COLD MOLECULAR IONS AT THE QUANTUM LIMIT

EVENTS

First Practical Course, School and Annual Meeting

The COMIQ Practical Course 1, School 1, and Annual Meeting 1 is going to take place **6–8 October 2014** at **University of Düsseldorf**, Germany. Local organiser is Prof. Stephan Schiller.

We are looking forward to see all COMIQ members (fellows as well as supervisors and associated members) at these events.

Detailed information can be found at:
http://itn-comiq.eu/events/

Topics of the course and school:

- Fundamentals of Ion Trapping and Cooling
- Fundamentals of Molecular Physics
- Advanced Trapping and Cooling Methods
- Molecular Dynamics (practical training)

FROM SCIENCE

First Nature article published within COMIQ

The COMIQ node at Aarhus University has in collaboration with the Max-Planck-Institut für Kernphysik (MPIK), Heidelberg, Germany, carried out the first helium buffer gas cooling experiments on molecular ions sympathetically cooled into a Coulomb crystal. The applied method constitutes a novel route to form cold and spatially localized molecular ions. The results, which has been published in Nature, open up for refined studies of molecules and molecular processes in a size-range spanning from the smallest diatomic molecular ions to complex molecules of biological relevance. In terms of science, the results are expected to have impact on such diverse fields as fundamental physics investigations, high-resolution spectroscopy of complex molecules, cold chemistry, astrochemistry, as well as biochemistry.

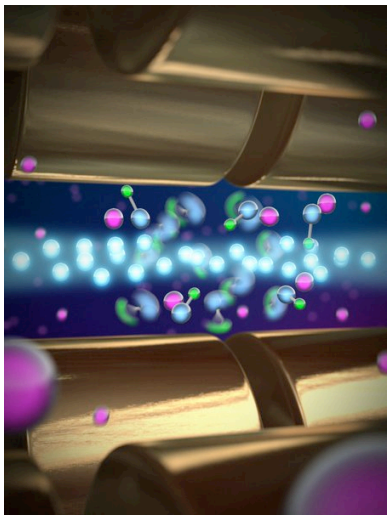

Illustration by Alex Gingell

Hansen, A. K. and Versolato, O. O. and Kłosowski, Ł. and Kristensen, S. B. and Gingell, A. and Schwarz, M. and Windberger, A. and Ullrich, J. and López-Urrutia, J. R. Crespo and Drewsen, M. **Efficient rotational cooling of Coulomb-crystallized molecular ions by a helium buffer gas** Nature **508** 76 (2014).
DOI: 10.1038/nature12996

COMIQ FELLOWS

10 out of 13 ESR positions have been filled as well as the ER position.


Michael DePalatis

Michael V. DePalatis, AU

The first employee of COMIQ joins the The Ion Trap Group of Prof. Michael Drewsen on 15 November 2013. Michael V. DePalatis holds the only position as Experienced Researcher (ER) in the network.

Michael V. DePalatis recently finished his PhD studies at Georgia Tech, Atlanta, USA, and has joined COMIQ as Experienced Researcher (ER). Michael will be overseeing training activities of the Early Stage Researchers (ESR) soon to join the network as well as setting up the wikisystem that will help the network reaching its ambitious training goals.


Kaveh Najafian

Kaveh Najafian, UNIBAS

Kaveh Najafian joins the group of Prof. Stefan Willitsch at University of Basel on 01 April 2014.

Kaveh Najafian received his Master's Degree in Physics and Astronomy from Chalmers University of Technology in Gothenburg, Sweden. There he investigated statistical decay-processes of carbon clusters in an electrostatic storage-ring as well as the spontaneous-decay from charged water clusters, the latter being the subject of his thesis. As part of Stefan Willitsch's group in Basel he will develop a toolbox for the coherent manipulation and precision spectroscopy of sympathetically cooled molecular ions such as N_2^+ in an ion trap.


Ibrokhim Iskanderov

Ibrokhim Iskanderov, UIBK

Ibrokhim Iskanderov joins group of prof. Franco Gianturco at University of Innsbruck on 01 June 2014.

I obtained my Master's degree at the University of Stuttgart in Germany. My Master thesis was in the field of Bose-Einstein condensation (BEC) where I investigated the dynamics of the BEC trapped in potential which possess parity and time-reversal symmetry (PT-symmetry). As being a part of COMIQ program under supervision of Professor Francesco Gianturco at the University of Innsbruck in Austria, my research will be in a close collaboration with experimental groups and will focus on numerical structure calculations as well as in development of existing numerical codes of various dynamical processes involving molecular ions and atoms such as CN-molecules and He-atoms.


Karin Fisher

Karin Fisher, AU

Karin joined the Ion Trap Group of Prof. Michael Drewsen, Aarhus University on 15 March 2014.

Karin Fisher recently obtained her Master of Science from ETH Zürich in Zürich, Switzerland. While in the Trapped Ion Quantum Information Group at ETH Zürich, Karin worked on the design and implementation of a system that was used to perform coherent state manipulations on trapped $^{40}Ca^+$. At Aarhus University, she joins the COMIQ Initial Training Network where, in the Ion Trap Group, she hopes to develop femtosecond laser techniques to address low-lying rotational transitions in MgH^+ as well as evaluate the possibility of using these states as qubit states.


Humberto da Silva

Humberto da Silva jr., CNRS/LAC

Humberto Jr. joins the group of Prof. Olivier Dulieu at CNRS Laboratoire Aimé Cotton on 17 March 2014.

Humberto received his master degree from the European Master in Theoretical Chemistry and Computational Modeling (EMTCCM), at the Universidad Autónoma de Madrid (UAM), under the Erasmus Mundus programme; working in the field of dynamics and fragmentation of excited molecular clusters (fullerenes and PAHs systems). At the COMIQ Initial Training Network, he joins as PhD student, the CNRS-node of Laboratoire Aimé Cotton (LAC)/Université Paris-Sud IX in the team of Dr. Olivier Dulieu, devoted to shed light on the electronic structure and dynamics of ultracold neutral/ionic molecular systems, i.e. their formation and destruction processes.


Ilia Sergachev

Ilia Sergachev, Alpes Lasers

Ilia Sergachev joins COMIQ under the supervision of Dr. Richard Maulini at Alpes Lasers SA as well at Prof. Stefan Willitsch at University of Basel on 01 April 2014.

Ilia Sergachev received his Master's degree in physics from Moscow State University, Russia, working on a spectral correlation based method for high precision optical measurements. He will develop quantum cascade lasers with specific properties at Alpes Lasers, Neuchâtel, Switzerland, while also taking part in Stefan Willitsch's group at University of Basel as a PhD student, where these lasers will be used for precision spectroscopy of cold molecular ions.


Milán János Negyedi

Milán János Negyedi, HighFinesse

Milán János Negyedi joins HighFinesse and University of Tübingen on 15 July 2014 under the supervision of Prof. József Fortágh.

My name is Milán János Negyedi. I have graduated from the Budapest University of Technology and Economics as a physicist. Previously I have worked as a research assistant at the university, in the field of laser (Photoluminescent and Raman) spectroscopy. I look forward to further develop my skills in optics. In my free time I like to read, play video games, and listen to rock music.


Alexander Dörfler

Alexander Dörfler, UNIBAS

Alexander Dörfler joins the group of prof. Stefan Willitsch in Basel on 1 August.

Alexander Dörfler received his Master's degree in physics from the University of Innsbruck, Austria. Working in the group of Univ. Prof. Dr. Wester he was investigating the photo dissociation of vibrationally excited molecules with the goal to verify the excited fraction in order to further study ion molecule reactions of vibrationally excited molecules using reactive scattering and velocity map imaging. Joining Stefan Willitsch's group in Basel he will focus on the project to explore quantum effects in cold collisions of ultracold atoms and molecules with quantum-state-selected, cold molecular ions in an ion-neutral hybrid trap.


Lorenzo Petralia

Lorenzo Petralia, UOXF

Lorenzo Petralia joins group of prof. Tim Softley at Oxford University 15 September.

I obtained my Bachelor's Degree in Physics from Sapienza University of Rome. I recently received my Master's Degree in Physics from Roma Tre University, in Rome, Italy. During my Master programme I worked on X-ray diffraction of multiferroic systems and on the development of a genetic algorithm for curve fitting at Diamond Light Source Synchrotron. I will join COMIQ ITN under the supervision of Professor Tim Softley at the University of Oxford to investigate cold ion-neutrals reactive collision working with two different sources of cold neutral molecules in combination with laser cooled or sympathetically cooled ions.


Steffen Meyer

Steffen Meyer, AU

Steffen Meyer joined the Ion Trap Group of Prof. Michael Drewsen, Aarhus University, on 1 July 2014.

Steffen Meyer recently obtained his Master of Science from the Albert-Ludwigs-University in Freiburg, Germany where he worked in the group of Prof. H. Helm on fine structure resolved imaging of dissociating triatomic hydrogen. At Aarhus, Steffen joins the Initial Training Network COMIQ and the Ion Trap Group where he will work on advancing various techniques for state-preparation of molecular ions such as MgH^+ and CaH^+. These techniques will allow to measure lifetimes of specific rovibrational states and to carry out reaction experiments with state prepared reaction partners.

PRACTICAL ISSUES

Important dates in relation to employment of ESRs:

1. **Declaration of Conformity**: must be filled out within the first month of employment. The document is available through the Participant Portal.
2. **Career Development Plan**: must be filled out for each ESR in liaison with his/her supervisor within one month after the first three months of employment. A template is available.

Access to the wiki:

1. **Supervisor/management wiki**: https://collab.au.dk/COMIQ/Wiki/Home.aspx (Username and password can be found in email dated 24 January 2014 12:26/7)
2. **ESR Space** is under construction. Feel free to contact Mike (depalatis@phys.au.dk) with any comments and/or ideas

COMIQ news will be posted at our **website**:

http://itn-comiq.eu

Further information about the network can also be found here as well as all official EU documents, minutes from meetings, financial guidelines etc. (which can also be found at the Mgmt wiki).

Important tasks in relation to **publications**:

1. Make sure to **acknowledge COMIQ**: This work was supported by the European Commission under the Seventh Framework Programme FP7 GA 607491 COMIQ.
2. Send the publication to celia@phys.au.dk (**doi number** is sufficient)