



International Conference on Ultralow Temperatures ULT 2014

Conference Report

ULT 2014 - Frontiers of Low Temperature Physics, was held in San Carlos de Bariloche, Argentina, from August 14th to 19th, following the International Conference on Low Temperature Physics LT25 held in Buenos Aires. Both conferences are held every 3 years, usually in developed countries, thus limiting the access of emerging countries researchers. This is the first time that LT and ULT took place in South America, an event of great importance to the scientists involved in Low Temperature research in this large region of the Southern hemisphere.

The 2014 edition of “ULT” has been organized by scientists of the Institut Néel - CNRS (France) and the Low Temperature Laboratory of the Comisión Nacional de Energía Atómica (Argentina), with the support of the Instituto Balseiro and the Fundación José A. Balseiro (San Carlos de Bariloche, Argentina).

The event was sponsored by the Ministerio de Ciencia, Tecnología e Innovación Productiva - Programa Raices, the International Union of Pure and Applied Physics (IUPAP), the Low Temperature Section of the European Physical Society - Condensed Matter Division, the Microkelvin Collaboration (EU-FRP7 Program), and Institut Néel - CNRS (France).

The aim of this conference is to discuss new physics in condensed matter systems at temperatures below 1 Kelvin, to identify new research directions, and to discuss technical challenges and innovations. It brings together a broad community of researchers, forging links between different experimental communities, as well as between experimentalists and theorists.

The conference topics included Quantum fluids and solids, Quantum matter at ULT, Quantum phase transitions, Quantum crystals, Quantum turbulence, Nanostructures at low temperatures, Thermometry and temperature scales, Cryogenic ULT techniques.

ULT 2014 welcomed 71 participants from 12 countries all over the world: Argentina (15), Austria (1), Czech Republic (1), Finland (4), France (5), Germany (2), Japan (14), Russia (3), Slovakia (2), South Korea (1), United Kingdom (15), and United States of America (8). The age of the participants was in the range 23 – 78, with 22 participants less than 30 years old (see graphics and table below).

There were 7 female researchers among the participants, 3 of them giving invited talks, and 1 chairing a session. The International Advisory Committee (listed below) did not include female members: female researchers of the ULT community are young, not yet leading research groups or laboratories. Note however, that we organise training courses (European Advanced Cryogenics courses “Cryocourse”) with a participation of female students approaching 50% in



2013, already contributing to change this situation. There were 3 female and 4 male members in the organizing committee of ULT 2014.

8 accompanying persons were present during ULT2014.

The booklet of contributions to ULT is attached to this document. The Conference included a Memorial session for John Wheatley, a distinguished member of the ULT community who dedicated many years of his life to the foundation of a Low Temperature laboratory in Bariloche, Argentina. Details can be found in the conference mirror web sites:

<http://fisica.cab.cnea.gov.ar/ult2014> and <http://ult2014.grenoble.cnrs.fr>

There were 33 invited speakers, including 3 for the Memorial session. Talks were organized by sessions, with 8 main presentations (45 mn), 30 talks (30 mn) and 15 short talks for poster's presentation. 15 posters were posted for the whole duration of the conference, and discussed actively during 2 lively poster sessions.

Many new results were presented at the ULT conference. Superfluid ^3He topics of interest were for instance the new phases found in nematically ordered aerogel or confined geometries, orbital dynamics, surface effects, Bose-Einstein condensation of magnons, fundamental non-linear phenomena in nano-mechanical oscillators and their application for quantum fluids studies, controlled generation of quantum turbulence, quantum phase transitions in two-dimensions, and last but not least, the new SQUIDS and noise thermometric methods which are radically changing the ULT experimental domain.

The conference could be realized with a small budget, 15.744,05 USD thanks to the grants provided by IUPAP and CNRS, as well as support from local institutions. From this budget, 7.469,02 USD were used to provide young and female researchers with financial support, mainly covering the staying expenses and local transportation. In addition, registration fees were waived for a total amount of 2.600,00 USD.

All requests for financial support could be satisfied, with the exception of two from a European Eastern country, where the whole travel and staying costs was needed as support. The registration fee was waived for 18 participants, students had a reduced fee of 100 USD, while the full registration fee was 200 USD. In addition, 15 participants received a grant covering their full staying expenses. Transportation from Llao-Llao (conference venue) from and to Bariloche airport (2*40 km) was arranged for free for practically all participants.

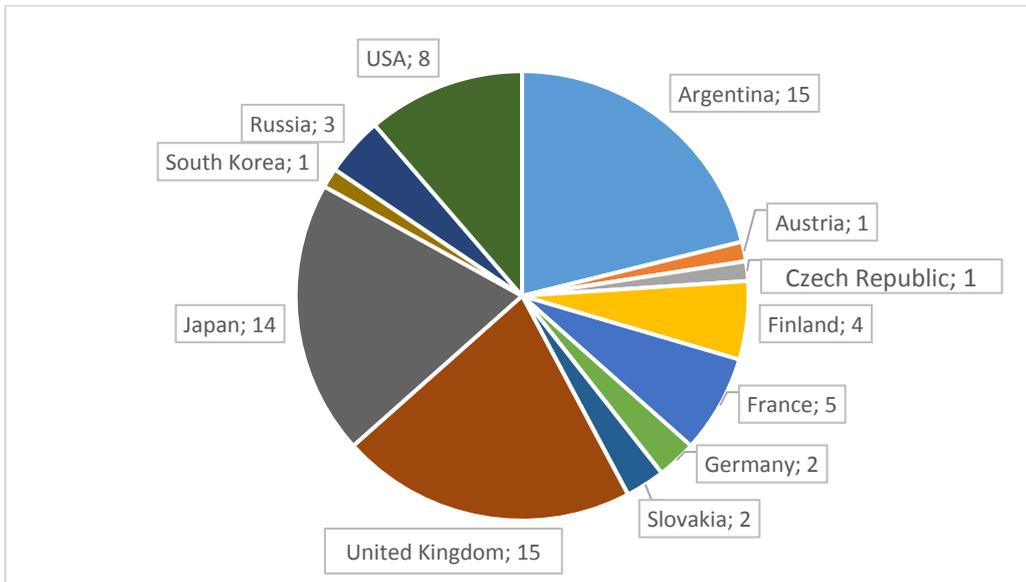
ULT2014 is grateful to the IUPAP for the 5.000 € grant, which was essential to organize the Conference. Since ULT 2014 had a positive balance, we shall dedicate the corresponding amount (3.164 USD) to support the participation of South American researchers to the next IUPAP C5 sponsored conferences.



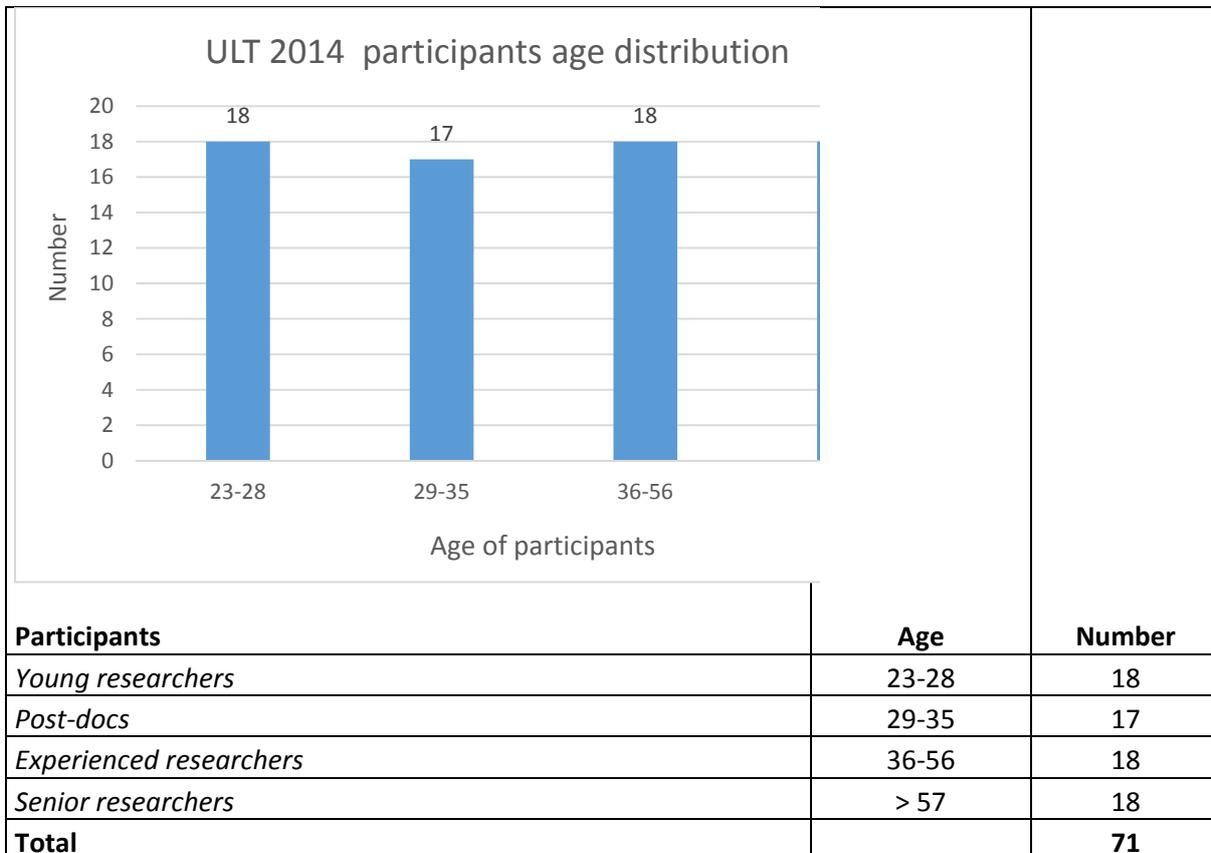
The number of participants (71) was well below our expectations. For instance, the Ultra-Low Temperature Conference ULT 2011 held in Korea had 204 participants, among them 144 from non-hosting countries. Since ULT 2014 was advertised adequately (all potential participants were contacted), the low participation appears to be the consequence of several causes:

- ULT was held for the first time in the South America, where the density of population and research laboratories is much lower than in Europe, North America, or Asia. There were 15 local participants in ULT2014, compared to 60 in ULT2011. This was foreseen, obviously.
- A “Cold Atoms” workshop was organized in Brazil at the same time as ULT2014. Its traditional topic of Quantum Gases was extended to cover some aspects of Quantum Fluids and Solids. Several distinguished members of our community were invited. Unfortunately, the organizers of the Quantum Gases Workshop were not aware of the traditional dates for the ULT conference series. The dates could not be changed, in spite of our efforts. Research groups had to split their between the conference ULT 2014 and the workshop QGFS, both satellites of LT27, with overlapping dates and subjects. We are working with the organizers of the next LT and ULT conferences and the Quantum Gases community to avoid such a problem in the future, three years from now.
- The world economy crisis has affected research budgets in many countries. There were few participants from the USA (8), probably due to travel budget issues. The cost of airline tickets has increased substantially in the last two years. In particular, low cost trips in August have almost vanished.
- Nevertheless, in spite of the very long travel distance, Japan participated actively to ULT 2014, with 14 delegates, and the EU participation (30) was quite good.
- It was not possible for researchers from low income countries of Europe and Asia to cover even a small fraction of the costs. This would have also been the case, however, if the conference has taken place in the USA, for instance.

The Conference, though smaller than usual, certainly gathered the core partners of the ULT community, with a good balance between senior and junior participants. We believe that ULT 2014 provided an excellent opportunity for high level scientific discussions, but also for training younger researchers. Finally, Argentina was well represented, with 15 participants, showing the importance of bringing the ULT conference to emerging countries.



ULT 2014 participants' distribution per country





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