The Abdus Salam International Centre for Theoretical Physics

School and Workshop on Theory and Technology in Quantum Information, Communication, Computation and Cryptography

Cosponsor(s): EUROPEAN COMMISSION, EUROTECH GROUP and SISSA, Trieste
Organizer(s): Directors: F. Benatti, M. Fannes, R. Floreanini, D. Petritis Local Organizer: R. Zecchina
Trieste - Italy, 12 - 23 June 2006

Final programme

Monday, 12 June 2006 (Room:Adriatico Guest House Kastler Lecture Hall)

12 June 2006

08:00 - 09:00	(Room: Adriatico Guest House (Lower Level 1)) **Registration Formalities**
09:00 - 10:00	**D. PETZ** / *Alfred Renyi Inst. of Mathematics, Budapest, Hungary* **Algebraic methods for quantum mechanics: part I**
10:00 - 11:00	**H. MAASSEN** / *Radboud University, Dept. Math., Nijmegen, Netherlands* **Quantum probability quantum information theory: part I**
11:00 - 11:30	--- Coffee break ---
11:30 - 12:30	**Y. SUHOV** / *Univ. Cambridge, Centre for Math. Sciences, Stat. Lab., Cambridge, U.K.* **Classical information theory: part I**
12:30 - 14:30	--- Lunch break ---
14:30 - 15:30	**D. PETZ** / *Alfred Renyi Inst. of Mathematics, Budapest, Hungary* **Algebraic methods for quantum mechanics: part II**
15:30 - 16:30	**H. MAASSEN** / *Radboud University, Dept. Math., Nijmegen, Netherlands* **Quantum probability quantum information theory part II**

16:30 - 17:00 --- Coffee break ---

17:00 - 18:00 **S. MICHALAKIS** / *UC at Davis, Dept. Mathematics, Davis, CA, U.S.A.*
Classical information theory: part II

Tuesday, 13 June 2006 (Room:Adriatico Guest House Kastler Lecture Hall)

13 June 2006

09:00 - 10:00 **D. PETZ** / *Alfred Renyi Inst. of Mathematics, Budapest, Hungary*
Algebraic methods for quantum mechanics: part III

10:00 - 11:00 **H. MAASSEN** / *Radboud University, Dept. Math., Nijmegen, Netherlands*
Quantum probability quantum information theory: part III

11:00 - 11:30 --- Coffee break ---

11:30 - 12:30 **R. ALICKI** / *Univ. Gdansk, Theoretical Physics & Astrophysics, Gdansk, Poland*
Field-theoretical methods: part I

12:30 - 14:30 --- Lunch break ---

14:30 - 15:30 **Y. SUHOV** / *Univ. Cambridge, Centre for Math. Sciences, Stat. Lab., Cambridge, U.K*
Classical information theory: part III

15:30 - 16:30 **P. HORODECKI** / *Gdansk Univ. of Tech., Theoretical & Math. Physics, Gdansk, Poland*
Entanglement: part I

16:30 - 17:00 --- Coffee break ---

17:00 - 18:00 **A.E.M. BUCHLEITNER** / *MPI Physics of Complex Systems, Dresden, Germany*
Physical implementation: part I

Wednesday, 14 June 2006 (Room:Adriatico Guest House Kastler Lecture Hall)

14 June 2006

09:00 - 10:00 **R. ALICKI** / *Univ. Gdansk, Theoretical Physics & Astrophysics, Gdansk, Poland*
Field-theoretical methods: part II

10:00 - 11:00 **R. ALICKI** / *Univ. Gdansk, Theoretical Physics & Astrophysics, Gdansk, Poland*
Field-theoretical methods: part III

11:00 - 11:30 --- Coffee break ---

11:30 - 12:30 **P. HORODECKI** / *Gdansk Univ. of Tech., Theoretical & Math. Physics, Gdansk, Poland*
Entanglement: part II

12:30 - 14:30 --- Lunch break ---

14:30 - 15:30 **A.E.M. BUCHLEITNER** / *MPI Physics of Complex Systems, Dresden, Germany*
Physical implementation: part II

15:30 - 16:30 **A.E.M. BUCHLEITNER** / *MPI Physics of Complex Systems, Dresden, Germany*
Physical implementation: part III

16:30 - 17:00 --- Coffee break ---

17:00 - 18:00 **M. GENOVESE** / *I.N.Ri.M., Torino, Italy*
Photonic realization of quantum information protocols: part I

19:30 - 21:00 (Room: Adriatico Guest House (Terrace))
--- Reception ---

Thursday, 15 June 2006 (Room:Adriatico Guest House Kastler Lecture Hall)

15 June 2006

09:00 - 10:00 **P. HORODECKI** / *Gdansk Univ. of Tech., Theoretical & Math. Physics, Gdansk, Poland*
Entanglement: part III

10:00 - 11:00 **N. DATTA** / *Univ. Cambridge, DPMMS, Cambridge, U.K.*
Quantum entropy and information: part I

11:00 - 11:30 --- Coffee break ---

11:30 - 12:30 **N. DATTA** / *Univ. Cambridge, DPMMS, Cambridge, U.K*
Quantum entropy and information: part II

12:30 - 14:30 --- Lunch break ---

14:30 - 15:30 **M. GENOVESE** / *I.N.Ri.M., Torino, Italy*
Photonic realization of quantum information protocols: part II

15:30 - 16:30 **D.B.J. BRUSS** / *Heinrich-Heine-Univ., Theoretische Phys. III, Dusseldorf, Germany*
Quantum cryptography: part I

16:30 - 17:00 --- Coffee break ---

17:00 - 18:00 **J. KEMPE** / *LRI, Univ. Paris-Sud, Orsay Cedex, France*
Quantum algorithms: part I

Friday, 16 June 2006 (Room:Adriatico Guest House Kastler Lecture Hall)

16 June 2006

09:00 - 10:00 **J. KEMPE** / *LRI, Univ. Paris-Sud, Orsay Cedex, France*
Quantum algorithms: part II

10:00 - 11:00 **D.B.J. BRUSS** / *Heinrich-Heine-Univ., Theoretische Phys. III, Dusseldorf, Germany*
Quantum cryptography: part II

11:00 - 11:30 --- Coffee break ---

11:30 - 12:30 **J. KEMPE** / *LRI, Univ. Paris-Sud, Orsay Cedex, France*
Quantum algorithms: part III

12:30 - 14:30 --- Lunch break ---

14:30 - 15:30 **N. DATTA** / *Univ. Cambridge, DPMMS, Cambridge, U.K*
Quantum entropy and information: part III

15:30 - 16:30 **D.B.J. BRUSS** / *Heinrich-Heine-Univ., Theoretische Phys. III, Dusseldorf, Germany*
Quantum cryptography: part III

16:30 - 17:00 --- Coffee break ---

17:00 - 18:00 **M. GENOVESE** / *I.N.Ri.M., Torino, Italy*
Photonic realization of quantum information protocols: part III

18:00 - 18:15 **Closing Remarks**

Monday, 19 June 2006

19 June 2006

08:15 - 09:30 **Registration Formalities with the Secretary**

09:30 - 10:10 **N. DATTA** / *DPMMS, Univ. Cambridge, U.K.*
Classical capacity of arbitrary quantum channels

10:10 - 10:50 **D.A. LIDAR** / *Dept.Chemistry & Electr.Engg., Univ. Southern California, Los Angeles, U.S.A.*
Adiabaticity in open quantum systems

10:50 - 11:20 --- Coffee break ---

11:20 - 12:00 **D. PETZ** / *Alfred Renyi Inst.Mathematics, Budapest, Hungary*
State tomography for qubits

12:00 - 12:40 **M. GENOVESE** / *I.N.Ri.M., Torino, Italy*
Recent studies at INRiM on polarisation entanglement transmission

12:40 - 14:30 --- Lunch Break ---

14:30 - 15:10 **S. MICHALAKIS** / *Univ. California at Davis, Dept. Mathematics, Davis, U.S.A.*
Entanglement in finitely correlated states

15:10 - 15:50 **K.M.R. AUDENAERT** / *QOLS, Physics, Blackett Lab., Imperial College, London, U.K.*
Entanglement on mixed stabiliser states

15:50 - 16:20 --- Coffee break ---

16:20 - 17:00 **M.B. PLENIO** / *Optics Section, Blackett Lab., Imperial College, London, U.K.*
Generic entanglement is physical

17:00 - 17:20 **G. ADESSO** / *Univ. Salerno, Italy / D.A.M.T.P., Quantum Computation, Mathematical Sciences, Univ. Cambridge, U.K.*
Entanglement in Gaussian matrix product states

17:20 - 17:40 **A.M. ERICSSON** / *Physics Dept., Stockholm Univ., Sweden*
The search for mutually unbiased bases

Tuesday, 20 June 2006

20 June 2006

09:30 - 10:10 **J. EISERT** / *Inst. Physics, Univ. Potsdam, Germany/Inst. Mathematical Sciences, Imperial College, London, U.K.*
Entanglement, area and the problem of finding ground states of many-body systems

10:10 - 10:50 **M. HORODECKI** / *Inst. Theoretical Physics & Astrophysics, Univ. Gdansk, Poland*
Quantum key distributions beyond entanglement distillation

10:50 - 11:20 --- Coffee break ---

11:20 - 12:00 **R. FAZIO** / *Scuola Normale Superiore, Pisa, Italy*
Decoherence by controlled quantum baths

12:00 - 12:40 **K. ZYCZKOWSKI** / *Institute of Physics, Jagellonian Univ., Cracow, Poland*
Quantum error correction and compression problems

12:40 - 14:30 --- Lunch Break ---

14:30 - 15:10 **R.F. WERNER** / *Inst. Mathematische Physik, TU Braunschweig, Germany*
The really mean king uses biased bases\"

15:10 - 15:50 **H. NARNHOFER** / *Inst. Theoretische Physik, TU Wien, Vienna, Austria*
Passage between finite dimensional classical and quantum phase spaces

15:50 - 16:20 --- Coffee break ---

16:20 - 17:00 **M. WOLF** / *MPI fuer Quantenoptik, Garching bei Munchen, Germany*
Special properties of special quantum channels

17:00 - 17:40 **M.G.A. PARIS** / *Univ. di Milano, Dipt. Fisica, Milano, Italy*
Cloning: states, observables and noise

17:40 - 18:00 **E.F. GALVAO** / *Univ. Fed. Fluminense, Inst. Fisica, Rio de Janeiro, Brazil*
Classicality in discrete Wigner functions

Wednesday, 21 June 2006

21 June 2006

09:30 - 10:10 **G.M. PALMA** / *Univ. Palermo, Dipt. Fisica, Palermo, Italy*
Entanglement controlled electron transport

10:10 - 10:50 **F. ILLUMINATI** / *Univ. Salerno, Dipt.Fisica E.R. Caianiello, Baronissi, Italy*
Qualifying and quantifying entanglement in continuous variable systems

10:50 - 11:20 --- Coffee break ---

11:20 - 12:00 **T. PROSEN** / *Dept. Physics, Univ. Ljubljana, Slovenia*
Order to chaos transition in quantum spin chains

12:00 - 12:40 **L. VIOLA** / *Dartmouth College, Dept. Physics & Astronomy, Hanover, New Hampshire, U.S.A.*
Generalized entanglement as a framework for exploring complex systems

12:40 - 14:30 --- Lunch Break ---

14:30 - 15:10 **L. MASANES** / *Univ. Bristol, Dept. Mathematics, Bristol, U.K.*
Entanglement is equivalent to non-simulability by classical correlations

15:10 - 15:50 **A. SANPERA** / *Univ. Aut. De Barcelona, Fisica Teorica, Barcelona, Spain*
Spinor ultracold gases

15:50 - 16:20 --- Coffee break ---

16:20 - 17:00 **C. MACCHIAVELLO** / *Univ. Pavia, Dipt. Fisica "A.Volta", Pavia, Italy*
Ideal broadcasting, purification and time-reversal for mixed states

17:00 - 17:40 **J.D. MAASSEN** / *Radboud Univ., Dept. Mathematics, Nijmegen, Netherlands*
Purification of quantum trajectories and dark subspaces

17:40 - 18:00 **G. FLORIO** / *Univ. Bari, Dipt. Fisica, Bari, Italy*
Robustness of optimal working points for non-adiabatic holonomic quantum computation

19:30 - 19:30 (Room: Adriatico Guest House (Terrace))
--- Reception - Adriatico Terrace ---

Thursday, 22 June 2006

22 June 2006

09:30 - 10:10 **H.J. BRIEGEL** / *Inst. Theoretische Physik, Uni. Innsbruck, Austria*
Universal resources for measurement-based quantum computation

10:10 - 10:50 **S. BOSE** / *Univ. College London, Dept. Physics & Astronomy, London, U.K.*
Spin chains in quantum information processing

10:50 - 11:20 --- Coffee break ---

11:20 - 12:00 **S. PASCAZIO** / *Univ. Bari, Dipt. Fisica, Bari, Italy*
A characterization of multipartite entanglement

12:00 - 12:40 **F. PETRUCCIONE** / *KwaZulu-Natal, Pure & Applied Physics, Durban, South Africa*
Dynamics of qubit systems in a spin star environment

12:40 - 14:30 --- Lunch Break ---

14:30 - 15:10 **L.C. KWEK** / *Nanyang Tech. Univ., NIE, Singapore*
Hybrid quantum computing

15:10 - 15:50 **D. VITALI** / *Univ. di Camerino, Dipt. Matematica e Fisica, Camerino, Italy*
Optomechanical networks for continuous variable quantum information processing

15:50 - 16:20 --- Coffee break ---

16:20 - 17:00 **G.M. D'ARIANO** / *INFM, Unita di Pavia, Dipt. Fisica A. Volta, Pavia, Italy*
Hilbert-space formulation of quantum mechanics from purely operational axioms

17:00 - 17:40 **Wonmin SON** / *Univ. Leeds, Quantum Information Group, Leeds, U.K.*
Untangled entanglement in solid state

17:40 - 18:00 **I. TSOHANTJIS** / *Technical Univ. Crete, Inst. Matter Structure & Laser Physics, Crete, Greece*
Quantum operations induced by classical randomness

Friday, 23 June 2006

23 June 2006

09:30 - 10:10	**M. MOSCA** / *Univ. Waterloo, Dept. of C&O, Waterloo, Ontario, Canada* **Self-testing of quantum circuits**
10:10 - 10:50	**A. JAMIOLKOWSKI** / *Nicholas Copernicus Univ., Inst. of Physics, Torun, Poland* **Comparison of some methods of quantum state tomography**
10:50 - 11:20	--- Coffee break ---
11:20 - 12:00	**C.K. KING** / *Northeastern Univ, Dept. Mathematics, Boston, MA, U.S.A.* **Review of multiplicativity results for product maps**
12:00 - 12:40	**M.B. RUSKAI** / *Tufts University, Medford, MA, U.S.A.* **Pauli diagonal channels constant on axes**
12:40 - 14:30	--- Lunch Break ---
14:30 - 15:10	**T. KRUEGER** / *TU Berlin, Fach. Mathematik, Berlin, Germany* **Typical subspaces for quantum sources and applications**
15:10 - 15:50	**C.L. VIVIESCAS** / *MPI Complex Systems, Dresden, Germany* **Unravelling entanglement**
15:50 - 16:20	--- Coffee break ---
16:20 - 16:40	**C. MORA** / *Univ. Innsbruck, Theoretische Physik, Innsbruck, Austria* **Quantum Kolmogorov complexity**
16:40 - 17:00	**M. PIANI** / *Univ. Gdansk, Inst. Theoretical Physics & Astrophysics, Gdansk, Poland* **Inseparability criteria based on matrices of moments**
17:00 - 17:15	**CLOSING REMARKS**