Research with CRYRING@ESR

Report of Contributions

https://indico.gsi.de/e/5462

Contribution ID: **1** Type: **Oral**

The Stockholm years of CRYRING: Facility, research and the transition to CRYRING@ESR

Tuesday, 25 April 2017 16:15 (1 hour)

The CRYRING is a small synchrotron and storage ring with electron cooling. Based on technology developed at the low-energy antiproton ring LEAR at CERN, it was initiated in the early 1980's at the then Research Institute of Physics, AFI, (from 1988 Manne Siegbahn Institute and from 1993 Manne Siegbahn Laboratory, MSL, Stockholm University). It has been used for research with atomic and molecular ions at low energies during almost two decades 1992 – 2009.

In the talk the CRYRING facility at The Manne Siegbahn Laboratory in Stockholm will be described. Some historical remarks will be given about the construction of an accelerator facility for research with atomic and molecular ions at low energies at a laboratory/institute by tradition dedicated to accelerator-based nuclear physics research. The talk will include a review of the research program at the CRYRING facility during the period 1992 - 2009 with some examples of the most recognized results. Finally some comments will be given about the transition of CRYRING from Stockholm to Darmstadt for new applications in the years to come in CRYRING@ESR and hopefully within some years in the future as the central low energy storage ring LSR in the FLAIR facility.

CRYRING was dismounted in Stockholm and sent to GSI 2012/13 and has now been reassembled in the GSI Target Hall with some updates. The project is now gradually transiting into productive operation with commissioning presently ongoing. A vigorous and exciting proposed scientific program is in depth described in the publication "Physics book: CRYRING@ESR", M. Lestinsky, Y. Litvinov and T. Stöhlker (Eds.), Eur. Phys. J. ST 225, 5 (2016). The project status will be celebrated and the diversity of the future experimental program will be previewed by presentations and posters at the workshop 24-25 April 2017 at GSI on the topic of "Research with CRYRING@ESR".

Co-author: Prof. SKEPPSTEDT, Örjan (Stockholm University)

Presenter: DANARED, Håkan (European Spallation Source ERIC)

Session Classification: Kolloquium

Contribution ID: **2** Type: **Oral**

Radiation Biology Experiments at CRYRING

Tuesday, 25 April 2017 11:25 (20 minutes)

Presenter: Dr PLESKAC, Radek (GSI, Darmstadt)

Session Classification: Talks

Track Classification: Biophysics

Contribution ID: **3** Type: **Oral**

TBA (tentatively: Laser physics at CRYRING)

Tuesday, 25 April 2017 09:00 (20 minutes)

Presenter: Prof. NOERTERSHAEUSER, Wilfried (TU Darmstadt)

Session Classification: Talks

Track Classification: Atomic structure

Contribution ID: **4** Type: **Oral**

TBA (tentatively: (p,gamma) in the Gamow window of the p-Process)

Monday, 24 April 2017 16:40 (20 minutes)

Presenter: Dr REIFARTH, Rene (University of Frankfurt)

Session Classification: Talks

Track Classification: Nuclear physics

Contribution ID: **5** Type: **Oral**

TBA (tentatively: Materials modifications with low-energetic HCI)

Monday, 24 April 2017 17:00 (20 minutes)

Co-author: Prof. SCHLEBERGER, Marika (Universität Duisburg-Essen)

Presenter: Prof. WUCHER, Andreas (University Duisburg-Essen)

Session Classification: Talks

Track Classification: Materials research

Contribution ID: **6** Type: **Oral**

Quantum dynamics of electrons in low-energy heavy-ion collisions

Monday, 24 April 2017 14:20 (30 minutes)

Presenter: SHABAEV, Vladimir (GSI, Darmstadt)

Session Classification: Talks

Track Classification: Atomic structure

Contribution ID: **7** Type: **Oral**

A new CRYRING gasjet target

Tuesday, 25 April 2017 10:00 (15 minutes)

Presenter: PETRIDIS, Nikolaos (GSI, Darmstadt)

Session Classification: Talks

Track Classification: Instrumentation

Contribution ID: **8** Type: **Oral**

XUV Photoionization of ions at CRYRING

Tuesday, 25 April 2017 11:45 (20 minutes)

Presenter: ROTHHARDT, Jan (GSI, Darmstadt)

Session Classification: Talks

Track Classification: Atomic structure

Contribution ID: **9** Type: **Oral**

Relativistic calculations of differential ionization cross sections: Application to antiproton-hydrogen collisions

Tuesday, 25 April 2017 14:35 (15 minutes)

A new relativistic method based on the Dirac equation for calculating fully differential cross sections for ionization in ion-atom collisions is developed. The method is applied to ionization of the atomic hydrogen by antiproton impact, as a non-relativistic benchmark. The fully differential, as well as various doubly and singly differential cross sections for ionization are calculated. Several discrepancies in available theoretical predictions are resolved. The future extension of the method towards supporting experiments at GRYRING@ESR is discussed.

Primary author: Mr BONDAREV, Andrey (St. Petersburg State University)

Co-authors: Dr PLUNIEN, Guenter (TU Dresden); Prof. TUPITSYN, Ilya (St.Petersburg State University); SHABAEV, Vladimir (GSI, Darmstadt); KOZHEDUB, Yury (GSI, Darmstadt)

Presenter: Mr BONDAREV, Andrey (St. Petersburg State University)

Session Classification: Talks

Track Classification: Atomic collision dynamics

Contribution ID: **10** Type: **Oral**

Search for NEEC with CRYRING@ESR

Tuesday, 25 April 2017 09:40 (20 minutes)

Presenter: Dr LITVINOV, Yury (GSI, Darmstadt)

Session Classification: Talks

Track Classification: Nuclear physics

Contribution ID: **11** Type: **Oral**

Nuclear Astrophysics

Monday, 24 April 2017 14:50 (30 minutes)

Presenter: Dr LAIRD, Alison (Department of Physics, University of York)

Session Classification: Talks

Track Classification: Nuclear physics

Contribution ID: **12** Type: **Oral**

Charge particle reaction studies for nuclear astrophysics on the CRYRING

Tuesday, 25 April 2017 11:05 (20 minutes)

The talk will discuss a new UHV chamber being developed for the CRYRING collaboration. The chamber is being designed to accommodate atomic and nuclear physics applications. The talk will focus on low energy (~MeVs/u) nuclear charge particle reaction studies applied to nuclear astrophysics research.

Primary author: WOODS, Phil (University of Edinburgh(UE-SP))

Co-author: Dr DAVINSON, Thomas (University of Edinburgh)

Presenters: WOODS, Phil (University of Edinburgh(UE-SP)); Dr DAVINSON, Thomas (University of Edinburgh)

Session Classification: Talks

Track Classification: Nuclear physics

Contribution ID: **13** Type: **Oral**

CRYRING, performance and characteristics of the Stockholm installation 1990-2010

Monday, 24 April 2017 15:50 (30 minutes)

Presenter: Dr KÄLLBERG, Anders (Department of Physics, Stockholm University)

Session Classification: Talks

Track Classification: The CRYRING@ESR machine in the broader picture

Contribution ID: **14** Type: **Oral**

Radiation effects in astrophysical ices and biomolecules

Tuesday, 25 April 2017 14:00 (15 minutes)

Astrophysical ices are exposed to ionic projectiles from galactic cosmic rays, Solar wind, shock waves or ions trapped in the magnetospheres of giant planets. Induced radiation effects include sputtering, amorphisation and compaction, dissociation of molecules, and formation of new molecular species after radiolysis and by implantation of reactive ions. We present recent results on radiolysis of astrophysical ices and on radio-resistance of biomolecules, with special emphasis on experiments with multiply charged ion beams. These experiments aim in particular at simulating the effects of cosmic rays on icy grains in dense molecular clouds, and on the formation of molecules on icy bodies in the Solar System [Rothard, Domaracka, Boduch, Palumbo, Strazzulla, da Silveira, Dartois, J. Phys. B: At. Mol. Opt. Phys. 50 (2017) 062001 (Topical Review) doi: 10.1088/1361-6455/50/6/062001].

Primary author: Dr ROTHARD, Hermann (CIMAP-Ganil CNRS)

Presenter: Dr ROTHARD, Hermann (CIMAP-Ganil CNRS)

Session Classification: Talks

Track Classification: Materials research

Contribution ID: **15** Type: **Poster**

SiM-X: Silicon microcalorimeters for high-precision X-ray spectroscopy – Status and Perspectives

Monday, 24 April 2017 19:10 (2 hours)

High-precision X-ray spectroscopy of highly-charged heavy ions is one of the established subjects within the program of SPARC. At CRYRING, such experiments profit from the low ion velocity, which minimizes systematic errors from correction of the Doppler shift. One prominent example is the investigation of the 1s Lamb Shift of hydrogen-like heavy ions.
As a benchmark for a detector with larger solid angle, a new detector setup with a dry 3He/4He dilution refrigerator and an array of 32 detector pixels was installed at the ESR in the recent test beamtime in June 2016. The cryogenic system performed perfectly well. An energy resolution of around 150 eV at a X-ray energy of 30 keV was obtained, which allowed the observation of Lyman-alpha emission from hydrogen-like xenon ions with high precision. The contribution will present results from this test as well as perspectives for a detector with 100 detector pixels.

Primary author: KRAFT-BERMUTH, Saskia (I.Physics Institute, Justus-Liebig-University, Giessen, Germany)

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Presenter: KRAFT-BERMUTH, Saskia (I.Physics Institute, Justus-Liebig-University, Giessen, Germany)

Session Classification: Posters

Track Classification: Instrumentation

Contribution ID: **16** Type: **Poster**

VUV Fluorescence Spectrometry at Heavy-Ion Storage Rings

Monday, 24 April 2017 19:10 (2 hours)

The collision of highly charged, heavy ions with atomic or molecular gas targets or free electrons causes a variety of reactions such as electronic excitation, ionization, radiative electron capture and, in the case of molecules, dissociation. These processes have an important role in Astrophysics, with solar wind as a source for highly charged ions that interact with cometary or atmospheric gases. Typically, these processes are followed by the emission of one or more fluorescence photons in the spectral range from visible light (VIS) to vacuum-ultraviolet radiation (VUV). A Seya-Namioka type spectrometer for the dispersion and detection of this fluorescence in the wavelength range between 35 nm and 180 nm for experiments at gas- and electron targets and electron coolers at the FAIR facility will be set up with the aim to investigate the state of the targets after interaction and also as an online tool for ion beam monitoring.

Primary author: Dr REIß, Philipp (Institute of Physics and Center for Interdisciplinary Nanostructure Science and Technology, University of Kassel)

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Presenter: Dr REIß, Philipp (Institute of Physics and Center for Interdisciplinary Nanostructure Science and Technology, University of Kassel)

Session Classification: Posters

Track Classification: Instrumentation

Contribution ID: **17** Type: **Poster**

PEGASUS – A versatile spin-polarized electron target

Monday, 24 April 2017 19:10 (2 hours)

We present PEGASUS, a versatile and mobile spin-polarized electron target designed, constructed and build at GSI. It consists of a laser diode driven bulk GaAs photocathode, extraction energies up to 10 keV and an electrostatical cylindrical bender turning the polarization angle. First results characterizing the beam parameters will be shown, as well as proposed experiments, focussing on the dissociation of molecular ions in storage rings through polarized electrons. Also, ideas for experiments with chiral molecules and H+3 will be presented.

Primary author: Mr SCHURY, Daniel (GSI, Darmstadt)

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Presenter: Mr SCHURY, Daniel (GSI, Darmstadt)

Session Classification: Posters

Track Classification: Instrumentation

Contribution ID: **18** Type: **Poster**

A Detection System for Laser Spectroscopy Experiments at CRYRING

Monday, 24 April 2017 19:10 (2 hours)

In order to enable laser spectroscopy experiments at CRYRING, a new general purpose fluorescence detector is being developed at the University of Münster. The design allows detection from ultraviolet wavelengths to the near infrared regime. Thus, the detector can be used to observe a large variety of atomic transitions. Among others Mg- (at 280 nm) and Ca+ (at 854 nm/866 nm) ions have transitions in the wavelength regime covered by the detector.

Geant4 simulations have been performed in order to optimize the detection efficiency of fluorescence photons, while – at the same time – suppressing the detection of background photons.
This is achieved by an elliptical detector geometry, which selectively focuses fluorescence photons from the beam axis onto one of three interchangeable PMTs.
Currently, the mechanical design of the hardware being completed and first components will be ordered soon.

This project is funded by BMBF under contract number 05P15PMFAA.

Primary author: Mr BUß, Axel (Westfälische-Wilhelms-Universität)

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Presenter: Mr BUß, Axel (Westfälische-Wilhelms-Universität)

Session Classification: Posters

Track Classification: Atomic structure

Contribution ID: **19** Type: **Poster**

Status report of the FISIC experimental program

Monday, 24 April 2017 19:10 (2 hours)

With the FISIC project, we propose an experimental crossed-beam arrangement at SPIRAL2 facility to measure absolute cross-sections for fundamental atomic processes in the intermediate collision regime. In future, it is also planned to move the low-energy branch of the FISIC setup to CRYRING to perform experiments with heaviest ions. For the realization of such a challenging experimental project, many technical barriers have to be overcome. Among them are: the control and detection of the slow ion charge states, the purification system to prevent pollution from electron capture on the residual gas located just before the collision point in the low-energy beam line, the detection of high energy ions, the overlap between the two ion beams, the design of the collider chamber, the vacuum conditions, the stripping issue of intense ion beams. A status report on the different aspects of the FISIC program will be presented at the workshop.

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Presenter: Dr KUMAR, Ajit (Institut des Nanosciences de Paris, Sorbonne Universités UPMC Paris 6, 75252 Paris Cedex 05, France)

Session Classification: Posters

Track Classification: Atomic collision dynamics

Contribution ID: **20** Type: **Poster**

Status of the precision high voltage divider for the electron cooler at CRYRING

Monday, 24 April 2017 19:10 (2 hours)

The low energy storage ring CRYRING is currently being comissioned as the first storage ring for FAIR phase 0 at GSI. CRYRING features an electron cooler to cool stored ions and thus achieve a low momentum spread of the beam. To determine the velocity of the ions a precise knowledge of the electron cooler voltage is essential. In earlier measurements of hyperfine transitions in hydrogen- and lithiumlike ions at the Experimental Storage Ring (ESR), the limiting uncertainty was the voltage measurement. To minimize this uncertainty we construct a high-precision divider for voltages up to 35 kV which will be similar to the ultrahigh-precision dividers used at the KATRIN experiment. The accuracy of the divider will be in the low ppm range and will allow for measurement uncertainties in the <10 E-5 region. The characteristics of the final design and the current project status will be presented. This work is supported by BMBF under contract number 05P15PMFAA and HGS-Hire for Fair.

Primary author: Mr WINZEN, Daniel (Institut für Kernphysik, WWU Münster)

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Presenter: Mr WINZEN, Daniel (Institut für Kernphysik, WWU Münster)

Session Classification: Posters

Track Classification: Instrumentation

Contribution ID: **21** Type: **Poster**

Dielectronic-recombination processes in highly-charged heavy ions

Monday, 24 April 2017 19:10 (2 hours)

Dielectronic-recombination (DR) spectra of highly-charged W^+ and Ir^+ ions have been measured by employing the Electron-Beam Ion Trap (EBIT) at National Institute of standards and Technology [1] and the Main Magnetic Focus Ion Trap (MaMFIT) [2] at Justus-Liebig Universität Gießen, respectively, over wide ranges of electron-beam energies. A series of DR resonances involving transitions between 2□ → 3□′ and 2□ → 4□′ subshells in Na-like through Ar-like tungsten have been revealed in the NIST EBIT spectra, while in the MaMFIT, DR resonances involving transitions between 2□ → 3□′ subshells in K-like through Ni-like iridium were seen. Detailed modeling of the observed spectra has been performed.

Primary author: Dr BOROVIK, Alexander (Justus-Liebig Universität Gießen)

Co-authors: Prof. MÜLLER, Alfred (JLU Giessen); Dr DIPTI, Dipti (Quantum Measurement Division, National Institute of Standards and Technology, Gaithersburg MD, USA); Prof. TAKÁCS, Endre (Department of Physics and Astronomy, Clemson University, Clemson SC, USA); Dr DREILING, Joan (Quantum Measurement Division, National Institute of Standards and Technology, Gaithersburg MD, USA); Dr GILLASPY, John (Division of Physics, National Science Foundation, Arlington VA, USA); Dr HUBER, Kurt (Institut für Atom- und Molekülphysik, Justus-Liebig- Universität Gießen); Prof. LOMSADZE, Ramaz (Department of Physics, Ivane Javakhishvili Tbilisi State University, Tbilisi, Georgia); Mrs SILWAL, Roshani (Quantum Measurement Division, National Institute of Standards and Technology, Gaithersburg MD, USA); Dr OVSYANNIKOV, VLDIMIR (Dresden MaMFIS Grup); Dr RALCHENKO, Yuri (Quantum Measurement Division, National Institute of Standards and Technology, Gaithersburg MD, USA)

Presenter: Dr BOROVIK, Alexander (Justus-Liebig Universität Gießen)

Session Classification: Posters

Track Classification: Atomic structure

Contribution ID: **22** Type: **Poster**

Commissioning of a high-power electron gun for electron-ion crossed-beams experiments

Monday, 24 April 2017 19:10 (2 hours)

In an electron-ion crossed-beams experiment, the experimental sensitivity is mainly determined by the densities of both beams in the interaction region. Aiming at the extension of the available range of accessible electron energies and densities, a new high-power electron gun has been developed and built. It delivers a ribbon-shaped beam with high currents at all energies variable between 10 and 3500 eV. The expected high currents and good beam transmission have already been shown. Here, we report on the current status of commissioning of this electron gun. The electron gun is integrated into the experimental electron-ion crossed-beams setup in Giessen. Employing the animated crossed-beams technique, first cross sections for electron-impact ionization of xenon and helium ions were measured. The measurement of more cross sections is intended for the near future. Further investigations concerning, e.g., space-charge effects in the high-density electron beam are currently performed.

Primary author: Mr EBINGER, Benjamin (Justus-Liebig-Universität Gießen)

Co-authors: Dr BOROVIK, Alexander (Justus-Liebig Universität Gießen); Prof. MÜLLER, Alfred (JLU Giessen); Mr DÖHRING, Michel (Justus-Liebig-Universität, FB07, AG für Atom- und Molekülphysik); SCHIPPERS, Stefan (JLU Giessen); Mr MOLKENTIN, Tobias (Justus-Liebig-Universität Giessen)

Presenter: Mr EBINGER, Benjamin (Justus-Liebig-Universität Gießen)

Session Classification: Posters

Track Classification: Instrumentation

Contribution ID: **23** Type: **Poster**

Enhancement of radiative recombination of ions with low energy electrons in cold magnetized plasma

Monday, 24 April 2017 19:10 (2 hours)

The radiative recombination (RR) is a one of the most important processes occurring in the interaction of highly charged ions with electrons. During the last decades the RR was actively studied in various aspects related to atomic and plasma physics, astrophysics, and accelerator physics. Recently, the RR of U92+ ions with electrons was studied in a subshell-selective manner by observing the emitted x-ray photons from recombination into the K and L shells at nonzero collision energies in an electron cooler. In this experiment the measured electron energy dependence of the RR rate coefficients was found to be sensitive to relativistic effects. The experiment yielded also hints for an enhancement of RR rate coefficients into the K and L shells, i.e., into low-n shells. This new state-selective experimental method is very promising for further experimental studies at CRYRING, for example, with more energy steps across and below the onset threshold of the RR enhancement.

Primary author: Dr BANAS, Dariusz (Jan Kochanowski University)

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Presenter: Dr BANAS, Dariusz (Jan Kochanowski University)

Session Classification: Posters

Track Classification: Atomic collision dynamics

Contribution ID: **24** Type: **Poster**

High resolution von Hamos spectrometer for low energy x-rays spectroscopy at CRYRING

Monday, 24 April 2017 19:10 (2 hours)

The structure of the few electrons heavy ions and the dynamics of the collisions of the ion with atoms can be precisely investigated by measurement of the radiation spectrum emitted in the electron-ion interaction. Detection of the radiation spectrum can be performed using conventional semiconductor detectors or high-resolution crystal spectrometers. However, as shown by the latest experimental results, very often only application of the crystal spectrometers allows to obtain the accuracy required to study many subtle effects such as relativistic effects and the higher-order QED effects.
Here we will report on the development of high-resolution von Hamos type crystal spectrometer dedicated for low-energy x-rays measurement at CRYRING. The construction details and the main factors influencing the energy resolution and the efficiency of the spectrometer, such as: a crystal radius of curvature, a crystal size, a source size, and the spatial resolution of a detector will be discussed.

Primary author: Dr BANAS, Dariusz (Jan Kochanowski University)

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Presenter: Dr BANAS, Dariusz (Jan Kochanowski University)

Session Classification: Posters

Contribution ID: **25** Type: **Poster**

Study of the Ti-44(alpha,p)V-47 reaction at CRYRING

Monday, 24 April 2017 19:10 (2 hours)

The radionuclide Ti44 is one of the few cosmogenic nuclei that were directly observed by satellite based gamma-ray observatories. It is produced in core collapse supernovae by the reaction Ca40(a,g)Ti44. The main reaction consuming Ti44 is Ti44(a,p)V47. The precise knowledge of both reaction rates is therefore crucial for the determination of the final amount of Ti44 produced in the supernova. Here we present the idea of measuring the reaction rate of the reaction Ti44(a,p)V47 at CRYRING at the Gamow window for core collapse supernovae. We propose the production of a beam of highly charged, off-line produced Ti44 (t1/2=60a) with an EBIT directly connected to CRYRING. The injected ions will be accelerated in CRYRING to energies of about 2.2 MeV/u and subsequently interact with helium atoms at the internal gas-jet target by interacting with a dense helium beam. The protons resulting from the alpha capture reaction will be detected with particle detectors downstream of the gas-jet target.

Primary authors: Dr LESTINSKY, Michael (GSI, Darmstadt); FORSTNER, Oliver; STÖHLKER, Thomas (GSI, Darmstadt)

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Presenter: FORSTNER, Oliver

Session Classification: Posters

Track Classification: Nuclear physics

Contribution ID: **26** Type: **Poster**

Electron Dynamics in transient high E-Fields during Heavy –Ion Collisions

Monday, 24 April 2017 19:10 (2 hours)

The heavy-ion storage ring CRYRING at GSI/FAIR is particularly suited to investigate the collision dynamics for very highly charged ions in the highly adiabatic and non-perturbative regime where the ratio of projectile charge state to projectile velocity qproj/vproj»1. We will discuss electron/lepton spectroscopy for studying leptons as authentic and precise messengers from extreme fields in very heavy transient quasi-molecules:
a) Resonant 1s to 1s electron transfer, e.g. in Xe54+ + Xe; via K-Auger electron –recoil ion time of flight (TOF) the impact parameter (b) dependence of the process can be determined and compared with recent ab initio calculations on oscillations in 1s to 1s transfer probabilities as function of b which arise from energy differences of involved quasi-molecular orbitals in these very heavy collision systems
b) Electron nucleus bremsstrahlung (enBS) at the high energy tip of the bremsstrahlung spectrum; theory predicts deep relations of the very high asymmetry of the radiative electron capture to continuum (RECC) cusp peak to corresponding asymmetries in radiative electron capture to continuum and pair production.
c) Near-threshold 1s ionization for slow collisions Zproj ≈ Ztar in the presence of a large and dominant capture channel; here the precise molecular mechanism for promoting a 1s electron from the 1sσ molecular orbital up to the continuum threshold is still under open theoretical considerations. The angular distribution of corresponding electron continua as an experimental benchmark is highly desirable.
d) The complete atomic fragmentation (i.e. complete stripping down to bare target ions) focusing on topologically stable multi-electron continua accompanying the fragmentation. The dominance of multiple over single electron continua is an unsolved challenge for theory.
e) Kinematically complete (e,2e) collisions of iso- electronic sequences of H- and He like ions in inverse kinematics. The ab initio calculation of triple differential ionization cross sections (TDCS) for electron impact ionization of 1- and 2- electron atoms/ions has exhibited numerous open problems faced for the TDCS when a spectator electron is present; here benchmarks are urgently needed using TDCS for the isoelectronic sequences which accessible only in inverse kinematics in storage rings.

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Presenter: HAGMANN, Siegbert (GSI-Darmstadt)

Session Classification: Posters

Track Classification: Atomic collision dynamics

Contribution ID: **27** Type: **Oral**

TBA (tentatively: Reaction microscopes in storage rings)

Tuesday, 25 April 2017 10:15 (20 minutes)

Presenter: Dr SCHÖFFLER, Markus (Goethe-University, Frankfurt)

Session Classification: Talks

Track Classification: Atomic collision dynamics

Contribution ID: **28** Type: **Oral**

Electron-Ion Collision Spectroscopy at CRYRING

Tuesday, 25 April 2017 14:15 (20 minutes)

Presenter: SCHIPPERS, Stefan (JLU Giessen)

Session Classification: Talks

Track Classification: At the intersection of atomic and nuclear physics

Contribution ID: **29** Type: **Oral**

Low-energy ion-atom/ion collisions in storage ring

Tuesday, 25 April 2017 09:20 (20 minutes)

Presenter: GUMBERIDZE, Alexandre (GSI, Darmstadt)

Session Classification: Talks

Track Classification: Atomic structure

Contribution ID: **30** Type: **Oral**

TBA (tentatively: SPARC and APPA at CRYRING)

Tuesday, 25 April 2017 15:10 (15 minutes)

Presenter: Prof. SCHUCH, Reinhold (Stockholm university)

Session Classification: Talks

Track Classification: The CRYRING@ESR machine in the broader picture

Contribution ID: **31** Type: **Oral**

Welcome address

Monday, 24 April 2017 14:00 (20 minutes)

Presenter: Prof. GIUBELLINO, paolo (gsi)

Session Classification: Talks

Track Classification: The CRYRING@ESR machine in the broader picture

Contribution ID: **32** Type: **Oral**

Overview of experiments at CRYRING

Tuesday, 25 April 2017 14:50 (20 minutes)

Presenter: Dr LESTINSKY, Michael (GSI, Darmstadt)

Session Classification: Talks

Track Classification: Instrumentation

Contribution ID: **33** Type: **Oral**

CRYRING@ESR machine performance

Monday, 24 April 2017 16:20 (20 minutes)

Presenter: Dr HERFURTH, Frank (GSI, Darmstadt)

Session Classification: Talks

Track Classification: The CRYRING@ESR machine in the broader picture

Contribution ID: **34** Type: **Oral**

High-resolution spectroscopy of low-energy X-ray at CRYRING

Tuesday, 25 April 2017 12:05 (20 minutes)

Presenter: Dr TRASSINELLI, Martino (Insitut des NanoSciences de Paris)

Session Classification: Talks

Track Classification: Atomic structure

Contribution ID: **35** Type: **Oral**

Micro-calorimeters for high resolution x-ray spectroscopy

Tuesday, 25 April 2017 12:25 (20 minutes)

Presenter: Dr FLEISCHMANN, Andreas (Uni Heidelberg)

Session Classification: Talks

Track Classification: Instrumentation