QCS project

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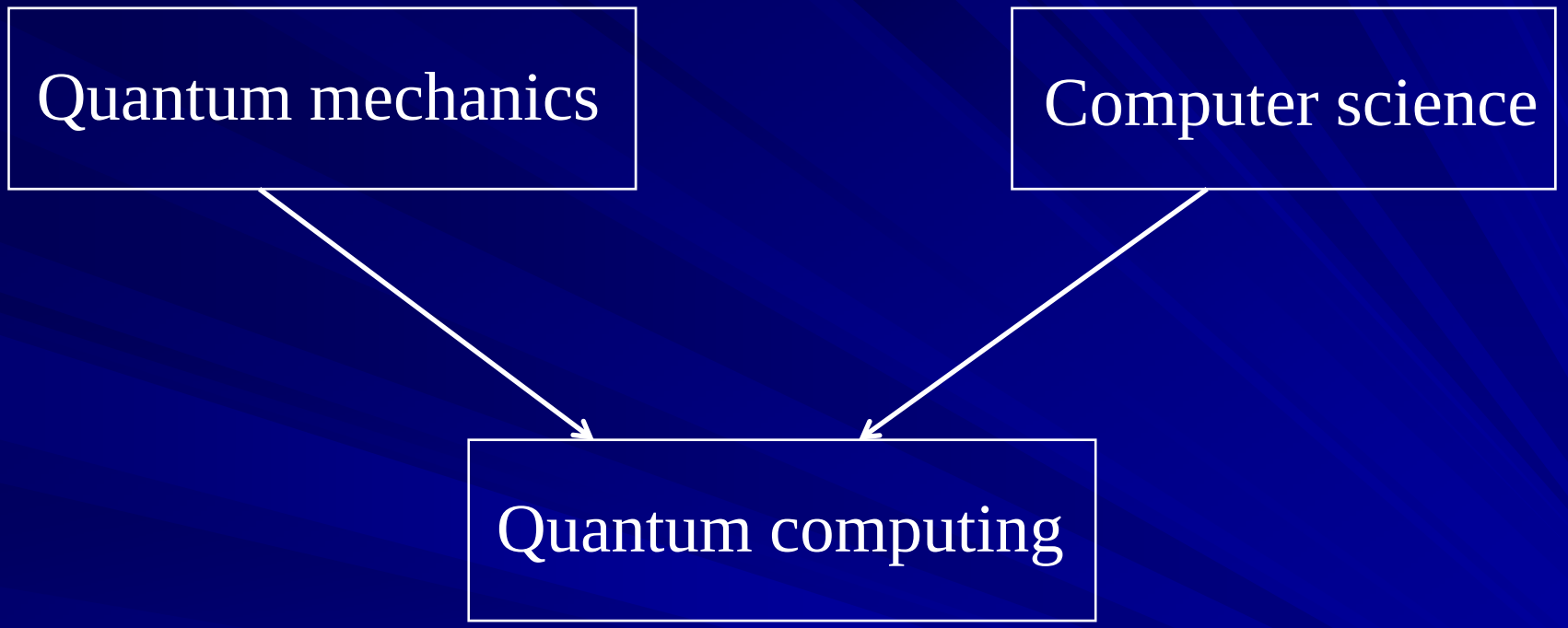
QCS project

- QCS = “Quantum Computer Science” (“Kvantu datorzinātne”);
- September 1, 2010 – August 31, 2013.
- 1.678 mln euros/3 years.
- 8 partners, University of Latvia as coordinator.

QCS partners

1. University of Latvia - coordinator;
2. University of Bristol (UK);
3. Cambridge University (UK);
4. University of Paris VI (France);
5. Centrum Wiskunde & Informatica (Netherlands);
6. Tel Aviv University (Israel);
7. Universite Libre de Bruxelles (Belgium);
8. Institut de Ciences Fotoniques (Spain);

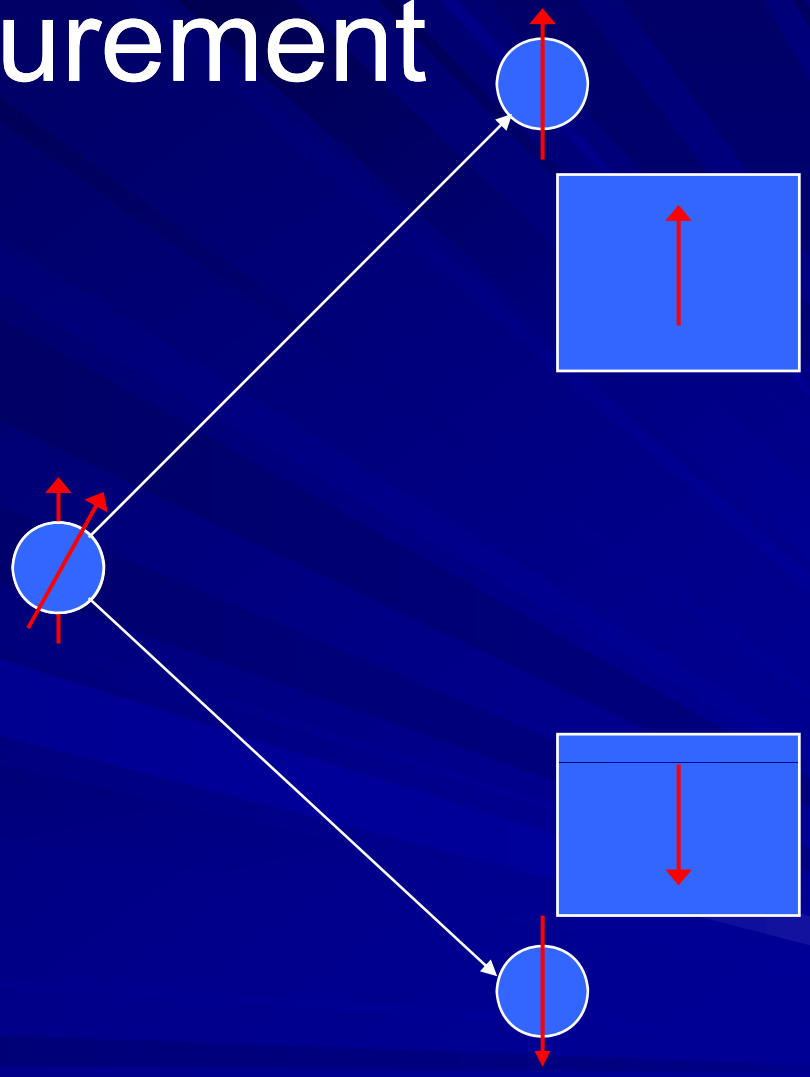


Using quantum effects for computing and communication.

Quantum mechanics

- Measuring a quantum state changes it.

Measurement



This property can be used for secure communication.

Quantum cryptography devices

MagiQ Technologies

Toshiba

- Secure quantum communication over an optical cable.
- 1Mb/s at 20km distance.
- 10 kb/s at 100 km distance.

Quantum computing

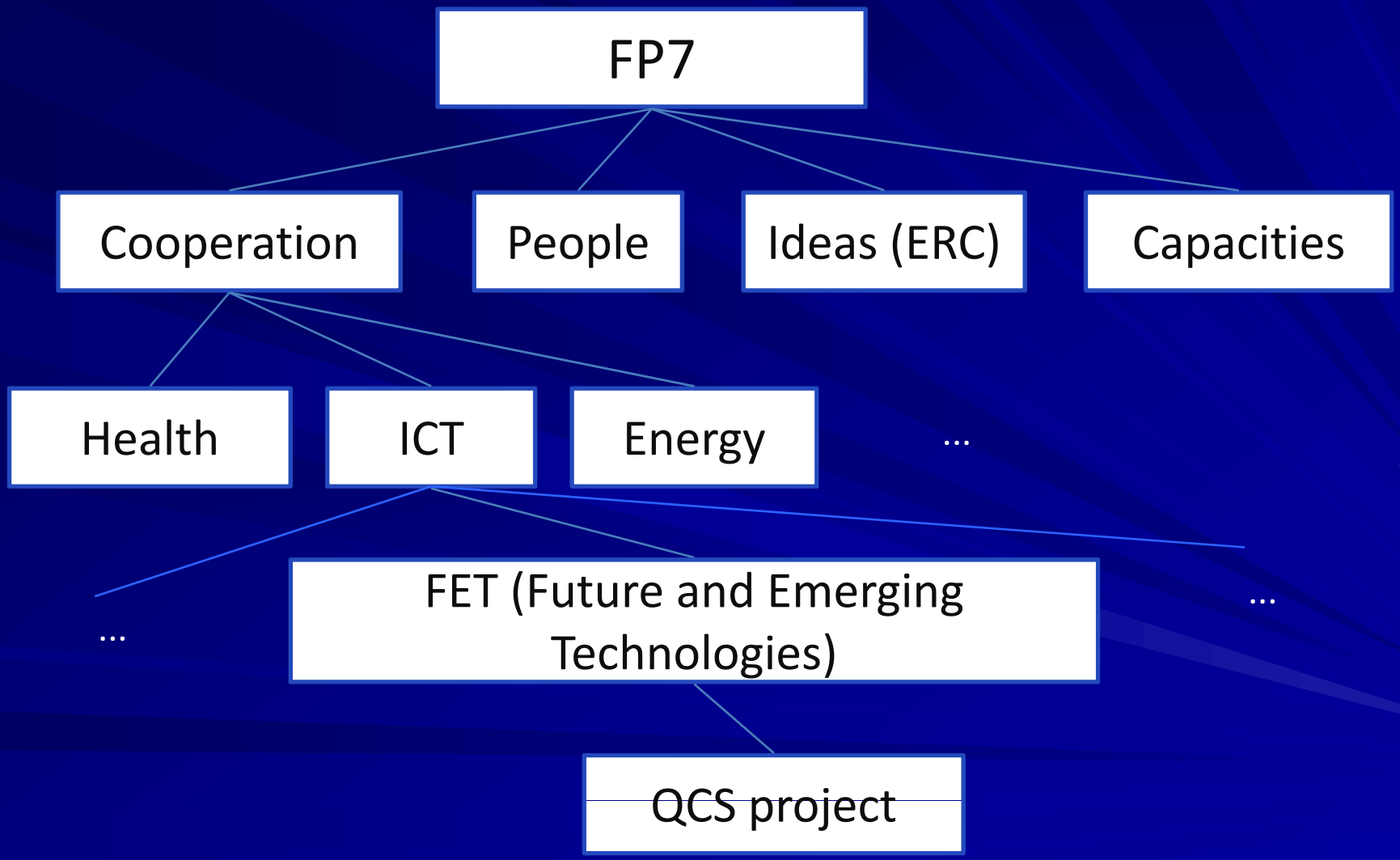
- Encode 0 and 1 into quantum states (e.g. nuclear spins).
- Compute by manipulating the quantum states.
- Can be much faster than conventional computing.

Our project

- WP1 Algorithms for quantum computing;
- WP2 Algorithmic issues in quantum communication;
- WP3 Tools for quantum and classical computer science;

What can we do with a quantum computer when we build it?

FP7 structure



FET (Future and Emerging Technologies)

- FET – long-term research in the area of information and communication technologies.
- Basic research inspired by real-world challenges.

FET

FET (Future and Emerging Technologies)

FET Proactive

- Quantum ICT,
- Molecular Scale Devices and Systems,
- Brain-Inspired ICT,
- Minimizing energy consumption,
- ...

FET Open

Any topic related to ICT

QCS project

FET Open

- **Challenging current thinking:**
  - Foundational breakthroughs towards new forms and uses of ICT;
  - Novelty comes from new, high-risk ideas;
  - New inter-disciplinary collaborations.

Other FET Projects

ARTIST	Alternative Routes Towards Information Storage and Transport at the Atomic and Molecular Scale
BRAIN-I-NETS	Novel Brain-Inspired Learning Paradigms for Large-Scale Neuronal Networks
CG Learning	Computational Geometric Learning
FOC-II	Forecasting Financial Crises
FORMATH	Formalisation of Mathematics
...	...

Application procedure

- FP-7-ICT-2011-C;
- Stage 1: 5-page anonymous proposal.
- Stage 2: full proposal.
- Success rate: about 7%.

Our application history

- Attempt 1: QUALITY (coordinated by University of Gdansk, May 2009): stage 1. 3.3/5
- Attempt 2: QACC (coordinated by University of Latvia, Jan 2010): stage 2. 4.0/5
- Attempt 3: QCS (coordinated by University of Latvia, May 2010): funded. 4.8/5

Lessons for other projects

1. FP7 provides funding for both applied and basic research;
2. High-quality partners are very important;
3. Feedback from reviewers can be very useful.
4. NCP can be very useful.