



COST

Ion Traps for Tomorrow's Applications

MP1001

Start date: 06/12/2010

End date: 05/12/2014

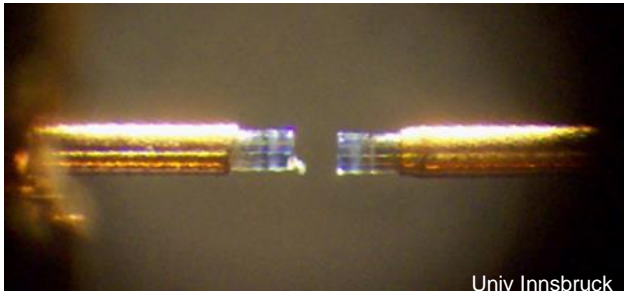
Year: 4

Martina Knoop

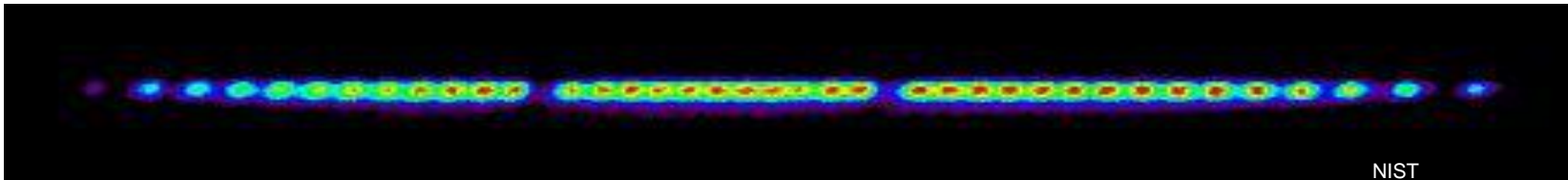
Chair

CNRS-Université d'Aix-Marseille / France

Manipulating individual atoms



Study of underlying quantum concepts for tomorrow's applications



Some applications

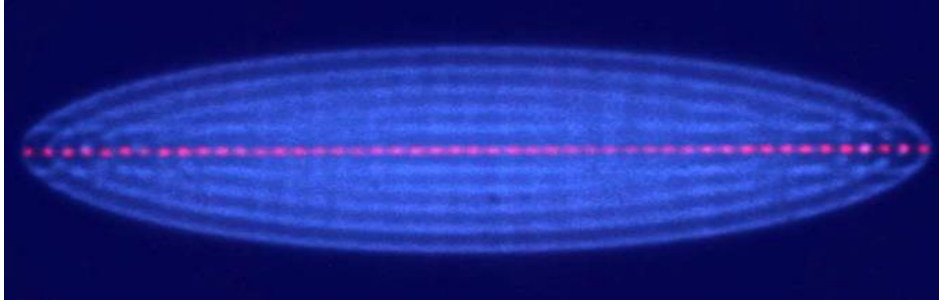
Atomic clocks → GPS, Galileo

Rare and exotic ions → hostile environments

Trace gas analysis → doping control

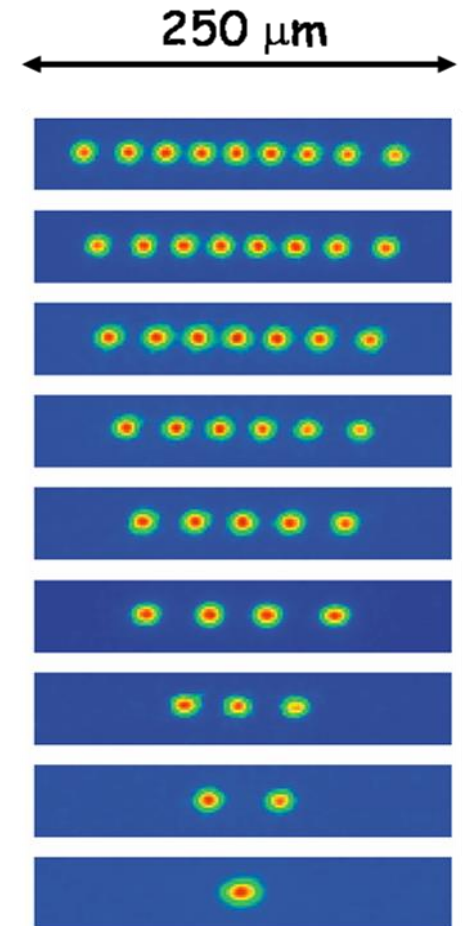
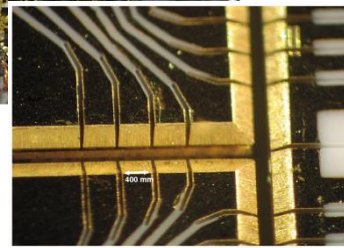
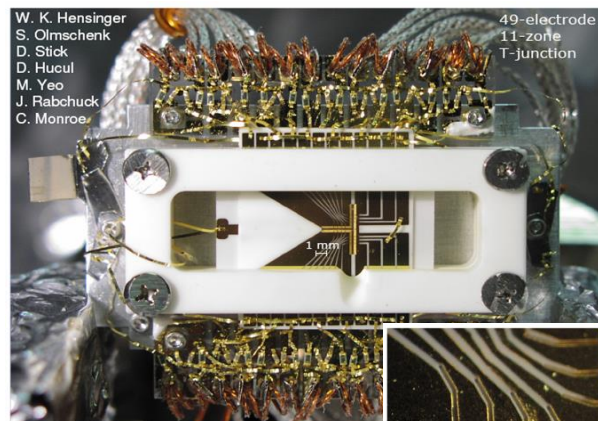
Scientific context and objectives

(1/2)



Indispensable for research and applications

- Various dimensions of sample and/or trap size
- Multiplication of qubits
- Study of finite-size effects
- Laser interaction
- Ultra-cold chemistry
- Quantum sensors
- ...





Scientific context and objectives

(2/2)

Research directions:

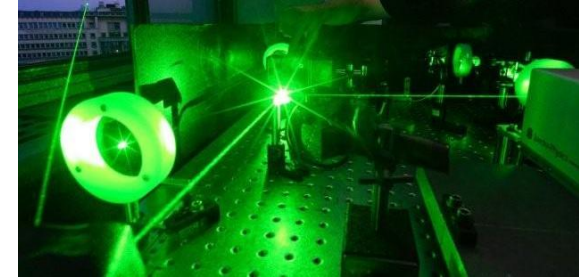
- Organize “unusual” workshops, ie with a wider and/or neighbouring community, on technical topics, with increased interaction.
- New approaches in quantum information (integrated quantum sensors, molecular qubits, ..)
- Experiments involving Highly-Charged Ions/large facilities and quantum approaches
- Ultrafast protocols for quantum measurements
- Dedicated technical sessions on common material (rf electronics, data acquisition, laser..)

Working groups

WG +junior WG leader

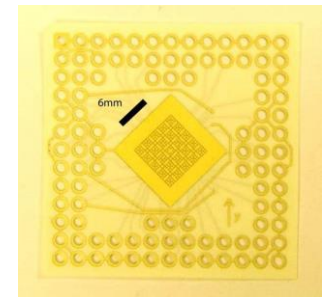
1. Working group **Technology**

- Technical developments, contacts to industry



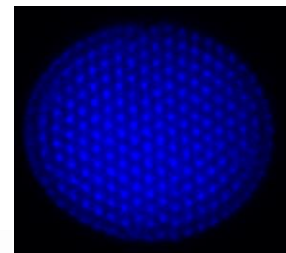
2. Working group **Various Scales**

- Micro- and nanotraps for various applications



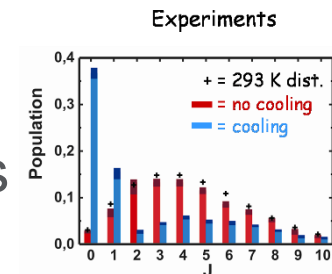
3. Working group **Interaction with EM radiation**

- Proposing novel interrogation protocols



4. Working group **Cold Molecular Ions**

- large overlap with neighboring communities





Results vs. Objectives

- Increasing number of bi- and multilateral collaboration projects in order to tackle hands-on questions (quantum simulation, quantum sensors, new routes in cold chemistry, ..)
- More and more interdisciplinary (physics/chemistry; QIP/molecules; microfabrication/quantum physics; ...)
- FET Proactive “Quantum technologies” and “Time for time”
- Network-based added value
 - Training events (number of lecturers and students)
 - Increasing number of collaborative publications (+ special volumes)
 - A common reflection on promotion and dissemination
 - International visibility

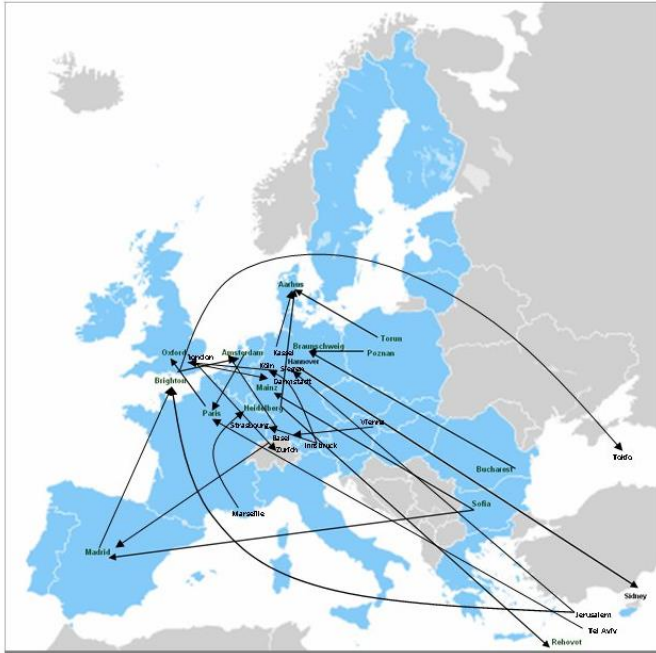


Significant Highlights in Science and Networking (1/4)

Some hot topics in Science 2013/14

- Mass spectrometry to unprecedented precisions (benchmarks for nuclear models)
- Hybrid systems (neutrals-ions)
- Integration of microtraps

Significant Highlights in Science and Networking (2/4)



Increasing number of STSMs

1st family-friendly STSM !

The Ion Trapper's News

e
4)

Dear all,

our Network has added many collaborative aspects to Ion Trapping, and we would like to go further by realizing a short promotional movie which will be at your disposal. The idea is to transmit a message, why it is important, exciting, original, innovative, and fun to work with trapped ions. Part of the movie will be realized at the ECTI conference, and we would like to put forward PhD students and postdocs to be the actor of this. So, if you are a young researcher, and will be attending ECTI, please contact me, so that we can prepare your participation.

Moreover, all groups are very welcome to send photos, videos, or other material, that we can include, so that we do not only have faces, but also some experiments in view. Please feel free also to send any comment or suggestion. I would be happy to receive your contributions by 27 August 2014.

Have a nice summer,
Martina

News

With a little delay, we welcome Dave Kielpinski's group at Griffith University, Brisbane, Australia, as official member of our COST Action !

New COST Action on Nanoscale Quantum Optics http://www.cost.eu/domains_actions/mpns/Actions/MP1403

Events

ECTI, ECTI, ECTI, ECTI - the largest Ion Trapper meeting this year !
15- 19 September 2014. Check the [website](#).

11th International Workshop on Non-Neutral Plasmas, 4-4 Dec 2014, Tokmetov

Mor

The

COS



Significant Highlights in Science and Networking (4/4)

Bi-annual Ion Trapper Conference



Schloss Waldthausen, Mainz, Germany

- 15-19 September 2014
- 150 participants, > 70 % ESR
- THE reference in the domain,
- large international participation



Future Plans

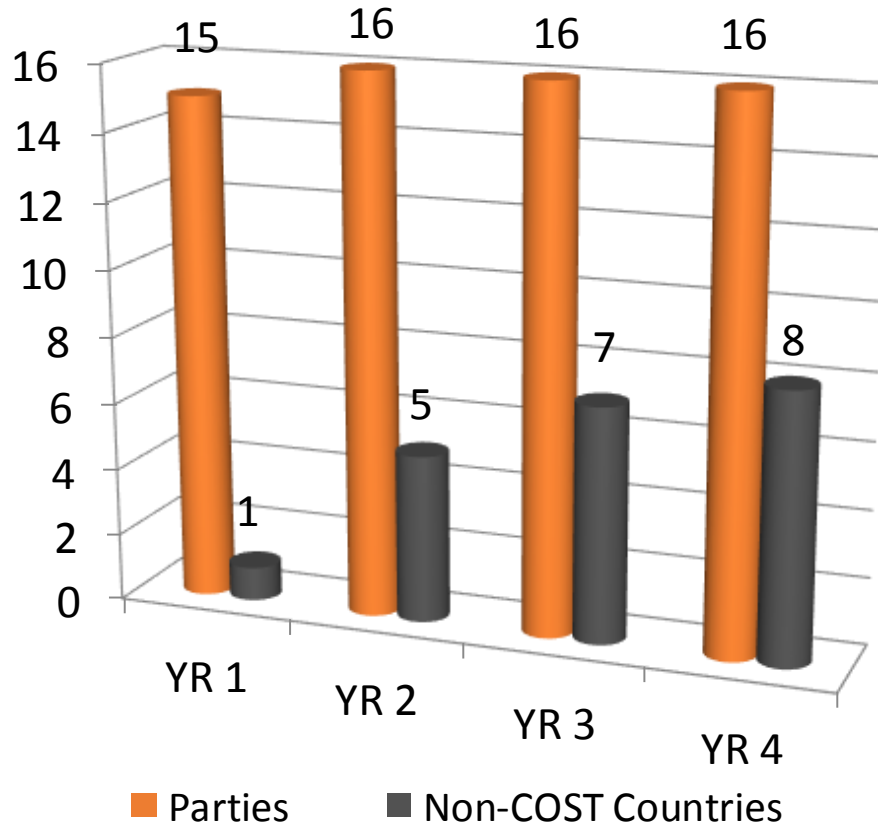
- Final evaluation workshop in November
- Promotional movie in preparation
- Future of workshop “series”
- Closer contact to companies
- Discussion about H2020 plans



Appendix

- The following three slides should be prepared for information only in case of questions from the DC but should NOT be presented

Action Parties

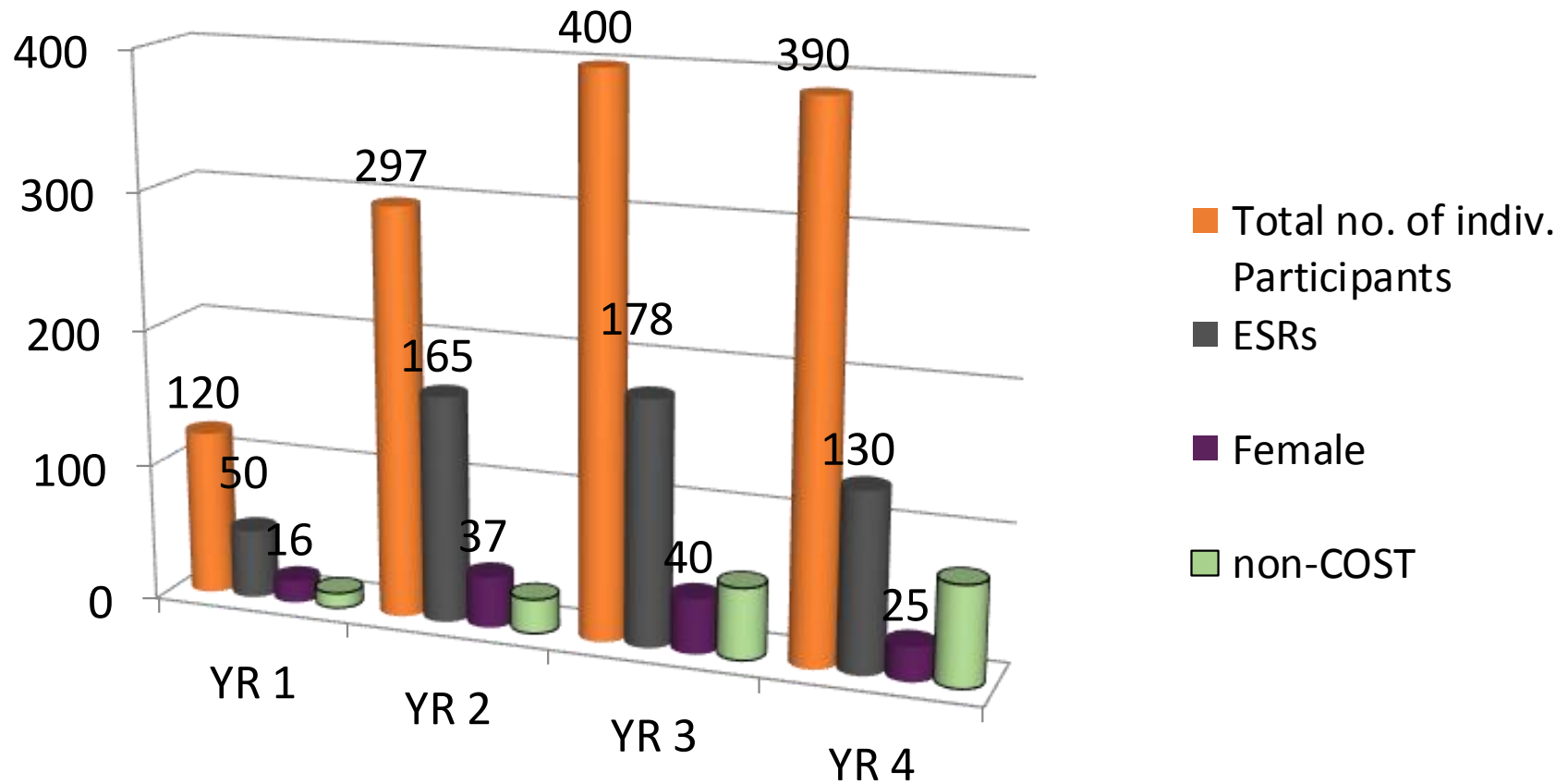


Grant Holder (if applicable):

Université d'Aix-Marseille
Prof Yvon Berland
France

**AT, BE, BG, CH, DE, DK, ES, FI, FR, IL, IT,
NL, PL, PT, RO, UK**

Action participants



Use of COST Instruments

Activity (No.)	Year 1	Year 2	Year 3	Year 4
MC/WG Meetings	2	2	3	4
STSMs	6	7	10	8+
Training Schools	1	1	1	0
Workshops or Conferences	2	2	3	1
Joint Publications	11	10+ and special issue	25+ and special issue	30+ and two lecture books