

7th European QIPC Workshop

Quantum Information Processing and Communication

$$|\Phi^+\rangle = \frac{1}{\sqrt{2}}(|0\rangle_A \otimes |0\rangle_B + |1\rangle_A \otimes |1\rangle_B)$$

$$|\Psi^+\rangle = \frac{1}{\sqrt{2}}(|0\rangle_A \otimes |1\rangle_B + |1\rangle_A \otimes |0\rangle_B)$$

$$|\Phi^-\rangle = \frac{1}{\sqrt{2}}(|0\rangle_A \otimes |0\rangle_B - |1\rangle_A \otimes |1\rangle_B)$$

$$|\Psi^-\rangle = \frac{1}{\sqrt{2}}(|0\rangle_A \otimes |1\rangle_B - |1\rangle_A \otimes |0\rangle_B)$$

Physics and Computer Science united for QIPC

13 and 14 October 2006
The Royal Society, London, UK



Organized by the QIPC Proactive Initiative
Future and Emerging Technologies
DG INFSO, European Commission



Programme Committee

Chairman: Artur Ekert

Harry Buhrman, Philippe Grangier, Martin Plenio, Miklos Santha,
Peter Zoller, Ian Walmsley, Goran Wendin

First announcement of 21/04/2006

Concept

The program pairs speakers (physics, computer science) who speak in simple terms on a specific theme from two different perspectives.

There will be a permanent poster display during the meeting.

The European QIPC Workshop is an annual event organized by the European scientific community and the QIPC Proactive Initiative of FET, DG INFSO, European Commission. This year the workshop is sponsored by the project "Structuring the ERA with Quantum Information Science and Technology". Participants of all QIPC FET projects are encouraged to attend the workshop and to submit posters. The afternoon of the first day will be dedicated to a kick-off meeting of the project QUROPE and to a session on strategy and planning of the QIPC proactive initiative. Everybody is very welcome to attend.

Tentative program

Friday 13 October

▶ 9h00 – 9h30: Arrival and coffee

▶ 9h30 – 10h30:

[Scott Aaronson](#) (University of Waterloo, Ontario, CA) and [Dave Bacon](#) (University of Washington, Seattle, WA, USA) - *What have I learned from physicists/ computer scientists and what else would I like to learn from them?*

▶ 10h30 – 11h30:

[Dan Gottesman](#) (Perimeter Institute in Waterloo, Ontario, CA) - *Error corrections, fault tolerance, threshold results and their relevance to experimentalists.*

[Hartmut Häffner](#) (Institute for Quantum Optics and Quantum Information of the Austrian Academy of Sciences, Innsbruck, AT) - *Experimental perspective on the above.*

▶ 11h30 – 12h30:

Speaker to be announced

Gavin Brennen (IQOQI, Innsbruck, AT) - *Implementing spin models à la Kitaev with quantum optical systems.*

▶ 12h30 – 14h00: Lunch (not provided)

▶ 14h00 – 15h00:

[Antonella Karlson](#) (FET, DG INFOS, European Commission, Brussels, BE) – *Strategy and planning of the QIPC Proactive Initiative. Presentation and discussion on the latest updates of the roadmap.*

▶ 15h00 – 17h00:

[Eugene Polzik](#) (Niels Bohr Institute, University of Copenhagen, DK) – *Kick-off meeting of the coordination action QUROPE ‘Quantum Information Processing and Communication in Europe’.*

▶ 17h00 – 19h00: Coffee and poster session

▶ 19h00 – 22h00: Dinner

Saturday 14 October

▶ 9h00 – 9h30: Coffee and poster session

▶ 9h30 – 10h30:

Panel meeting – *Discussion chaired by Scott Aaronson and Dave Bacon.*

▶ 10h30 – 11h30:

[Michael Wolf](#) (Max-Planck-Institut für Quantenoptik, Garching, DE) - *Ground states via PEP and their importance for physics.*

[Richard Jozsa](#) (University of Bristol, UK) - *MPS PES and quantum circuits.*

▶ 11h30 – 12h30:

▶ [Dorit Aharonov](#) (Hebrew University Jerusalem, Israel) - *Adiabatic quantum computation.*

▶ [Jens Siewert](#) (University of Regensburg, DE)- *Adiabatic computation with Josephson circuits.*

▶ 12h30 – 14h00: Lunch (not provided)

▶ 14h00 – 15h00:

[Nicolas Gisin](#) (University of Geneva, CH)- *How communication complexity changed the culture of the foundations of Quantum Mechanics and the concepts related to the Bell inequalities.*

[Stephanie Wehner](#) (CWI, Amsterdam, NL) – *The computer science view on communication complexity.*

▶ 15h00 – 16h00:

▶ [Immanuel Bloch](#) (Mainz University, DE) – *The future of quantum technologies, our abilities and limitations to control nature at quantum level.*

▶ *[Umesh Vazirani](#) (University of California at Berkeley, CA, USA) - *How "quantum" fits in the future of computer science.*

▶ 16h00 – 17h00:

Panel meeting – *Discussion and conclusions*

▶ 17h00 – 18h00: Coffee and poster session

(* = speaker to be confirmed)

Thursday 12 and/or Sunday 15 October

A suitable venue at Imperial College will be available for individual satellite meetings of the three integrated projects in the QIPC proactive initiative. For more information please contact directly the respective IP coordinator: **SCALA**: Philippe Grangier (philippe.grangier@iota.u-psud.fr), **QAP**: Ian Walmsley (walmsley@physics.ox.ac.uk) and Martin Plenio (m.plenio@imperial.ac.uk), **EuroSQIP**: Göran Wendin (goran.wendin@mc2.chalmers.se).

SCALA: date, time and place to be announced

QAP: Thu 12 Oct., time and place to be announced

EuroSQIP: date, time and place to be announced

General Information

Participants must register by filling an on-line form on the web site of [ERA Pilot QIST](#) which will become available no later than May 15. A registration fee of 75€ is required to cover the conference dinner and other small organizational expenses. Meeting room facilities and coffee breaks are covered by the project ERA Pilot QIST.

Participants must make their own arrangements for accommodations and lunches. Currently active FET QIPC projects can pay the travel and living expenses, as well as the registration fee for their respective consortium members.