MS 6: Poster

Time: Tuesday 16:30–19:00 Location: Poster.IV

MS 6.1 Tue 16:30 Poster.IV

A year-by-year record of 236U/238-U in coral as a step towards establishing 236-U from nuclear weapons testing fallout as oceanic tracer — •Stephan Winkler[1], Peter Steier[1], and Jessica Carilli[2] — [1]University of Vienna, Faculty of Physics, Vienna, Austria — [2]Australian Nuclear Science and Technology Organisation, Lucas Heights, Australia

Since uranium is known to behave conservatively in ocean waters, 236-U has great potential in application as oceanic tracer. 236-U (t1/2=23.4Ma) was introduced into the oceans by atmospheric nuclear weapon testing with amount estimates ranging from 700kg to 1500kg. Thus a resulting initial average 236-U/238-U ratio of at least 5e-9 is expected for an oceanic mixed layer depth of 100m. This ratio is already higher than the natural pre-nuclear background, which is expected to be at 10e-14 levels.

Even the elevated ratios of global stratospheric fall-out are beyond the capabilities of ICPMS and TIMS methods. However, the exceptional sensitivity and ultra-low background for 236-U of the Vienna Environmental Research Accelerator's Accelerator Mass Spectrometry system allows us to measure down to 10-13 detection limits.

We present a year-by-year record of 236-U/238-U for a Caribbean coral core covering years 1944 to 2006, thus allowing to us put constraints on the oceanic input of 236-U by atmospheric testing. Moreover modelling of the results also demonstrates the capabilities of 236-U as oceanic tracer.

MS 6.2 Tue 16:30 Poster.IV

Magnetic Field stabilization in THe-Trap — •Sebastian Streubel[1], Tommi Eronen[1], Martin Höcker[1], Jochen Ketter[1], Robert S. Van Dyck Jr.[2], and Klaus Blaum[1] — [1]Max-Planck-Institut für Kernphysik, Saupfercheckweg 1, 69117 Heidelberg, Germany — [2]Department of Physics, University of Washington, Seattle, WA 98195-1560, USA

THe-Trap is a Penning trap mass spectrometer dedicated to measure the ^{3}H to ^{3}He mass ratio aiming to a relative mass uncertainty better than 10^{-11}. The most vital prerequisite for this measurement is a stable magnetic field: The relative temporal fluctuations during a measurement cycle of typically 1 hour, should be better than 10^{-11}. The 5.26 T field is provided by a superconducting magnet. Unfortunately, the materials within the cryostat have a temperature-dependent susceptibility which necessitates a temperature stabilization. The stabilization is achieved by controlling the liquid helium level above the traps, and by keeping the pressure of the liquid helium constant. An important part of the system is the pressure reference, which is stable at a 0.04 Pa level.

In addition to the stabilization of the field fluctuations within the cryostat itself, a system to cancel external fluctuations is set up consisting of a passive coil with a shielding factor of up to 180 build into the cryostat. Furthermore, a Helmholtz coil pair is placed around the cryostat. The compensation signal is provided by a custom-built fluxgate magnetometer.

Technical details about the stabilization systems will be given.

MS 6.3 Tue 16:30 Poster.IV

Mass measurements of ^{82,83}Kr — •Martin Höcker[1,2], Klaus Blaum[1], and Edmund G. Myers[2] — [1]Max-Planck-Institut für Kernphysik, Heidelberg — [2]Department of Physics, Florida State University, Tallahassee, 32306-4350, USA

In 2005, The Florida State University Precision Penning Trap group made mass measurements of ^{84,86}Kr and ^{129,132}Xe, which revealed a three sigma deviation to the previously adopted value of the mass of ^{84}Kr [1,2]. Because noble gases can serve as readily available reference masses for a wide range of mass spectrometers, the group concurred to measure two more krypton isotopes, ^{82,83}Kr, to cross-check whether similiar deviations are present in these isotopes as well, and to provide state-of-the-art reference mass values for all major krypton isotopes.

The measurements were carried out in the FSU/MIT-trap, which currently provides the most accurate mass ratios for stable, low-charged atomic and molecular ions. The measurement technique uses two single ions in the trap simultaneously, with the ions alternately being parked on a large cyclotron orbit and measured in the center of the trap with the pulse-and-phase technique.

The new measurements are presented and an overview of the statistical and systematic limitations is given.

This work was supported by the U.S. National Science Foundation.

[1] W. Shi *et al.*, Physical Review A **72** 022510 (2005)
[2] M. Redshaw *et al.*, Physical Review A **74** 012506 (2009)

MS 6.4 Tue 16:30 Poster.IV

MR-ToF Isobar Separation for Mass and Life-Time Measurements of Neutron-Rich Zinc at ISOLTRAP — Georges Audi[1], Dietrich Beck[2], Klaus Blaum[3], Christine Böhm[3], Christopher Borgmann[3], Martin Breitenfeldt[4], R. Burcu Cakirli[3], Thomas Elias Cocolios[5], Sergey Eliseev[3], Sebastian George[6], Frank Herfurth[2], Alexander Herlert[7], Jürgen Kluge[2], Magdalena Kowalska[5], Susanne Kreim[3,5], David Lunney[1], Enrique Minaya Ramirez[2], Sarah Naimi[8], Dennis Neidherr[2], •Marco Rosenbusch[9], Stefan Schwarz[6], Lutz Schweikhard[9], Juliane Stanja[10], Meng Wang[1], Frank Wienholtz[9], Robert N. Wolf[9], and Kai Zuber[10] — [1]CSNSMIN2P3-CNRS, Université de Paris Sud, Orsay, France — [2]GSI Helmholtzzentrum für Schwerionenforschung GmbH, Darmstadt, Germany — [3]Max-Planck-Institut für Kernphysik, Heidelberg, Germany — [4]Instituut voor Kernen Strahlingsfysica, Leuven, Belgium — [5]CERN, Geneva, Switzerland — [6]NSCL, Michigan State University, East Lansing, USA — [7]FAIR GmbH, Darmstadt, Germany — [8]RIKEN Research Facility, Japan — [9]Ernst-Moritz-Arndt-Universität, Greifswald, Germany — [10]Technische Universität, Dresden, Germany

High-precision Penning-trap mass measurements of short-lived nuclei are performed with ISOLTRAP at the on-line isotope separator ISOLDE/CERN. An important prerequisite to achieve relative uncertainties of $\delta m/m = 10^{-8}$ is the availability of purely isobaric ion ensembles. To enhance the purity of radioactive ion beams, a multi-reflection time-of-flight mass separator developed at the University of Greifswald [1,2] has recently been implemented at the ISOLTRAP setup. A mass resolving power of $R = 2 \cdot 10^5$ and a contaminant reduction of four orders of magnitude by use of a Bradbury-Nielsen ion gate have been achieved. The performance of the combined setup (including an RFQ ion buncher, the MR-ToF MS and the two Penning traps) in both offline tests as well as in first applications with radioactive ion beams will be presented. Furthermore, the physics case and recent results of mass measurements of neutron-rich Zinc will be shown.

[1] R. N. Wolf et al., Hyperfine Interact. 199, 115 (2011)
[2] R. N. Wolf et al., Int. J. Mass Spectrom., accepted

MS 6.5 Tue 16:30 Poster.IV

Multianionen-Erzeugung in der Penningfalle in Abhängigkeit von der Fallenspannung — •Franklin Martinez, Steffi Bandelow, Christian Breitenfeldt, Gerrit Marx, Lutz Schweikhard und Frank Wienholtz — Institut für Physik, Ernst-Moritz-Arndt Universität, 17487 Greifswald, Deutschland

Die simultane Speicherung von Clusteranionen und Elektronen in einer Penning-Ionenfalle eignet sich zur Erzeugung höherer negativer Ladungszustände der Cluster. Dabei muss zum einen die Fallenspannung so groß gewählt werden, dass gespeicherte Elektronen ausreichend Energie haben, um das Coulomb-Potential der bereits anionischen Cluster zu überwinden. Zum anderen darf die Fallenspannung zur Speicherung der Cluster aber einen kritischen Wert nicht übersteigen, welcher sich invers zum Masse/Ladungs-Verhältnis der zu speichernden Ionen verhält. Da die Ausgangscluster jeweils einfach geladen sind, und zur Erzeugung höherer Ladungszustände insbesondere größere Cluster benötigt werden, widersprechen sich beide Kriterien für die Fallenspannung. Durch schrittweises Aufladen der Cluster und Erhöhen der Fallenspannung kann dieser Widerspruch jedoch umgangen werden. Die experimentelle Umsetzung wird am Beispiel der Erzeugung fünffach negativ geladener Aluminiumcluster im 5-T-Feld vorgestellt. Der Zusammenhang zwischen der Höhe des Coulomb-Potentials und der zur Elektronenanlagerung benötigten Fallenspannung werden diskutiert, ebenso wie die erweiterten Möglichkeiten im kürzlich installierten 12-T-Magneten.

MS 6.6 Tue 16:30 Poster.IV

Eine mobile Fallenapparatur für Cluster-Laser-Experimente an massenselektierten Clustern — •Madlen Müller[1], Robert

Irsig[2], Gerrit Marx[1], Karl-Heinz Meiwes-Broer[2] und Lutz Schweikard[1] — [1]Institut für Physik, Ernst-Moritz-Arndt Universität, 17487 Greifswald — [2]Institut für Physik, Universität Rostock, 18501 Rostock

Im Rahmen des SFB652 [1] wurde ein Ionenfallensystem zur Untersuchung von massenselektierten Clustern unter Einwirkung eines Laserfeldes aufgebaut und getestet. In einer ersten linearen Paulfalle wird ein Ionenensemble von einer Clusterquelle eingefangen, gekühlt und massenselektiert. Die so präparierten Ionen können entweder direkt einer Wechselwirkung mit Laserlicht ausgesetzt werden oder in eine zweite lineare Paulfalle transferiert werden. Nachgewiesen werden die in der Falle verbliebenen Reaktionsprodukte über eine Flugzeitanalyse. Eine variable Speicherzeit erlaubt kurze, aber auch definierbar ausgedehnte Wechselwirkungszeiten mit Laserlicht und nachfolgende Reaktionszeiten. In ersten Experimenten konnten C_{60}^+- und C_{70}^+-Fullerene akkumuliert, gespeichert, gekühlt und selektiert werden. Die mit Photoanregung in der Falle erzeugten und weiter gespeicherten Reaktionsprodukte wurden mittels Flugzeitmassenspektrometrie analysiert. Im nächsten Schritt soll das Fallensystem mit einer Magnetron-Ionenquelle verbunden werden, um die Untersuchungen an Metall-Clustern fortzusetzen.

[1] http://web.physik.uni-rostock.de/sfb/

MS 6.7 Tue 16:30 Poster.IV

Spin and orbital moments of isolated clusters - synchrotron radiation elucidates nanomagnetism — Sergey Peredkov[1], Matthias Neeb[2], Wolfgang Eberhardt[1], Jennifer Meyer[3], Matthias Tombers[3], and •Gereon Niedner-Schatteburg[3] — [1]TU Berlin, Institut für Optik und Atomare Physik, Hardenbergstr. 36, 10623 Berlin, Germany — [2]Helmholtz-Zentrum Berlin für Materialien & Energie, BESSY II, Albert-Einstein-Str. 15, 12489 Berlin, Germany — [3]TU Kaiserslautern, Fachbereich Chemie und Foschungszentrum OPTIMAS, 67663 Kaiserslautern, Germany

The determination of spin and orbital magnetic moments from the free atom to the bulk phase is an intriguing challenge for nanoscience, since most magnetic recording materials are based on nanostructures. We present temperature-dependent X-ray magnetic circular dichroism (XMCD) measurements of free Co-clusters (N=8-22) from which the intrinsic spin and orbital magnetic moments have been deduced [1]. An exceptionally strong enhancement of the orbital moment is verified for free magnetic clusters which is 4-6 times larger than the bulk value. Our temperature-dependent measurements reveal that the spin orientation along the external magnetic field is nearly saturated at ca. 20 K and 7 T while the orbital orientation is clearly not. The comparison of the magnetic moments as deduced from XMCD and previous Stern-Gerlach measurements might help to reconcile divergent results of the total magnetic moments of small Co-clusters published earlier. We present an outlook towards other transition metal clusters.

References: [1] S.Peredkov et al., PRL 107, 233401 (2011)

MS 6.8 Tue 16:30 Poster.IV

Normal and inverse H/D-isotope effects in the reactions of size selected transition metal cluster ions with aromatic hydrocarbon molecule — •Christine Merkert, Matthias Tombers, Lars Barzen, Anke Stamm, Maximilian Gaffga, and Gereon Niedner-Schatteburg — TU Kaiserslautern, Fachbereich Chemie und Foschungszentrum OPTIMAS, 67663 Kaiserslautern, Germany

Isolated transition metal cluster ions have been subject of reactivity studies ever since appropriate ion sources became available. We have utilized high resolution mass spectrometry in conjunction with ion trapping for the investigation of aromatic hydrocarbon reactivity of Iron, Cobalt and Nickel cluster cations and anions in the cluster size range from 3 to 30 atoms per cluster under single collision conditions. The measurements serve to determine relative rate constants for various reaction channels observed. Reaction rates of normal and perdeuterated reactants reveal remarkable isotope effects, that are in part normal and in part inverse. Mechanistic interpretations are to discuss.

MS 6.9 Tue 16:30 Poster.IV

A Detector for 3D Molecular Fragmentation Imaging at the Cryogenic Storage Ring — •Arno Becker[1], Klaus Blaum[1], Claude Krantz[1], Oldřich Novotný[2], Andrey Shornikov[1], Kaija Spruck[3], and Andreas Wolf[1] — [1]Max-Planck-Institut für Kernphysik, Saupfercheckweg 1, 69117 Heidelberg — [2]Columbia Astrophysics Laboratory, 550 West 120th Street, New York, NY 10027, USA — [3]Institut für Atom- und Molekülphysik, Leihgesterner Weg 217, 35392 Giessen

The electrostatic Cryogenic Storage Ring (CSR), currently under construction at the Max-Planck-Institute for Nuclear Physics in Heidelberg, will enable long time storage of slow molecular ions with energies up to 300 keV and low blackbody radiation corresponding to the ∼10 K temperature of the storage ring enclosure. Under these conditions, polyatomic ions up to high masses can be prepared in or near the rovibrational ground state. Their fragmentation can be studied by fast-beam coincidence fragment momentum imaging. A detection system for 3D imaging of neutral fragments from Dissociative Recombination reactions is being developed. The requirements of the CSR regarding the huge temperature range from operation at ∼10 K to bakeout at ∼520 K as well as an extremly high vacuum of 10^{-13} mbar place high demands on the detector design. The use of an MCP-based detector with a multi-hit-capable position- and time-resolving delay-line anode is investigated. Simulations of the achievable multi-hit resolution performance for typical fragmentation events to be studied at the CSR and the cryogenic implementation will be presented.

MS 6.10 Tue 16:30 Poster.IV

A Converter-Plate Ion-Counting Detector for the Cryogenic Storage Ring — •Kaija Spruck[1], Arno Becker[2], Klaus Blaum[2], Claude Krantz[2], Alfred Müller[1], Oldřich Novotný[3], Stefan Schippers[1], Andrey Shornikov[2], and Andreas Wolf[2] — [1]Institut für Atom- und Molekülphysik, Leihgesterner Weg 217, 35392 Giessen — [2]Max-Planck-Institut für Kernphysik, Saupfercheckweg 1, 69117 Heidelberg — [3]Columbia Astrophysics Laboratory, 550 West 120th Street, New York, NY 10027, USA

The electrostatic Cryogenic Storage Ring (CSR), currently under construction at the Max-Planck-Institute for Nuclear Physics in Heidelberg, will allow for experiments with atomic, molecular and cluster ions of 300 keV or lower energy in extremely high vacuum (XHV) conditions. XHV will be achieved by cryopumping at 2 K in a chamber kept at about 10 K. Collisions of the stored ions with photons, electrons, or neutral heavy particles will lead to reaction products with masses and/or charge states that differ from those of the primary particles. For the detection of the reaction products a high-efficiency single-particle detector based on a converter plate and electron detection by a microchannel plate detector has been designed and is currently being tested. It has a sensitive area of ∼20×50 mm^2 and will be mounted on a translation stage with a travel range of up to ∼40 cm inside the cryogenic XHV. The layout is compatible with the cryogenic operating conditions and a high-temperature bakeout of up to ∼250°C.

MS 6.11 Tue 16:30 Poster.IV

Das CSR-Reaktionsmikroskop — •Johannes Goullon, Shaofeng Zhang, Klaus Blaum, Manfred Grieser, Robert von Hahn, Andreas Wolf, Alexander Dorn, Daniel Fischer, Robert Moshammer, Claus Dieter Schröter und Joachim Ullrich — Max-Planck-Institut für Kernphysik, Heidelberg

Am Max-Planck-Institut für Kernphysik in Heidelberg wird derzeit ein kryogener elektrostatischer Speicherring (CSR) aufgebaut. Unter Flüssig-Helium-Kühlung werden Temperaturen weniger Kelvin bei extremen Vakuumbedingungen ($< 10^{-13}$ mbar) erreicht. Dies erlaubt die Durchführung von Experimenten mit niederenergetischen, hochgeladenen Ionen, zustandsselektierten Clustern oder ultra-kalten, wohlpräparierten Molekülionen (20 - 300 keV / Ladungszustand) mit langen Speicherzeiten und denkbar geringen Störungen durch die Umgebung, d.h. durch Restgas oder Wärmestrahlung. Wir berichten über den Aufbau eines kryogenen Reaktionsmikroskops (REMI) mit einem Gasjet-Target und dessen Implementierung in den CSR.

MS 6.12 Tue 16:30 Poster.IV

Status of the Cryogenic Storage Ring (CSR) — •Sebastian Menk[1], Arno Becker[1], Felix Berg[1], Klaus Blaum[1], Florian Fellenberger[1], Michael Froese[1], Johannes Goullon[1], Manfred Grieser[1], Claude Krantz[1], Michael Lange[1], Felix Laux[1], Roland Repnow[1], Andrey Schornikov[1], Kaija Spruck[2], Robert von Hahn[1], and Andreas Wolf[1] — [1]Max-Planck-Institut für Kernphysik (MPIK), 69117 Heidelberg — [2]Institut für Atom- und Molekülphysik Justus-Liebig-Universität, 35392 Giessen

A novel cryogenic storage ring is currently under construction at the MPIK. By electrostatic ion optical elements, the 35 m circumference Cryogenic Storage Ring will be able to store ions at energies of up to 300 keV per charge unit without any mass limitations. The

CSR consists of a cryogenic (∼5 K) beam pipe surrounded by two radiation shields (40 and 80 K) in a large outer, thermal insulation vacuum. Extreme vacuum (density $\sim 10^3$ cm^{-3}) will be achieved by 2 K cryopumping as demonstrated in a prototype ion beam trap. The ion optics was completely assembled within the precision cryogenic mounting and shielding structure of the first corner. There, cooldown tests to ∼40 K were performed which confirmed the required sub-millimeter accuracy of the specially designed electrode positioning under large temperature changes. The high-voltage connections to the cryogenic electrodes were installed and breakdown tests will be reported. Based on the test results the beam pipe, electrode mounting and shielding structures are under final construction for mounting during 2012.

MS 6.13 Tue 16:30 Poster.IV

Status of the Low-Energy Electron Cooler for the Cryogenic Storage Ring — •Claude Krantz[1], Arno Becker[1], Klaus Blaum[1], Oldřich Novotný[2], Stefan Schippers[3], Andrey Shornikov[1], Kaija Spruck[3], and Andreas Wolf[1] — [1]Max-Planck-Institut für Kernphysik, Saupfercheckweg 1, 69117 Heidelberg — [2]Columbia Astrophysics Laboratory, 550 West 120th Street, New York, NY 10027, USA — [3]Institut für Atom- und Molekülphysik, Leihgesterner Weg 217, 35392 Giessen

The Cryogenic Storage Ring (CSR) under construction at the Max-Planck Institute for Nuclear Physics in Heidelberg is a next-generation electrostatic storage ring for atomic, molecular, and cluster ions. The CSR beam pipe will be cooled to ∼10 K, thereby reducing the residual gas density and the black body radiation background to very low values. This will allow precision experiments on IR-active or very massive ionic species that are not possible in room-temperature setups. The CSR features an electron-ion merged beams section that can be used both for electron cooling of the stored ions and for low-energetic electron-ion collision experiments. The design of the cooler must comply with the requirements of the CSR with regard to its very large range of operating and bakeout temperatures and the target vacuum of 10^{-13} mbar. The cooler will use a combination of superconducting and cold copper coils for magnetic guiding of the electron beam. The latter will be produced by a cold photocathode source already in operation. The cooler entered its construction phase in 2011 and is expected to become operational for the commissioning phase of the CSR.

MS 6.14 Tue 16:30 Poster.IV

High resolution in-jet resonance ionization laser spectroscopy using an injection-locked Ti:sapphire laser @ RIKEN — •Volker Sonnenschein[1], Hideki Tomita[2], Iain Moore[1], Mikael Reponen[1], Tetsuo Sonoda[3], Michiharu Wada[3], and Klaus Wendt[4] — [1]Institute of Physics, University of Jyväskylä, Finland — [2]Department of Quantum Engineering, University of Nagoya, Japan — [3]RIKEN, Tokyo, Japan — [4]University of Mainz, Germany

The combination of resonant laser ionization with a radiofrequency based ion guide extraction structure from a gas cell or hot cavity has proven to provide high purity ion beams at radioactive ion beam facilities. So far this technique has been predominantly applied in combination with a hot cavity atomizer, i.e. as the Laser Ion Source Trap (LIST) at ISOLDE. The adaptation of this technique at facilities using a buffer gas-filled stopping chamber like JYFL, LISOL, or BigRIPS to stop and extract nuclear reaction products should provide further benefits. The velocity spread of the atoms exiting the target chamber in a supersonic jet is greatly reduced allowing for in-jet high resolution studies of hyperfine structures as well as isotope shifts of the produced isotopes. An injection locked pulsed Ti:sapphire laser is an ideal system for studies in this environment as it provides both a narrow bandwidth of less than 20 MHz as well as high photon flux enabling efficient single pass frequency conversion to access the corresponding atomic ground state transition wavelengths for the first step of the resonant ionization process. A description of modifications made to the existing laser geometry will be given together with first spectroscopic results.

MS 6.15 Tue 16:30 Poster.IV

Hochpräzise Messungen der Kohlenstoff-Konzentration in Silicium mittels SSMS — •Bernhard Wiedemann[1], Michael Deveaux[1], Michael Petri[1], Hans Christian Alt[2], Maria Porrini[3], Maria Giovanna Pretto[3] und Roberto Scala[3] — [1]Institut für Kernphysik, Goethe-Universität, Max-von-Laue-Str. 1, D-60438 Frankfurt am Main — [2]University of Applied Sciences, D-80335 München — [3]MEMC Electronic Materials, I-39012 Merano

Die Kohlenstoff-Konzentration in hochreinem kristallinem Silicium wird mittels hochauflösender FTIR-Absorptionsspektroskopie bei tiefen Temperaturen (77K) gemessen. Multikristallines Silicium zeigt gegenüber monokristallinem Silicium eine stark veränderte Phononenstruktur, so dass für kleine Kohlenstoff-Konzentrationen die FTIR-Absorptionsspektroskopie nicht unmittelbar anwendbar ist. Dies wird erst durch eine Wärmebehandlung bei 1360°C ermöglicht, die zu einer Annäherung der Phononenstruktur von multikristallinem an die von einkristallinem Silicium führt. Hochpräzise Messungen mittels SSMS-Methode ergeben an mono- und an multikristallinen Silicium-Proben höhere Kohlenstoff-Konzentrationen als die FTIR-Absorptionsmethode, die materialabhängig zwischen 20ppb(atomar) und 80ppb(atomar) liegen. In ultrahochreinem multikristallinem Material sind oberhalb von 10ppb(atomar) unter gleichen Bedingungen keine Kohlenstoff-Konzentrationen mittels SSMS nachweisbar. Es werden experimentelle Vorgehensweisen beschrieben, die zu einer richtigen Bestimmung der Kohlenstoff-Konzentration im Bereich oberhalb einer Nachweisgrenze von 5ppb(atomar) notwendig sind.

MS 6.16 Tue 16:30 Poster.IV

Ion Beam Camera for Mass Spektrometers — •Ann-Kathrin Rink[1], Jens Ebert[1], Timo Dickel[1,2], Hans Geissel[1,2], Martin Petrick[1], Wolfgang Plass[1,2], and Christoph Scheidenberger[1,2] — [1]Justus-Liebig-Universität, Giessen — [2]GSI Helmholtzzentrum für Schwerionenforschung GmbH, Darmstadt

For the design and performance optimisation of a mass spectrometer the spatial distribution of the ion beam plays an important role. In particular, for a multiple-reflection time-of-flight mass spectrometer it is important to know how the spatial distribution of ions evolves with increasing number of turns. The ion beam camera has been developed, which allows to determine the ion distribution.

For detecting the ions two micro-channel-plates (MCP) in chevron configuration are used to generate conversion electrons and amplify the signal. The electrons are post-accelerated onto a phosphor screen. The fluorescence light is recorded by a CCD camera mounted in vacuum. The advantage of such a detector system is the fast method of position distribution determination, the simplicity of the required setup and electronics and the single ion sensitivity. Furthermore the MCP detectors can be tested for their spatial homogeneity.

The instrument was designed, constructed and successfully tested. The setup and results will be shown and discussed.

MS 6.17 Tue 16:30 Poster.IV

A monitoring and control system for the ISOLDE resonance laser ion source RILIS — •Ralf Rossel[1,2,3], Valentin Fedosseev[1], Bruce Marsh[1], Sebastian Rothe[1,2], and Klaus Wendt[2] — [1]Engineering Department, CERN, Geneva, Switzerland — [2]Institut für Physik, Johannes Gutenberg-Universität, Mainz, Germany — [3]Fachbereich Design Informatik Medien, Hochschule Rhein-Main, Wiesbaden, Germany

The RILIS laser ion source is one of the central components of the ISOLDE on-line isotope production facility. A record of about 2500 hours of on-line operation for the year 2011 shows the major importance and high demand for RILIS which provides radioactive ion beams of various elements with the highest efficiency and unmatched isobaric purity. The RILIS is currently operated 24/7 with the operators continuously present to control and possibly correct the crucial laser parameters, i.e. wavelength, output powers and beam positions of all individual lasers in use. Moreover, the operator acts as contact person for the ISOLDE user to inform about its current status. Deploying a widely automated, network-based monitoring and control software will not only enable manpower to devote their time to system improvement rather than supervision but also greatly improve health issues and work safety as stay in areas with increased levels of radiation exposition will be significantly reduced. The on-going software and hardware development covers the four key aspects: Machine protection, monitoring of beam parameters, automated correction and a RILIS status display for the users. The concept and the status of implementation are presented.