NEWS*letter*

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Dear friends of low energy antimatter and ion physics,

We are delighted to present you this first edition of the MIRROR - a quarterly newsletter that shall from now on highlight R&D results from across the FLAIR collaboration and beyond, stimulate knowledge exchange and create awareness of upcoming events.

We would like to use this opportunity to thank the outgoing FLAIR spokespersons Prof. Klaus Blaum (MPIK, Heidelberg) and Prof. Eberhard Widmann (SMI, Vienna) for all their hard work over the past years and for representing our collaboration so well internationally. Klaus and Eberhard will both remain active in the collaboration and help us bring *FLAIR to FAIR*.

In this first edition you will find some hot news from FAIR, an update on the CRYRING and HITRAP facilities, several position vacancies, as well as a list of upcoming events that you might be interested in attending.

We would like to encourage you to actively contribute to the MIRROR to turn it into an effective communication tool for our community.

With our very best wishes

Carsten, Thomas and Jochen

News from FAIR

An international review committee for the FAIR Project, chaired by Prof. Rolf Heuer (CERN DG), critically evaluated the four scientific pillars of FAIR in the context of world-wide progress earlier this year. The committee worked closely with FAIR and GSI managements, the various experiments and scientific committees and presented its recommendations in April 2015. These were discussed in detail by the Joint Scientific Council of FAIR and GSI during their meeting beginning of July. The council recommends the realization of the so-called *Modularised Start Version* (MSV) of FAIR, thus ensuring a unique research infrastructure enabling a broad and interdisciplinary scientific program with enormous impact and excellent discovery potential.

We will keep you closely informed about any news.

FAIR
Facility for Antiproton and Ion Research in Europe GmbH

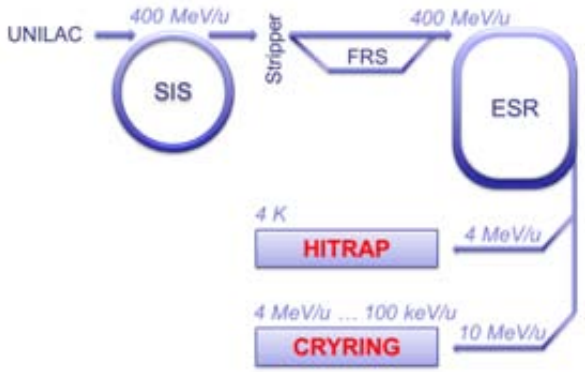
Deceleration and storage of highly charged ions and antiprotons at GSI/FAIR

F. Herfurth (GSI) for the HITRAP and CRYRING working groups

To perform precision experiments it is mandatory to provide means to link high-energy production schemes with low energy storage and measurement schemes. At GSI, heavy, highly charged ions up to bare uranium are produced in large quantities by stripping all electrons at high energies. The FAIR facility will additionally provide antiprotons. While the production of heavy, highly charged ions happens at a few 100 MeV/nucleon it is even at 2 to 3 GeV when it concerns antiprotons. The deceleration down to a few keV/nucleon, an energy that can be handled for instance by ion traps, requires several steps in storage rings and finally in a dedicated linear decelerator.

The linear decelerator HITRAP, is being commissioned with heavy, highly charged ions from the experimental storage ring ESR at GSI. It decelerates ions from 4 MeV/nucleon to 6 keV/nucleon to finally trap them in a Penning trap. For this it employs two different linear accelerator structures operated in inverse, an IH type structure and a RFQ structure. After extensive test and a thorough redesign the RFQ was finally taken into operation during an on-line test beam time in 2014. This was the last step in the deceleration chain from 400 MeV/nucleon production energy, to 4 MeV/nucleon – accompanied by cooling – in the experimental storage ring (ESR), and finally down to 6 keV/nucleon within the linear decelerator.

The CRYRING@ESR project is the early installation of the low-energy storage ring (LSR), the Swedish in-kind contribution to FAIR, which was proposed as the central decelerator ring for antiprotons at the FLAIR facility. Since the modularized start version of FAIR does not include the erection of the FLAIR building but the continuing operation of the ESR, it was proposed to install the CRYRING storage ring behind the existing experimental storage ring ESR already now – target date for start of commissioning is December 2015.



This opens in particular novel opportunities to explore part of the low energy atomic physics program with heavy, highly charged ions as proposed by the SPARC collaboration, but also experiments of nuclear physics background in the NUSTAR collaboration much sooner than foreseen in the FAIR general schedule.

Furthermore, since the installation of the ring will mostly follow FAIR standards, it will be used to test major parts of the FAIR control system for the first time and well before it is needed to run for example SIS100.

An option for the future that is being evaluated right now is to feed antiprotons back from the production at FAIR into the existing ESR. This would make antiprotons available in CRYRING and hence enable an early realization of at least part of the low energy antiproton program at FAIR, proposed and advanced by the FLAIR collaboration. **When finally moving the commissioned decelerator HITRAP into a new spot behind CYRING@ESR, low energy antiprotons could be trapped very efficiently.**

Selected Research Papers

In the future, we will list selected R&D highlights here – please email us your publications for consideration.

Position Vacancies

Postdoctoral Research Assistant in Accelerator Physics
RHUL, UK

Post-doctoral position in Accelerator Physics
LAL, France

PhD Research Project: Investigations into Laser-electron beam Interaction in a Storage Ring
The Cockcroft Institute, UK

Insertion Device Physicist / Senior Insertion Device Physicist
Diamond, UK

Applied Physicist or Electrical Engineer
CERN, Switzerland

Beamline Scientist for the High Resolution Powder Diffraction beamline ID22
European Synchrotron Radiation Facility, France

Doctoral Fellowships in Particle Detector Research
Universitat Heidelberg, Germany

Ernest Rutherford Fellowships
The Cockcroft Institute, UK

Nuclear Fusion, Nuclear Decommissioning and High Energy Physics projects
Oxford Technologies Ltd, UK

Please keep us informed about vacancies at your institution.

Selected Events

IBIC15 – International Beam Instrumentation Conference
13 – 17 September, Melbourne, Australia

COOL '15 - International Workshop on Beam Cooling and Related Topics
28 September – 3 October 2015, Jefferson Lab, Newport News, Virginia, USA

International Conference on Accelerator Optimization
7 – 9 October 2015, CNA, Seville, Spain

International Workshop on Antiproton Physics and Technology at FAIR
16-19 November 2015, Budker Institute of Nuclear Physics, Novosibirsk, Russia

12th International Conference on Low Energy Antiproton Physics (LEAP2016)
6-11 March 2016, Kanazawa, Japan

The collaboration is often requested to present research highlights and suggest good speakers to various program committees. If you think you or your work should be highlighted, please do not hesitate to get in touch with us.

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