10.15-11.00	Maciej Lewenstein Institut de Ciencies Fotoniques, ES <i>Entanglement: from linear algebra and geometry to harmonic analysis on compact groups</i>
11.00-11.30	Coffee break
11.30-12.15	Velimir Jurdjevic University of Toronto, CA <i>Integrable systems on Lie groups</i>
12.15-12.40	D. Chruscinski (short talk) <i>Entangling properties of quantum channels</i>
13.00	Lunch

Chairman: Pawel Urbanski, University of Warsaw, PL

15.00-15.45	Pierre Rouchon Ecole Normale Supérieure des Mines de Paris, FR <i>Invariant observer and parameter estimation of quantum systems</i> (in collaboration with S. Bonnabel and M. Mirrahimi)
15.45-16.15	A. Zuyev (Short Talk) National Academy of Sciences of Ukraine, UA <i>Optimal control of an infinite dimensional system with modal coordinates</i>
16.15-16.50	Coffee break
16.50-17.15	R. Zeier (short talk) Harvard University, US <i>Time-optimal synthesis of unitary transformations in coupled fast and slow qubit system</i>

- 17.15-17.40 **Z. Mouayn** (short talk)
University of Cadi Ayyad, MA
*Coherent state transforms and representation theory of Lie groups.
Application to uniform magnetic field on two-dimensional surfaces*
- 18.30 Bonfire Dinner

Friday – 12 October

Chairman: Ingemar Bengtsson, Stockholm University, SE

- 09.00-10.00 **Armin Uhlmann**
Universität Leipzig, DE
The convexity of state spaces
- 10.00-11.00 **Roger Brockett**
Harvard University, US
*Noise Models for Quantum Systems and Controlling for Minimal
Decoherence*
- 11.00-11.20 Coffee break
- 11.20-12.05 **Niels Chr. Nielsen**
University of Aarhus, DK
Optimal control for design and optimization of solid-state NMR experiments
- 12.05-12.50 **Giuseppe Marmo**
Universita Federico II di Napoli and Istituto Nazionale di Fisica Nucleare, IT
Geometrical formulation of quantum mechanics: Zeno dynamics
- 13.00 Lunch

Chairman: Manuel de Leon, Institute of Mathematics and Fund, Physics CSIC, FR

- 15.00-15:45 **Anthony Bloch**
University of Michigan, US
Classical and quantum systems interacting with their environment
- 15.45-16.10 **Pierre Rouchon**
Ecole Normale Supérieure des Mines de Paris, FR
Open Quantum Systems Governed by the Lindblad Equation
- 16.10-16.40 Coffee break
- 16.40-17.05 **J. Mulherkar** (short talk)
University of California Davis, US
The XXZ model and applications to quantum computing
- 17.05-17.30 **M.A. Can** (short talk)
Bilkent University, TR
States of local systems can violate Bell's conditions
- 17.30-19.00 Poster Session
- 19.00 Dinner

Saturday – 13 October

Chairman: Giuseppe Marmo, University of Naples, IT

- 09.00-10.00 **Steffen Glaser**
Technische Universität München, DE
Optimal Control of Spin Systems
- 10.00-10.45 **Uwe Helmke**
Würzburg University, DE
Controllability of finite-dimensional quantum systems
- 10.45-11.15 Coffee break
- 11.15-12.00 **Manuel de Leon**
Instituto de Matematicas y Fisica Fundamental CSIC, ES
Optimal control in presence of nonholonomic constraints
- 12.00-12.45 **Ugo Boscain**
SISSA, IT
Controllability of the Schrödinger equation via intersection of eigenvalues
- 13.00 Lunch

Chairman: Anthony Bloch, University of Michigan, US

- 15.00-15.45 **Yuri Sachkov**
Russian Academy of Sciences, RU
Symmetries and cut points in optimal control problems on Lie groups
- 15.45-16.10 **J. Clemento-Gallardo** (short talk)
University of Zaragoza, ES
Geometrical aspects of the space of density states
- 16.10-16.35 **R. Dobrzanski** (short talk)
Polish Academy of Sciences, PL
Effects of imperfect noise correlations on decoherence-free subsystems: SU(2) diffusion model
- 16.35-17.00 Coffee Break

Chairman: Marek KUS, Centre of Theoretical Physics, Warsaw, PL

- 17.00-19.00 Round Table: Mathematics, Theory, Experiment in QS
- 19.00 Dinner

Sunday – 14 October

Chairman: Roger Brockett, Harvard University, US

- 09.00-10.00 **Navin Khaneja**
Harvard University, US
Control of Spin Ensembles
- 10.00-10.45 **Frederic Jean**
ENSTA, UMA, FR
Singular trajectories: geometric aspects and genericity properties I
- 10.45-11.15 Coffee break

- 11.15-12.00 **Emmanuel Trélat**
 Université d'Orléans, FR
Singular trajectories: geometric aspects and genericity properties II
- 12.00-12.45 **Thomas Schulte-Herbrueggen**
 Technische Universität München, DE
Controlling Quanta under Constraints: Quantum Compilation by Optimal Control of Open Systems
- 13.00 Lunch
- 14.00 Excursion
- 19.00 Get-together & Conference Dinner

Monday – 15 October

Chairman: Marek Kus, Centre of Theoretical Physics, Warsaw, PL

- 09.00-09.45 **Witold Respondek**
 INSA de Rouen, FR
Non-integrability of the optimal control problem for n-level quantum systems
- 09.45-10.30 **Thomas Chambrion**
 Université de Nancy, FR
Control of the Schrödinger equation in infinite dimensions (common work with Mario Sigalotti and Paolo Manson)
- 10.30-11.00 Coffee break
- 11.00-11.45 **Eduardo Martinez**
 University of Zaragoza, ES
Lie algebroids and groupoids in mechanics
- 11.45-12.10 **M. Guerra** (short talk)
 Technical University of Lisbon, PT
Approximants of generalized minimizers of noncoercive optimal control problems
- 12.10-12.35 **J. Sheriff** (short talk)
 Harvard University, US
Controllability of Electron-Nuclear Spin Systems
- 13.00 Lunch

Chairman: Witold Respondek, INSA de Rouen, FR

- 15.00-15.45 **Włodzimierz Tulczyjew**
 Warsaw University, PL
Density operators and selective measurements
- 15.45-16.30 **Gregoire Charlot**
 University of Grenoble, FR
Optimal control of finite dimensional quantum systems
- 16.30-16.50 Coffee break
- 16.50-18.00 Get-together & Forward Look Plenary Discussion
- 19.00 Dinner

