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Report on the Benasque session on Quantum Information

The Benasque Center for Science has organized a session on Quantum Information partially financed by the **Quiprocone**. Here follows the report on the scientific activities that took place during the session and the final budget.

Title: QUANTUM INFORMATION

Dates: 22nd of June to 11th July 2003

Place: Centro de Ciencias de Benasque, Benasque, Spain.

Coordinators: Prof. Ignacio Cirac. Max Planck Institute, Munich, Germany
Prof. Artur Ekert. Cambridge University, United Kingdom.

Participants: The number of participants in the meeting was 86, coming from institutions of 20 different countries. The names of the participants and the institutions are given below.

Activities: The session was organized around a reduced number of talks and discussion groups. All scientific activity, including titles of talks and participants, can be found at the web page: <http://benasque.ecm.ub.es/main/sessions.htm#2003> as well as in the below.

Cost: The total cost of the meeting has been:

Support for 2 Coordinators	3.500 €
Support for 3 Organizers	3.900 €
Support to 86 participants	12.000 €
Secretary	2.800 €
System manager	1.800 €
Bus Barcelona-Benasque-Barcelona	1.200 €
Computers	1.300 €
General expenses	2.000 €

Total	28.500 €

Quiprocone contribution: 19000 €

2003 Quantum Information Talks

Monday, June 23

- **General Meeting**
11h, Casa de la Cultura
-

Tuesday, June 24

- Hans BRIEGEL
Graph states and their applications
12:30, Seminar Room (School)
-

Wednesday, June 25

- Guifré VIDAL
**Entanglement, quantum critical phenomena
and efficient simulation of quantum dynamics**
12:30, Seminar Room (School)
-

Thursday, June 26

- Mary Beth RUSKAI
If not Schmidt, then who? (15 minutes of remarks)
followed by
Wolfgang DÜR
**Stability of macroscopic entanglement
under decoherence**
18:30, Seminar Room (School)
-

Friday, June 27

- Igor VOLOVICH
**Spatial correlations of entangled states
and EPR-Bell experiments**
(Quantum information in space and time)
12:30, Seminar Room (School)
 - Masato KOASHI
**Unconditional security
of B92 quantum key distribution**
18:30, Seminar Room (School)
-

Monday, June 30

- Juan Pablo PAZ
**How to measure expectation values
of arbitrary operators**
12:30, Seminar Room (School)
-

Tuesday, July 1

- Otfried GÜHNE
Characterizing entanglement

via uncertainty relations
12:30, Seminar Room (School)

- Viv KENDON
Quantum walks on general graphs
18:30, Seminar Room (School)
-

Wednesday, July 2

- Jonathan OPPENHEIM
**Local/Non-local complementarity,
phase transitions and information space**
12:30, Seminar Room (School)
 - Giacomo Mauro D'ARIANO
Universal observables
18:30, Seminar Room (School)
-

Thursday, July 3

- David DiVINCENZO
**Will quantum information processing
ever really happen?**
12:30, Seminar Room (School)
-

Friday, July 4

- Howard BARNUM
Generalized entanglement
12:30, Seminar Room (School)
-

Monday, July 7

- Discussion group: **Spin chains and beyond**
Chair: Guifré VIDAL
17:00, Seminar Room (School)
-

Tuesday, July 8

- Mary Beth RUSKAI
Equivalence of additivity questions
12:30, Seminar Room (School)
 - Robert RAUSSENDORF
Quantum algorithms and graphs
18:30, Seminar Room (School)
-

Wednesday, July 9

- Debbie LEUNG
On state randomization and its applications
12:30, Seminar Room (School)
-

Thursday, July 10

- Masanao OZAWA
**Uncertainty relations
and the limits on quantum computation**
12:30, Seminar Room (School)
- Pawel HORODECKI
Hashing inequalities and their consequences
13:00, Seminar Room (School)

2003 Quantum Information Participants

Acín, Antonio (Univ. Politécnica de Cataluña, Spain)
Asorey, Manuel (Univ. Zaragoza, Spain)
Barnum, Howard (Los Alamos National Laboratory, USA)
Barret, Jonathan (Univ. Libre de Bruxelles, Belgium)
Bartlett, Stephen (Macquarie Univ., Sydney, Australia)
Beige, Almut (Imperial College, London, United Kingdom)
Bergli, Joakim (Univ. Oslo, Norway)
Berry, Dominic (Macquarie Univ., Sydney, Australia)
Blume-Kohout, Robin (LANL, Univ. California, Berkeley, USA)
Briegel, Hans (Univ. Munich, Germany)
Bruss, Dagmar (Univ. Hannover, Germany)
Cabello, Adán (Univ. Sevilla, Spain)
Calarco, Tommaso (NIST, Gaithersburg, USA)
Calsamiglia, John (ITAMP, Univ. Harvard, USA)
Carollo, Angelo (Imperial College, London, United Kingdom)
Carteret, Hilary (Univ. Waterloo, Canada)
Cirac, Ignacio (Max Planck Inst., Garching, Germany)
Collins, Daniel (GAP, Univ. Geneva, Switzerland)
Côté, Robin (Univ. Connecticut, USA)
Cubitt, Toby (Max Planck Inst., Garching, Germany)
D'Ariano, Giacomo Mauro (Univ. A. Volta, Pavia, Italy)
DiVincenzo, David (Watson Center, IBM, USA)
Duer, Wolfgang (Univ. Ludwig-Maximilians, Munich, Germany)
Eisert, Jens (Iniv. Postdam, Germany)
Ekert, Artur (Univ. Oxford, United Kingdom)
Emerson, Joseph (Massachusetts Inst. Technology, USA)
Ericsson, Marie (Univ. Urbana, USA)
Facchi, Paolo (Univ. Bari, Italy)
Fillips, Radim (Palacky Univ. Olomouc, Czech Republic)
Fuentes-Guridi, Ivette (Perimeter Ins., Waterloo, Canada)
Galvao, Ernesto (Perimeter Ins., Waterloo, Canada)
Georgeot, Bertrand (Univ. Paul Sabatier, France)
Giedke, Geza (Univ. Stuttgart, Germany)
Horodecki, Pawel (Univ. Gdansk, Poland)
Ionicioiu, Radu (ISI, Inst. Scientific Interchange, Italy)
Janzing, Dominik (Univ. Karlsruhe, Germany)
Kendon, Viv (Imperial College, London, United Kingdom)
Kim, Jaewan (Korea Inst. Advanced Studies, Korea)
Koashi, Masato (Univ. Bristol, United Kingdom)
Kraus, Barbara (Univ. Innsbruck, Austria)
Kwek, Leong-Chuan (Nanyang Technological Univ., Singapore)
Latorre, José Ignacio (Univ. Barcelona, Spain)
Lee, Hyuk-jae (Inst. Quantum Information, Seoul, Korea)
Leuenberger, Michael (Univ. Iowa, USA)
Leung, Debbie (Caltech, USA)

Lo Presti, Paoloplacido (Univ. A. Volta, Pavia, Italy)
Macchiavello, Chiara (Univ. Pavia, Italy)
Manne, Kiran K. (Univ. New Mexico, USA)
Markham, Damian (Imperial College, London, United Kingdom)
Martín-Delgado, Miguel Ángel (Univ. Complutense de Madrid, Spain)
Masanes, Lluís (Univ. Barcelona, Spain)
Mejía Monasterio, Carlos (Univ. Insubria, Italy)
Montangero, Simone (Scuola Normale Superiore Pisa, Italy)
Muñoz-Tapia, Ramón (Univ. Autónoma Barcelona, Spain)
Ollivier, Harold (INRIA, France)
Omar, Yasser (Univ. Oxford, United Kingdom)
Oppenheim, Jonathan (Racah Ins. Physics, Israel)
Orús, Roman (Univ. Barcelona, Spain)
Otfried, Guehne (Univ. Hannover, Germany)
Ozawa, Masanao (Tohoju Univ., Japan)
Pachos, Jiannis (Imperial College, London, United Kingdom)
Palma, G. Massimo (Univ. Milan, Italy)
Pascual, Pedro (Univ. Barcelona, Spain)
Paz, Juan Pablo (Los Alamos National Lab., USA)
Pironio, Stefano (Univ. Libre de Bruxelles, Belgium)
Popescu, Anca (Univ. Cambridge, United Kingdom)
Poulin, David (Univ. Waterloo, Canada)
Raussendorf, Robert (Univ. Munich, Germany)
Reina, John Henry (Univ. Oxford, United Kingdom)
Reznik, Benni (Tel-Aviv Univ., Israel)
Rico, Enrique (Univ. Barcelona, Spain)
Rudolf, Oliver (Univ. Pavia, Italy)
Ruskai, Mary Beth (Univ. Massachusetts Lowell, USA)
Sacchi, Massimiliano (Univ. A. Volta, Pavia, Italy)
Sanders, Barry (Macquarie Univ., Australia)
Santos, Marcelo (Imperial College, London, United Kingdom)
Solano, Enrique (Max Planck Inst., Garching, Germany)
Terhal, Barbara (Watson Center, IBM, USA)
Terra Cunha, Marcelo de Oliveira (Univ. Federal Minas Gerais, Brazil)
Tian, Lin (Univ. Innsbruck, Austria)
Toth, Geza (Max Planck Inst., Garching, Germany)
Venegas-Andraca, Salvador (Univ. Oxford, United Kingdom)
Vidal, Guifré (Caltech, USA)
Volovich, Igor (Steklov Mathematical Inst., Russia)
Wei, Tzu-Chieh (Univ. Illinois at Urbana-Champaign, USA)
Wolf, Michael (Max Planck Inst., Garching, Germany)
Zalka, Christof (Univ. Waterloo, Canada)
Zurek, Wojciech (Los Alamos National Lab., USA)

Support staff:

Rifà, Raquel (Secretary)
Aguado, Miguel (System Manager)

Yours sincerely,

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