Mass Spectrometry Division
Fachverband Massenspektrometrie (MS)

Karin Hain
Universität Wien
Währinger Straße 17
1090 Wien, Austria
karin.hain@univie.ac.at

Overview of Invited Talks and Sessions

(Lecture hall HS 2 Chemie; Poster Foyer Physik)

Invited Talks

MS 1.1	Mon	15:00–15:30	HS 2 Chemie	**Recent technical developments and precision mass measurements at ISOLTRAP** — •Christoph Schweiger
MS 2.1	Mon	16:45–17:15	HS 2 Chemie	**Non destructive mass and lifetime measurement of unstable nuclear states in heavy ion storage rings** — •Shahab Sanjari
MS 4.1	Tue	15:45–16:15	HS 2 Chemie	**A big scale to measure the tiniest mass - closing in on the neutrino mass with the KATRIN experiment** — •Alexander Marsteller
MS 6.1	Thu	11:00–11:30	HS 2 Chemie	**Isobar analysis in the actinide range and the characterization of an isotopic Np spike** — •Andreas Wiederin, Martin Martschini, Aya Sakaguchi, Peter Steier, Karin Hain
MS 8.1	Thu	15:45–16:15	HS 2 Chemie	**LABEC, the INFN-university of florence laboratory of nuclear techniques (IBA and AMS) for environment and cultural heritage** — •Franco Lucarelli
MS 9.1	Thu	17:30–18:00	HS 2 Chemie	**Development of chemical ionization methods based on plasma driven reactant ion production** — •Thorsten Benter, Hendrik Kersten, Walter Wissdorf
MS 10.1	Fri	11:00–11:30	HS 2 Chemie	**Rare-RI Ring facility: tool of precision mass spectrometry of short-lived nuclei** — •Takayuki Yamaguchi

Invited Talks of the joint Symposium Mass matters: Prospects of Bridging Nuclear Physics, Mass Spectrometry, and Astrophysics (SYMM)

See SYMM for the full program of the symposium.

SYMM 1.1	Tue	11:00–11:30	Kurt-Alder HS Chemie	**Mass measurements with RIBs** — •Guy Savard
SYMM 1.2	Tue	11:30–12:00	Kurt-Alder HS Chemie	**LUNA -Experimental challenges in Underground Nuclear Astrophysics Laboratory** — •Alba Formicola
SYMM 1.3	Tue	12:00–12:30	Kurt-Alder HS Chemie	**The r-process: connecting astrophysics and nuclear physics** — •Almudena Arcones

Invited Talks of the joint Symposium Precision Measurements at the Intersection of Atomic and Nuclear Physics (SYPM)

See SYPM at the SAMOP meeting in Bonn for the full program of the symposium

SYPM 1.1	Wed	14:30–15:00	HS 1+2	**Probing new bosons and nuclear structure with ytterbium isotope shifts** — •Tanja Mehlstäubler, Chih-Han Yeh, Henning Fürst, Laura Dreissen
SYPM 1.2	Wed	15:00–15:30	HS 1+2	**Probing the stars: Nuclear astrophysics with stable and radioactive ion beams** — •Ragandeep Singh Sidhu
SYPM 1.3	Wed	15:30–16:00	HS 1+2	**Precision measurements and metrology applications at the borderline between atomic and nuclear physics** — •Adriana Pálffy

SYPM 1.4 Wed 16:00–16:30 HS 1+2 **Atomic parity violation: the seventh decade** — •Dmitry Budker

Sessions

MS 1.1–1.5	Mon	15:00–16:30	HS 2 Chemie	**Heavy and Superheavy Elements**
MS 2.1–2.5	Mon	16:45–18:15	HS 2 Chemie	**New Methods, Technical Development I**
MS 3	Tue	13:00–14:00	HS 2 Chemie	**Members' Assembly**
MS 4.1–4.5	Tue	15:45–17:15	HS 2 Chemie	**Application to Astrophysics**
MS 5.1–5.9	Tue	17:30–19:00	Foyer Physik	**Poster**
MS 6.1–6.5	Thu	11:00–12:30	HS 2 Chemie	**Isobar Suppression Techniques**
MS 7.1–7.3	Thu	14:45–15:30	HS 2 Chemie	**New Methods, Technical Development II**
MS 8.1–8.5	Thu	15:45–17:15	HS 2 Chemie	**Accelerator Mass Spectrometry I**
MS 9.1–9.5	Thu	17:30–19:00	HS 2 Chemie	**Actinide Analysis**
MS 10.1–10.5	Fri	11:00–12:30	HS 2 Chemie	**Accelerator Mass Spectrometry II**

Members' Assembly of the Mass Spectrometry Division

Tuesday 13:00–14:00 HS 2 Chemie

- Report
- Miscellaneous

MS 1: Heavy and Superheavy Elements

Time: Monday 15:00–16:30 Location: HS 2 Chemie

Invited Talk MS 1.1 Mon 15:00 HS 2 Chemie

Recent technical developments and precision mass measurements at Isoltrap — •Christoph Schweiger for the ISOLTRAP-Collaboration — Max-Planck-Institut for Nuclear Physics, Heidelberg, Germany — CERN, Geneva, Switzerland

The Isoltrap experiment [1] is a multi-ion-trap mass spectrometer located at ISOLDE/CERN for high-precision mass measurements of artificially produced, short-lived, exotic radionuclides far from stability. Experimentally, Isoltrap uses multi-reflection time-of-flight and Penning-trap mass spectrometry for absolute and relative mass measurements. Following Einstein's famous mass-energy equivalence, $E = mc^2$, the measured masses can be related to nuclear binding energies which reflect the underlying interactions and structure in the nucleus. Knowledge of the binding energies therefore allows the study of nuclear structure and nuclear astrophysics while precise mass measurements have also applications in fundamental physics such as neutrino or weak interaction studies.

In this contribution, the experimental setup, recent technical developments such as the commissioning of a linear Paul trap for mass-selective re-trapping [2], as well as selected results from recent beamtimes will be presented. These include the neutron-deficient ^{97,98}Cd ground states in vicinity of the self-conjugate doubly-magic ^{100}Sn and the high-lying 25/2+ isomer ^{97n}Cd as well as the first mass measurements of the neutron-rich ^{209,210,212}Hg.

[1] Lunney, D. et al., J. Phys. G: Nucl. Part. Phys. 44, 064008 (2017)
[2] Dickel, T. et al., J. Am. Soc. Mass Spectrom. 28, 1079 (2017)

MS 1.2 Mon 15:30 HS 2 Chemie

Mass Measurements of Actinides at TRIGA-Trap — •Tanvir Sayed[1], Klaus Blaum[1], Michael Block[2,3], Burcu Cakirli[1], Stanislav Chenmarev[1], Christoph Düllmann[2,3], Szilard Nagy[1], and Dennis Renisch[2,3] — [1]Max-Planck-Institut für Kernphysik, Heidelberg, DE — [2]Helmholtz-Institut Mainz, DE — [3]Department Chemie - Standort TRIGA, Mainz, DE

TRIGA-Trap is a high-precision, double Penning-trap mass spectrometer. Masses of actinides including ^{244}Pu, ^{241}Am, ^{243}Am, ^{248}Cm, and ^{249}Cf have been measured using the Phase-Imaging Ion-Cyclotron-Resonance (PI-ICR) technique with parts-per-billion precision [1]. The precise mass measurements allow to explore nuclear structure through trends in mass filters, such as S_{2n} (two-neutron separation energies) and $\delta V_{p,n}$ (average p-n interaction of the most loosely-bound two nucleons), as well as their differentials. Measurements of nuclei in the neutron-deficient Pu isotopic chain – ^{238}Pu, ^{239}Pu, ^{240}Pu, and ^{242}Pu – are in preparation to enhance the current dataset and complement ongoing nuclear structure studies. In particular, the shell evolution with increase in neutron number N towards the N=152 sub-shell closure for proton number Z=94 can be investigated, and the predictive capabilities of nuclear shell models for heavy, deformed nuclei can be assessed. In this talk, an overview of the current status of the experiment, as well as future directions, will be discussed.

References: [1] S. Chenmarev, K. Blaum, M. Block et al. Masses of transuranium nuclides measured with the PI-ICR technique at TRIGA-Trap. Eur. Phys. J. A 60, 204 (2024).

MS 1.3 Mon 15:45 HS 2 Chemie

Analysis and quantification of a transcurium breeding solution after intense neutron irradiation at ORNL via RIMS — •Sebastian Berndt[1], Christoph E. Düllmann[1,2,3], Raphael Hasse[1], Andrea T. Loria Basto[1,2], Christoph Mokry[1,2], Thorben Niemeyer[1], Sebastian Raeder[2,3], Dennis Renisch[1,2], Jörg Runke[1,3], Samantha K. Schrell[4], Matou Stemmler[1], and Klaus Wendt[1] — [1]Johannes Gutenberg University Mainz, Mainz, Germany — [2]Helmholtz-Institut Mainz, Mainz, Germany — [3]GSI, Darmstadt, Germany — [4]Oak Ridge National Laboratory, Oak Ridge, TN, USA

The High Flux Isotope Reactor at Oak Ridge National Laboratory produces trans-Cm samples through intense neutron irradiation. The expected isotope yields are modeled, but these models require experimental benchmark data. In this context, a trans-Cm sample was characterized using α- and γ-spectrometry as well as Resonance Ionization Mass Spectrometry (RIMS) for an isotopically resolved determination of the Np, Pu, Am, Cm and Cf content. Such a characterization of the isotopic composition of a mixed actinide solution by α- and γ-spectrometry can be difficult due to large differences in the half-lives of the individual nuclides ranging from a few up to 10^7 years. In addition, the individual α- or γ-lines of several nuclides overlap. In contrast, RIMS is an efficient and, due to the ionization process, element-selective technique with the capability of resolving the elemental and isotopic composition avoiding such disadvantages. The results of the combined approach of classical radioanalytics and RIMS will be presented.

MS 1.4 Mon 16:00 HS 2 Chemie

Status and prospects for laser spectroscopy with RADRIS — •Kenneth van Beek for the SHE Laser-Collaboration — TU Darmstadt — GSI Helmholtzzentrum für Schwerionenforschung GmbH

The experimental determination of atomic and nuclear properties such as atomic energy levels, ionization potentials, electromagnetic moments, trends in mean-square charge radii, and isotope shifts for nuclei in the region of heavy actinides ($Z \geq 100$) remains limited. The main challenges are low production rates in accelerator facilities and the short half-life of the fusion products. This necessitates the use of highly efficient and selective laser spectroscopy techniques. At GSI-FAIR in Darmstadt, Germany, the **RA**diation **D**etected **R**esonance **I**onization **S**pectroscopy (RADRIS) apparatus has been succesfully used to study aforementioned properties in $^{245,246,248-250,254}$Fm and $^{252-255}$No.

This contribution deals with the latest results with RADRIS, which include laser spectroscopy of $^{152-154}$Tm and, for the first time, of ^{152}Tm. Here, the isotope shift was measured in three different optical transitions. These results are discussed in particular with regard to a planned search for atomic levels in the chemical element Md (Z=101), for which Tm is the chemical homolog.

MS 1.5 Mon 16:15 HS 2 Chemie

High precision laser ionisation spectroscopy with JetRIS at GSI — •Alexandre Brizard for the SHE Laser-Collaboration — GANIL, CEA/DRF-CNRS/IN2P3, Caen, France

Resonance Ionization Spectroscopy (RIS) probes the atomic structure through multi-step laser ionization of neutralised atoms. When performed in a hypersonic gas jet, the technique's precision is enhanced by minimizing Doppler and pressure broadening [1].

At the SHIP velocity filter at GSI, JetRIS utilizes ion guiding and filament neutralization to inject the fusion products into the gas jet [2]. The photoions are studied using an alpha detector for efficient detection with low background. Future upgrades include an MR-ToF-MS, enabling mass-selected ion detection and access to long-lived as well as beta-decaying nuclides.

Following online commissioning in 2022, which revealed a transport efficiency of about 0.2% [3], significant effort has been put in improving the extraction and neutralisation of ions from the stopping gas cell. This work is being carried out in collaboration with KU Leuven.

Here we present the latest developments on the setup in preparation for the beamtime in February 2025.

[1] R. Ferrer et al., Nat Commun, 8, 14520 (2017)
[2] S. Raeder et al., NIMB, 463, 272-276 (2020)
[3] J. Lantis et al., Phys. Rev. Research 6, 023318 (2024)

MS 2: New Methods, Technical Development I

Time: Monday 16:45–18:15 Location: HS 2 Chemie

Invited Talk MS 2.1 Mon 16:45 HS 2 Chemie

Non destructive mass and lifetime measurement of unstable nuclear states in heavy ion storage rings — •Shahab Sanjari — GSI Darmstadt

Storage rings provide a unique experimental environment for non-destructive measurements of the mass and lifetimes of unstable nuclei and/or their isomeric states. With their high resolution, cavity-based Schottky detectors provide the speed and sensitivity required for such measurements. In order to increase the measurement accuracy, the velocity spread of the particles must be addressed. In the past, the electron cooler was used for this purpose. However, since the cooling time is on the order of seconds, efforts have been made to perform measurements of shorter-lived states by tuning the lattice of the storage ring to the isochronous ion-optical mode. During the last beam times, the isochronous mode was successfully used in combination with sensitive and fast non-destructive Schottky detectors (S+IMS method), thus combining the measurement of short lifetimes with high frequency resolution. In order to further improve the accuracy of mass measurements using non-destructive Schottky cavities, the effect of velocity outside the isochronous window needs to be addressed. For this purpose, a novel position sensitive detector structure was simulated, designed and constructed at GSI for use in the R3 storage ring at RIKEN. In this work we describe the successful application of the new combined Schottky and isochronous mass (and lifetime) spectroscopy (S+IMS) method. The experimental setup, used detectors and methods are described and future perspectives are discussed.

MS 2.2 Mon 17:15 HS 2 Chemie

Setup for Technical Development of Resonance Ionization Spectroscopy in Buffer Gases — •Tim van de Vendel[1,2], Michael Block[2,3,4], Julia Even[1], and Sebastian Raeder[2,4] — [1]University of Groningen, The Netherlands — [2]GSI Helmholtzzentrum für Schwerionenforschung, Germany — [3]Johannes Gutenberg University, Mainz, Germany — [4]Helmholtz-Institut Mainz, Germany

A new offline development setup is being established in the laser spectroscopy group of the Superheavy Physics-department at GSI. While the existing RADRIS [1] and JetRIS [2] setups provide efficient, high-precision online measurements, they offer limited flexibility for off-line development studies.

This new setup solves this problem by constructing a novel three-cell design, where atoms are ionized in a pressurized cell and guided into a second cell. Here, a compact RFQ design directs the ions to a detector cell. The setup allows pressures in the first two cells to be easily varied, and the construction simplifies exchange of components.

This setup can be used for a variety of studies including pressure broadening effects in different gases, the extraction efficiency of various electrode designs, and other preparatory studies for online experiments.

An overview of the current status of the setup and future applications are discussed.

[1] F. Lautenschläger et al., NIMB, 383, (2016) 115-122
[2] R. Ferrer et al., Nat Commun, 8, 14520 (2017)

MS 2.3 Mon 17:30 HS 2 Chemie

Recent beam line and vacuum line upgrades at the FRS Ion Catcher — •Leonard Welde[1] and Jiajun Yu[2,3] for the FRS Ion Catcher-Collaboration — [1]Justus-Liebig-Universität Gießen, Gießen, Germany — [2]GSI Helmholtzzentrum für Schwerionenforschung, Darmstadt, Germany — [3]Institute of Modern Physics, Chinese Academy of Sciences, Lanzhou, China

At the FRS Ion Catcher, located at GSI, experiments with exotic nuclei are conducted. Exotic nuclei produced and separated at the Fragment Separator (FRS) are stopped in a gas-filled cryogenic stopping cell (CSC), transported via a radio frequency quadrupole (RFQ) beam line, which contains mass filters, to a multiple-reflection time-of-flight mass spectrometer (MR-TOF-MS).
Experiments targeting exotic nuclei with detection rates down to less than one ion per hour demand an as high as achievable transport efficiency from the CSC to the MR-TOF-MS, to be able to get sufficient statistics in a reasonable time frame. Simulations of the RFQ beam line were done, indicating possibilities to improve the transport efficiency by changing the positioning and/or the geometry of different apertures inside the beam line. In addition an upgrade of the pre-vacuum lines was done to be able to achieve higher areal densities in the CSC for future experiments. The results of these recent technical upgrades will be reported in this contribution.

MS 2.4 Mon 17:45 HS 2 Chemie

Simulations of ion transport at the high-density RF Carpet for the Cryogenic Stopping Cell of the Super-FRS — •Nils Steinbrenner[1], Daler Amanbayev[1,2], Timo Dickel[1,2], and Wolfgang R. Plass[1,2] — [1]II. Physikalisches Institut, Justus-Liebig Universität, Gießen, Deutschland — [2]GSI Helmholtzzentrum für Schwerionenforschung GmbH, Darmstadt, Deutschland

In the context of the Super-FRS at FAIR, the Cryogenic Stopping Cell (CSC) is responsible for decelerating and stopping exotic ion beams produced at relativistic energies. The CSC's design is constrained by the need to achieve exceptionally high areal gas densities, up to 40 mg/cm^2, which presents significant challenges in ion extraction. The RF carpet, a critical component in this process, experiences decreased efficiency in ion capture and transport at high gas densities. To optimize the RF carpet's performance, detailed ion trajectory simulations were conducted. This contribution presents recent investigations into various RF-carpet geometries and explores the influence of the gap-to-electrode ratio on ion transport efficiency, with the ultimate goal of enhancing the RF carpets functionality for future CSC configurations.

MS 2.5 Mon 18:00 HS 2 Chemie

Comparing a Conventional and an Improved Faraday Cup in an Element-Specific Analysis for Ion Beam Current Measurements — •Sarah Oehler[1], Sebastian Berndt[1], Vadim Gadelshin[1], Raphael Hasse[1], Christoph E. Düllmann[1,2,3], Tom Kieck[2,3], Nina Kneip[1], and Klaus Wendt[1] — [1]Johannes Gutenberg-Universität, Mainz — [2]GSI Helmholtzzentrum für Schwerionenforschung, Darmstadt — [3]Helmholtz-Institut, Mainz

Faraday cups are crucial tools for ion beam current measurements in mass spectrometry, at accelerators or storage rings. Comparative measurements at the RISIKO mass separator facility in Mainz using γ-spectroscopy indicated a systematic underestimation of the ion beam current, leading to the implementation of a new Faraday cup design. This new design provides an optimized geometry and an adapted material composition for significantly improved suppression of any charged secondary particles. Within the experiment, primary ions of various elements along the Periodic Table were measured on both a conventional and the improved Faraday cup. The results show that for non-alkali and non-alkaline earth metals, the improved Faraday cup reduces loss of sputtered particles by an average of 24.8% compared to the conventional design at 200 V repeller voltage. Further, for alkali and alkaline earth metals the corrections were observed to reach above 50% with respect to the conventional design.

MS 3: Members' Assembly

Time: Tuesday 13:00–14:00 Location: HS 2 Chemie

All members of the Mass Spectrometry Division are invited to participate.

MS 4: Application to Astrophysics

Time: Tuesday 15:45–17:15 Location: HS 2 Chemie

Invited Talk MS 4.1 Tue 15:45 HS 2 Chemie

A big scale to measure the tiniest mass - closing in on the neutrino mass with the KATRIN experiment — •Alexander Marsteller for the KATRIN-Collaboration — Karlsruher Institut für Technologie, Karlsruhe, Deutschland

The neutrino mass is a fundamental parameter with profound implications for cosmology, shaping structure formation in the universe, and offering a gateway to physics beyond the Standard Model. The kinematics of weak decays provide the only model-independent laboratory approach to determine the absolute neutrino mass scale.

The KArlsruhe TRItium Neutrino experiment (KATRIN) aims to measure the mass of the electron anti-neutrino via high-precision beta-decay spectroscopy of tritium. KATRIN combines a high-luminosity, windowless gaseous molecular tritium source with an electrostatic spectrometer employing magnetic adiabatic collimation. This setup achieves eV-scale energy resolution while maintaining a large accepted solid angle. Since commencing measurements in 2019, KATRIN has achieved stable and precise operation, recently establishing the most stringent direct upper limit of 0.45 eV (90% C.L.) for the neutrino mass.

This presentation will highlight results from the most recent data release and gives an overview of current and future KATRIN activities beyond the neutrino-mass measurement. The talk will conclude with an outlook on KATRIN's remaining path to its 0.3 eV sensitivity goal, and long-term perspectives for pushing neutrino mass measurements in the laboratory by at least another order of magnitude in sensitivity.

MS 4.2 Tue 16:15 HS 2 Chemie

Using metastable C^- ions to infer limits on room temperature radiation in the Cryogenic Storage Ring — •Mira Newe, Manfred Grieser, Florian Grussie, Oldřich Novotný, Viviane C. Schmidt, Aigars Znotiņš, and Holger Kreckel — Max-Planck-Institut für Kernphysik, Heidelberg, Germany

In order to investigate molecular processes of astrophysical relevance the Cryogenic Storage Ring (CSR) is operated at very low temperatures ($\sim$ 4 K). In this low black-body radiation field molecules can cool to their lowest rotational states. Nevertheless, small radiation leaks, as e.g. by laser viewports or beamline ports, lead to a slightly elevated radiation field with a small room temperature component [1]. For future experiments and new detector developments it is important to quantify this room temperature component. To probe the room temperature contribution we measured the lifetime of metastable C^- anions in the highly excited ^{2}D states, which can be photodetached by room temperature radiation. Using the method of laser probing we measured the radiation-limited lifetime of the metastable ions at cryogenic temperatures. Corresponding measurements were also made at room temperature (without laser probing) to verify previous results [2]. The results and implications will be presented and discussed.

[1] C. Meyer *et al.*, Phys. Rev. Lett. 119, 02320 (2017)
[2]T. Takao *et al.*, J. Phys. Conf. Ser. 88, 012044, (2007)

MS 4.3 Tue 16:30 HS 2 Chemie

Interstellar ^{60}Fe in Antarctic Ice Tracing the Local Interstellar Cloud — •Annabel Rolofs[1], Dominik Koll[1,2,3], Florian Adolphi[4], Sebastian Fichter[1], Maria Hörhold[4], Johannes Lachner[1], Stefan Pavetich[2], Georg Rugel[1], Stephen Tims[2], Sebastian Zwickel[1,3], and Anton Wallner[1,2,3] — [1]Helmholtz-Zentrum Dresden-Rossendorf, Dresden, Germany — [2]Australian National University, Canberra, Australia — [3]TUD Dresden University of Technology, Dresden, Germany — [4]Alfred-Wegener-Institut, Bremerhaven, Germany

^{60}Fe ($t_{1/2}$=2.6 Myr) is formed in massive stars and can be transported to Earth if embedded into interstellar dust grains. Previous studies found ^{60}Fe in million-year-old marine archives and on the Moon. A recent influx of interstellar ^{60}Fe was discovered in Antarctic surface snow and with sediment data it was shown that this recent influx extends back to at least 33 kyr ago. The solar system entered a denser substructure of the otherwise thin Local Bubble about 40 kyr ago, the Local Interstellar Cloud (LIC).
To investigate a connection between the entry into the LIC and an interstellar ^{60}Fe influx, 295 kg of continuous flow analysis water from the EDML ice core in Antarctica, spanning 40 - 80 kyr BP, were analysed. A suite of cosmogenic radionuclides, ^{10}Be, ^{26}Al, ^{41}Ca and ^{53}Mn, was measured by accelerator mass spectrometry to assess any potential losses of interstellar ^{60}Fe. The cosmogenic radionuclide abundance as well as the amount of interstellar ^{60}Fe deposited into Antarctic ice will be discussed and a connection to the LIC will be drawn.

MS 4.4 Tue 16:45 HS 2 Chemie

Interstellar Radionucildes in Lunar Regolith Tracing Supernova and *r*-Process Events — •Sebastian Zwickel[1,2], Sebastian Fichter[1], Michael Hotchkis[3], Dominik Koll[2], Johannes Lachner[1], Marc Norman[4], Stefan Pavetich[4], Georg Rugel[1], Konstanze Stübner[1], Stephen Tims[4], and Anton Wallner[1,2] — [1]HZDR, Dresden, Germany — [2]TU Dresden, Germany — [3]ANSTO, Sydney, Australia — [4]ANU, Canberra, Australia

The search for live interstellar radionuclides on Earth and the Moon via accelerator mass spectrometry provides valuable insights into the history and dynamics of our galaxy. The detection of ^{60}Fe in deep-sea archives has shown that two supernova explosions occurred in the solar neighbourhood during the last 10 Myr. While lunar regolith lacks time resolution, it offers an integral measurement of interstellar radionuclide deposition over the last few to several hundred million years. Interstellar ^{60}Fe in lunar regolith already provided a clearer understanding of the total amount of ^{60}Fe arriving on Earth and the Moon. Further insight into the evolution of the solar neighbourhood could be realised using ^{244}Pu as a probe. This radionuclide provides a signal essentially only derived from *r*-process events that occurred in the last few hundred million years, and could shed light on the heavily disputed astrophysical sites of the *r*-process. This project aims to simultaneously measure ^{60}Fe and ^{244}Pu in lunar regolith, with the goal of linking them to nearby supernova and *r*-process nucleosynthesis events. I will show the importance of cosmogenic radionuclides for this research and present new preliminary results on ^{60}Fe in lunar regolith.

MS 4.5 Tue 17:00 HS 2 Chemie

Challenges in the extraction of ^{182}Hf from geological archives — •Sebastian Fichter[1], Dominik Koll[1], Sebastian Zwickel[1], Martin Martschini[2], Silke Merchel[2], Laurenz Widermann[2], Robin Golser[2], and Anton Wallner[1] — [1]HZDR, Dresden, Germany — [2]University of Vienna, Faculty of Physics, Austria

The identification and measurement of the astrophysically relevant radionuclide ^{182}Hf ($t_{1/2}$ = 8.9 * 10^6 yr) in different geological archives would significantly advance our understanding of potential *r*-process sites, especially when its abundance is compared to other nucleosynthesis radionuclides such as ^{60}Fe and ^{244}Pu over time. In this work, we present our recent efforts to develop a suitable chemical protocol to extract ^{182}Hf from various sample matrices including deep-sea ferromanganese crusts. The main objective of this work is to maintain a high chemical yield while separating other elements as much as possible. Special attention is paid to the suppression of the stable isobar ^{182}W, which is yet one of the limiting factors preventing the actual measurement of live ^{182}Hf using Accelerator Mass Spectrometry (AMS). This work is partly funded by ChETEC-INFRA.

MS 5: Poster

Time: Tuesday 17:30–19:00 Location: Foyer Physik

MS 5.1 Tue 17:30 Foyer Physik

An experimental setup to study collisions of molecular ions using the 4k-pixel microcalorimeter detector MOCCA and follow-up integration into the Cryogenic Storage Ring CSR — •Selina Gaisser[1], Christian Enss[2], Andreas Fleischmann[2], Lisa Gamer[1], Oded Heber[3], Daniel Hengstler[2], Christopher Jakob[3], Daniel Kreuzberger[2], Ansgar Lowack[2], Abdullah Özkara[2], Micheal Rappaport[3], Andreas Reifenberger[2], Dennis Schulz[2], Abhishek Shahi[3], Yoni Toker[4], Andreas Wolf[1], and Oldřich Novotný[1] — [1]MPIK Heidelberg — [2]KIP Heidelberg University — [3]Weizmann Institute of Science, Rehovot, Israel — [4]Bar-Ilan University, Ramat Gan, Israel

One key process for the formation of over 300 molecular species detected in the InterStellar Medium (ISM) is Dissociative Recombination (DR). For a better understanding of this reaction, experimental studies under conditions similar to those in the ISM are necessary. A facility capable of such conditions and measurements is the electrostatic Cryogenic Storage Ring (CSR) at the Max Planck Institute for Nuclear Physics in Heidelberg. To obtain precise data, a detector which collects neutral DR products with high energy, time and position resolution is essential. Therefore, the 4k-pixel MOleCule Camera Array (MOCCA) based on Metallic Magnetic Calorimeters was designed and fabricated at the Kirchhoff Institute for Physics in Heidelberg. MOCCA will first be implemented in a CSR-independent standalone setup, where collisions between ions and a gas jet will be studied. The current status of the project will be presented.

MS 5.2 Tue 17:30 Foyer Physik

Recent technical developments and measurements at ISOLTRAP — •Paul Florian Giesel for the ISOLTRAP-Collaboration — Universität Greifswald, Institut für Physik, Greifswald, Deutschland

The ISOLTRAP setup at ISOLDE/CERN is a high-precision mass spectrometer designed to measure the masses of short-lived, exotic radionuclides far from the valley of stability. Utilizing both multi-reflection time-of-flight (MR-ToF) and Penning-trap mass spectrometry, ISOLTRAP performs precise absolute and relative mass measurements. Converting these measured masses into nuclear binding energies (via the mass-energy equivalence) provides critical insights into the underlying nuclear forces and structures.

This contribution will present the current status of ISOLTRAP and highlight recent technical developments, such as the implementation of a second linear Paul trap to rebunch mass-selected ion beams and the addition of a temperature-stabilization system for the MR-ToF mass spectrometer. Recent beamtime results will also be shown, focusing on the neutron-deficient ^{97,98}Cd ground states in the vicinity of the doubly-magic ^{100}Sn and the ^{97m}Cd isomeric state, as well as the first mass measurements of the neutron-rich ^{209,210,212}Hg.

MS 5.3 Tue 17:30 Foyer Physik

Investigation of a New Control Loop for the Stability of the Cologne 10 MV AMS System — •Marcus Sickmöller, Markus Schiffer, Gereon Weingarten, and Dennis Mücher — Institute for Nuclear Physics, University of Cologne

This work focuses on improving the voltage stability of the 10 MV tandem accelerator at the University of Cologne for improved Accelerator Mass Spectrometry (AMS) measurements. AMS requires pulsed ion beams with highly stable beam energies for precise isotopic ratio measurements, such as Fe-60 and Mn-53. Until now, the slit control mode, which offers superior long-term voltage stability (50-100 V/MV compared to 500-1000 V/MV in the Generating Voltmeter (GV) mode), could not be utilized due to the pulsed nature of AMS beams.

In this research project, modifications to the accelerator enabled the slit control mode to be applied for the first time with pulsed beams. A comparative analysis showed that the slit control mode significantly reduces beam instability caused by voltage fluctuations, enhancing measurement precision. However, challenges were observed during extended non-active pulse times, indicating areas for further optimization.

This work provides a starting point for improving terminal voltage stability in pulsed beam operation, making it comparable to that of non-pulsed beams.

MS 5.4 Tue 17:30 Foyer Physik

Ion-optical and optical measurements of the Anion Laser Isobar Separator - ALIS — •Derin Schmidt[1], Stefan Heinze[1], Oscar Marchhart[1,2,3], Dennis Mücher[1], and Markus Schiffer[1] — [1]University of Cologne, Institute for Nuclear Physics, Germany — [2]University of Vienna, Faculty of Physics, Isotope Physics, Austria — [3]University of Vienna, Vienna Doctoral School in Physics, Vienna, Austria

As the detection of trace amounts of certain nuclides via Accelerator Mass Spectrometry (AMS) is highly dependent on the suppression of isobars, the Anion Laser Isobar Separator (ALIS) was installed at the University of Cologne for element-selective photo-detachment and buffer-gas reactions. The ion-optical system of the ion source and the injector magnet was characterized by beam profile measurements, and the results were compared to simulations. The ion source efficiency was measured for ^{12}C, ^{27}AlO, ^{88}SrF$_3$, and ^{35}Cl. An 18W continuous-wave 532 nm laser was installed, and transmission tests were conducted with the optical system to prepare for its future application in element-selective photo-detachment.

MS 5.5 Tue 17:30 Foyer Physik

Advancing AMS-based techniques for ultra-trace detection of ^{99}Tc — •Stephanie Adler[1,2], Martin Martschini[1], Dennis Mücher[3], Erik Strub[3], Thomas C. Meisel[4], and Karin Hain[1] — [1]University of Vienna, Faculty of Physics, Austria — [2]University of Vienna, Vienna Doctoral School in Physics, Austria — [3]University of Cologne, Institute for Nuclear Physics, Germany — [4]Montanuniversität Leoben, Austria

Determination of absolute concentrations of the anthropogenic radionuclide ^{99}Tc ($t_{1/2}$=2.1×10^5 yr) in environmental samples by accelerator mass spectrometry (AMS) requires the suppression of the stable isobaric background of ^{99}Ru and a reliable normalisation method. Classical AMS of ^{99}Tc at the Vienna Environmental Research Accelerator (VERA) yielded a reproducibility of 15% for normalisation to ^{93}Nb^{4+}. We achieved a detection limit of 2×10^9 atoms ^{99}Tc when correcting for the ^{99}Ru background by monitoring ^{101}Ru. With the addition of the Ion-Laser InterAction Mass Spectrometry (ILIAMS) setup, a better ^{99}RuF$_5^-$ suppression of up to 10^5 can be achieved. Previously, this method showed poor reproducibility, but we have finally improved the reproducibility from 50% to 15% by optimisation of ion source parameters. At the Montanuniversität Leoben, isobar suppression was tested using a thermal ionisation source. By extracting ^{99}TcO$_4^-$ ions, a ^{99}Ru suppression factor of 10^6 was achieved. The feasibility of normalisation with a ^{97}Tc spike is investigated. To produce the spike, a Nb foil was irradiated with a ^{7}Li^{3+} beam at the Institute for Nuclear Physics in Cologne yielding $> 5 \times 10^{12}$ atoms of ^{97}Tc.

MS 5.6 Tue 17:30 Foyer Physik

AMS-detection of ^{182}Hf: Characterization of new low-level reference materials and cross-contamination experiments — •Laurenz Widermann[1], Martin Martschini[1], Silke Merchel[1], Sebastian Fichter[2], Dominik Koll[2,3], Johannes Lachner[2], Johannes H. Sterba[4], Anton Wallner[2], and Robin Golser[1] — [1]University of Vienna, Faculty of Physics, Austria — [2]HZDR, Dresden, Germany — [3]TUD Dresden University of Technology, Dresden, Germany — [4]TRIGA Center Atominstitut, TU Wien, Vienna, Austria

To detect the potentially supernova-produced radionuclide ^{182}Hf ($t_{1/2} = 8.9 \cdot 10^6$ yr) as low as $2.2 \cdot 10^4$ atoms per ferromanganese crust sample with Accelerator Mass Spectrometry (AMS), the stable isobar ^{182}W needs to be suppressed by six orders of magnitude.

Ion-Laser InterAction Mass Spectrometry (ILIAMS) in Vienna allows suppression of ^{182}WF$_5^-$ by a factor of 10^5. New low-level reference materials prepared from a known activity of ^{182}Hf, with ^{182}Hf/^{180}Hf ratios between 10^{-13}–10^{-11}, were characterized and cross-checked against ViennaHf-10 and ViennaHf-11. These previously used materials have too high ^{182}Hf/^{180}Hf ratios ($> 10^{-10}$) to allow measurements at the 10^{-14} level expected from crust samples.

New isobar spikes for correcting A = 182 counts for residual ^{182}W were investigated at the AMS-facilities in Vienna and Dresden. Sputtering targets spiked with varying amounts of tungsten revealed both short-term cross-contamination and long-term memory effects.

This work is supported by ChETEC-INFRA (H2020 #101008324).

MS 5.7 Tue 17:30 Foyer Physik

Multi-Actinide Analysis on Air Filters Collected in Different Environmental Settings — •Mihails Pavlenko, Helinä Poutamo, Nathalie Schuster-Bourgin, and Karin Hain — University of Vienna, Faculty of Physics, Austria

The earth's surface was labelled with human-produced long-lived actinides deposited as nuclear weapons fallout in the 1950s and 1960s, and, more locally restricted, by emission from the nuclear industry and major nuclear accidents. Until today, they take part in redistribution processes and are re-mobilized in the form of aerosols. The signals of the anthropogenic actinides ^{233,236}U, ^{237}Np,^{239,240,241}Pu, and ^{241}Am have been studied in air filters using Accelerator Mass Spectrometry (AMS) at the Vienna Environmental Research Accelerator (VERA). Samples provided by Deutscher Wetterdienst had been collected at various locations in Germany which suggest a different aerosol composition.

In this context, a chemical procedure preparing U, Pu and Np together in the same AMS target is being developed. First results e.g. on the chemical recovery, were compared to our routine preparation protocol of separating U from Pu and Np, respectively. The parallel analysis of Pu and U is within reach thanks to the efficient suppression of neighbouring masses in the actinide region at VERA.

MS 5.8 Tue 17:30 Foyer Physik

AMS for long-lived cosmogenic radionuclides in stony meteorites - Now without chemical preparation — •Silke Merchel, Oscar Marchhart, Martin Martschini, Alexander Wieser, and Robin Golser — University of Vienna, Faculty of Physics, Austria

Long-lived radionuclides in meteorites are a result of the interaction with cosmic rays. These cosmogenic nuclides (CNs) record the history of extraterrestrial matter. Reconstruction parameters of interest are: 1. pre-atmospheric size and shielding depth of the body in space (meteoroid); 2. irradiation time in space; 3. identification of complex exposure, i.e., repeated collisions or inherited CNs from pre-exposure at the surface of the meteoroid's parent body (asteroid, Moon, Mars); 4. residence time on Earth (terrestrial age). Accelerator mass spectrometry (AMS) is the preferred method for the detection of CNs such as ^{10}Be, ^{14}C, ^{26}Al, ^{36}Cl, and ^{41}Ca ($t_{1/2}$ = 6 ka – 1.4 Ma). However, tedious radiochemical separation to deplete matrices and isobars has been essential for AMS preventing rapid analysis until recently. Now, the unique Ion-Laser InterAction Mass Spectrometry (ILIAMS) system at the Vienna Environmental Research Accelerator provides isobar suppression of up to 14 orders of magnitude. Thus, ILIAMS-assisted AMS, allows the direct detection of ^{26}Al/^{27}Al ($\sim 10^{-10}$) and ^{41}Ca/^{40}Ca ($\sim 10^{-11}$) in stony meteorites containing intrinsic ∼1% Al and Ca. Isobars of the naturally-abundant elements (∼15% Mg, ∼0.1% K) do not interfere, making radiochemical separation redundant. Recent examples are the German and Austrian meteorite falls of Elmshorn, Ribbeck (Bischoff et al., *MAPS* 2024a/b) and Kindberg.

MS 5.9 Tue 17:30 Foyer Physik

Recurring Routine Measurements at DREAMS - Status and Challenges — •Georg Rugel, Toralf Döring, Sebastian Fichter, Klemens Kirsch, Dominik Koll, Johannes Lachner, Annabel Rolofs, Konstanze Stübner, Alexander Wieser, Stella Winkler, Janis Wolf, René Ziegenrücker, Sebastian Zwickel, and Anton Wallner — Helmholtz-Zentrum Dresden-Rossendorf, Dresden, Germany

DREAMS, the DREsden AMS-facility in operation since 2011 is based on a 6 MV tandetron (manufactured by High Voltage Engineering Europa) and shared with other research groups at the Helmholtz-Zentrum Dresden-Rossendorf (HZDR). DREAMS has been used primarily for the measurement of the cosmogenic isotopes ^{10}Be and ^{26}Al. Over the years, we have improved the AMS facility in various aspects for increased performance, particularly for these two isotopes. In this poster we will give details on the performance of our routine measurements over the past 13 years of operation with a focus on the impact of methodological developments since 2021. We will present our recent investigations and improvements on the performance of ^{10}Be and ^{26}Al measurements, highlight remaining key challenges, and point to potential future optimisations. Finally, we will show a comparison of our in-house standards material for ^{26}Al with the standards provided by Nishiizumi (KNSTD) demonstrating the compatibility of our analytical results with exposure-age calculators such as CRONUS-Earth.

MS 6: Isobar Suppression Techniques

Time: Thursday 11:00–12:30 Location: HS 2 Chemie

Invited Talk MS 6.1 Thu 11:00 HS 2 Chemie

Isobar analysis in the actinide range and the characterization of an isotopic Np spike — •Andreas Wiederin[1,2,3], Martin Martschini[1], Aya Sakaguchi[4], Peter Steier[1], and Karin Hain[1] — [1]University of Vienna, Faculty of Physics, Isotope Physics Austria — [2]University of Vienna, Vienna Doctoral School in Physics, Austria — [3]Austrian Academy of Sciences, Austria — [4]University of Tsukuba, Institute of Pure and Applied Sciences, Japan

^{237}Np is the second most abundant anthropogenic actinide in the environment and has great potential as an environmental tracer. An isotopic Np spike would solve the problem of normalization for mass spectrometric ^{237}Np measurements in a robust and reliable manner. Such a material has been produced via the ^{232}Th(^{7}Li,3n)^{236g}Np reaction at the Nishina AVF cyclotron ($<10^{10}$at ^{236g}Np). The co-production of the isobars ^{236}U, ^{236}Pu presented a challenge for the spike characterization since no AMS facility could distinguish isobars in this high mass range. An approach that combines AMS (Accelerator Mass Spectrometry), AFIA (Anion Formation Isobar Analysis) and the first non-chemical isobar separation in the actinide range in AMS using ILIAMS (Ion Laser InterAction Mass Spectrometry) has been developed to characterize a Np spike candidate. This pilot spike has been applied to a selection of environmental samples to analyze ^{237}Np. This work was funded by the Austrian Science Fund (FWF): [I-4803-N], a Dimitrov Fellowship of the Austrian Academy of Sciences, and supported by the Vienna Doctoral School in Physics, the Japanese Society for the Promotion of Sciences, and the ERAN network.

MS 6.2 Thu 11:30 HS 2 Chemie

Investigations on ILIAMS isobar suppression for non-routine AMS isotopes — •Martin Martschini[1], Denis Ibrahimovic[1], David Krebs[1], Oscar Marchhart[1], Silke Merchel[1], Thorben Niemeyer[2], Raphael Haase[2], Klaus Wendt[2], and Karin Hain[1] — [1]University of Vienna, Faculty of Physics - Isotope Physics, Austria — [2]Johannes Gutenberg-University, Mainz, Germany

The Ion-Laser InterAction Mass Spectrometry (ILIAMS) setup at Vienna offers unique opportunities for atomic isobar suppression in AMS via element-selective laser photodetachment. Over the past years, several studies on the ILIAMS performance for rather exotic AMS isotopes like ^{32}Si, ^{44}Ti, ^{59}Ni, ^{60}Fe, and ^{107}Pd ($t_{1/2} = 60 - 7\times10^{6}$ yr) were carried out, fueled by interest in these isotopes from nuclear astrophysics and environmental sciences. First, screening campaigns of oxide and fluoride molecular anions to identify systems suited for suppression of S, Ca, Co, Ni and Ag, respectively, were conducted using our fixed-frequency lasers of typically 10 – 20 W output power. Subsequently, negative ion yields of several of these anions in a Cs-sputter ion source were investigated. Additionally, measurement campaigns with tunable Ti:Sa and OPO lasers have recently been started to pin down unknown detachment energies of further promising systems. This work was partly supported by ChETEC-INFRA (EU H2020 #101008324).

MS 6.3 Thu 11:45 HS 2 Chemie

New light in Cologne: low-energy isobar suppression for trace isotopes — •Markus Schiffer[1], Oscar Marchhart[1,2,3], Derin Schmidt[1], Ferhat Altun[1], Stefan Heinze[1], Natasha Kalanke[1], Martin Martschini[2], Timm-Florian Pabst[1], Peter Steier[2], Gereon Weingarten[1], Erik Strub[4], Robin Golser[2], Tibor Dunai[5], and Dennis Mücher[1] — [1]University of Cologne, Institute for Nuclear Physics, Germany — [2]University of Vienna, Faculty of Physics, Isotope Physics, Austria — [3]University of Vienna, Vienna Doctoral School in Physics, Vienna, Austria — [4]University of Cologne, Institute for Nuclear Chemistry, Germany — [5]University of Cologne, Institute for Geology and Mineralogy, Germany

CologneAMS has successfully implemented a new low-energy isobar suppression unit, the Anion Laser Isobar Separator (ALIS), to im-

prove and expand the detection of trace amounts of isotopes for scientists that apply the AMS technique for their geologic, environmental, archaeological, nuclear chemical, and nuclear astrophysical research. The new infrastructure ALIS consists of four major sections: anion beam formation and mass selection, anion cooling and isobar suppression, ion-beam transport to the 6 MV AMS system and finally an 18 W 532 nm continuous wave laser. We will report on the detailed design and the status of ALIS. First beams are transmitted through ALIS and we will show initial physics cases, with a focus on geological and environmental aspects, that are feasible with the achieved transmissions and characteristics of the setup.

MS 6.4 Thu 12:00 HS 2 Chemie

Installation and characterization of the new ion cooler beamline at the 1 MV AMS facility in Dresden — •Johannes Lachner[1], Alexander Wieser[1,2], Robin Golser[2], Stefan Findeisen[1], Thilo Hauser[3], Timo Kirschke[1], Markus Meyer[1], Allan O'Connor[3], Carlos Vivo-Vilches[1,2], Nicole Wagner[1], Gerald Wedel[1], Stella Winkler[1], and Anton Wallner[1] — [1]Helmholtz-Zentrum Dresden-Rossendorf — [2]Universität Wien, Fakultät für Physik — [3]National Electrostatics Corp.

The AMS system HAMSTER (Helmholtz Accelerator Mass Spectrometer Tracing Environmental Radionuclides) will be installed at HZDR in 2025. This 1 MV facility includes an additional injection line for the purpose of isobar suppression with an ion cooler, the so-called Ion Linear Trap for Isobar Suppression (ILTIS). The beamline was installed in 2024 and its operation with the new ion cooler has started. The design of the ion cooler follows the system used for Ion-Laser InterAction Mass Spectrometry (ILIAMS) at the University of Vienna. An important update is the segmentation of the electrodes inside the cooler. This modular design allows the ion cooler to be operated as a single system or split into multiple radiofrequency quadrupole (RFQ) sections, which gives us more control of the ion energy. Within the RF circuit, the additional inductivity can be continuously adjusted. This simplifies the trap's adaptation for different frequencies.

Our presentation will cover a description of the new injection line and results from first experiments with the cooled ion beam and the characterization of the Paul trap using ion beams of Cl^- and Cu^-.

MS 6.5 Thu 12:15 HS 2 Chemie

Photodetachment measurements of negatively charged molecules and element separation at VERA — •T. Niemeyer[1], S. Berndt[1], Ch. E. Düllmann[1,2,3], O. Forstner[4,5], K. Hain[6], R. Hasse[1], K. Hens[7], M. Martschini[6], S. Merchel[6], M. Stemmler[8], and K. Wendt[1] — [1]Johannes Gutenberg-Universität Mainz — [2]Helmholtz-Institut Mainz — [3]GSI Darmstadt — [4]Friedrich-Schiller-Universität Jena — [5]Helmholtz-Institut Jena — [6]Universität Wien — [7]Hübner GmbH & Co. KG, Division HÜBNER Photonics, Kassel — [8]Institut für Radioökologie und Strahlenschutz (IRS), Leibniz Universität Hannover

Detection limits of 16 orders of magnitude in isotope ratios and isobaric suppression make Acccelerator Mass Spectrometry (AMS) the method of choice for ultra-sensitive trace analysis in various fields such as radiometric dating, nuclear astrophysics and geology. However, isobaric interferences still challenge ultrarare isotope measurements, e.g., of Mn-53 which is used for long-term geological and extraterrestrial dating or Fe-60 as an indication of supernovae remains found on Earth.

To suppress interfering isobar anions such as CrO on mass 53, tunable light sources, based on Ti:Sa and OPO technology, were used for the first time at the ILIAMS cooler at the low-energy side of the VERA AMS facility at the University of Vienna. Here we report on measurement of laser photodetachment curves for various oxide anions such as FeO, NiO, MnO, CrO and TiO, delivering useful molecular physics data as well as predictions on the expected isobaric suppression of e.g. MnO against CrO for AMS applications.

MS 7: New Methods, Technical Development II

Time: Thursday 14:45–15:30 Location: HS 2 Chemie

MS 7.1 Thu 14:45 HS 2 Chemie

Optimizing ToF-SIMS Analysis Conditions for Detecting Antibiotics in Frozen Hydrated Samples — •Michael Bäumer, Thorsten Adolphs, Richard Erling Peterson, Bonnie June Tyler, and Heinrich Franz Arlinghaus — University of Münster, Münster, Germany

In order for most biological specimens to be analyzed with ToF-SIMS, either the water must be removed via a process such as freeze-drying or the samples must be frozen and analyzed under cryogenic conditions. Cryogenic preparation and analysis of biological samples preserves the 3-dimensional structure of tissues and biofilms and can prevent migration artifacts that occur during freeze-drying. However, ToF-SIMS analysis of frozen aqueous sample systems results in a spectrum of pure and non-pure water ice cluster ions, extending to high masses, which can interfere with detection of biomolecules. Furthermore, metastable decay of the cluster ions in the time-of-flight analyzer can lead to a high background that raises the detection limit for target analytes. In this study, we have investigated the influence of a range of analytical parameters, including primary ion species, cluster size, analysis temperature and analyzer voltages, on the spectrum of water ice mixed with typical biological sample preparation additives such as dextran, ammonium formate, acetic acid and the antibiotic ciprofloxacin. The aim of this work is to optimize analysis conditions in order to improve the detection limit for antibiotic compounds. We also provide an outlook on further reduction of background signals by the destruction of water ice clusters using a 157 nm excimer laser.

MS 7.2 Thu 15:00 HS 2 Chemie

Status of the MR-ToF MS for JetRIS for laser spectroscopy of heavy actinides at GSI/HIM — •J. Weyrich[1,2,3], M. Block[1,2,3], A. Brizard[4], C. Helmel[2,3], D. Münzberg[1,2,3], P. Fischer[5], S. Raeder[1,2], D. Rodríguez[7], M. Schlaich[6], L. Schweikhard[5], K. Wendt[3], and F. Wienholtz[6] — [1]GSI, Darmstadt, DE — [2]Helmholtz-Institut, Mainz, DE — [3]JGU, Mainz, DE — [4]GANIL, Caen, France — [5]Universität Greifswald, Greifswald, DE — [6]Technische Universität, Darmstadt, DE — [7]Universidad de Granada

Research on heavy and superheavy elements enhances our understanding of the nuclear structure, as these elements exist just due to nuclear shell effects. These elements are radioactive, with short half-lives, and produced only in limited quantities. As a result, techniques like Resonant Ionization Spectroscopy (RIS) play a crucial role in studying atomic spectra to determine atomic and nuclear properties. The in-gas Jet Resonant Ionization Spectroscopy (JetRIS) experiment at GSI in Darmstadt, Germany, allows spectroscopy of heavy elements on minute amounts and with a spectral resolution of down to 260 MHz. JetRIS currently utilizes α-decay detection to selectively measure isotopes achieving low to zero background. However, this method is not suitable for long-lived isotopes or those without an α-decay branch. Thus, a Multi-Reflection Time-of-Flight Mass Spectrometer (MR-ToF MS) [DOI: 10.1016/j.ijms.2023.117166] will be integrated into the JetRIS setup enabling ion detection through mass-to-charge ratio separation. This contribution will discuss the MR-ToF MS setup, its commissioning status, and the latest experimental results.

MS 7.3 Thu 15:15 HS 2 Chemie

TOFControl, a data acquisition and analysis software system for multiple-reflection time-of-flight mass spectrometry (MR-TOF-MS) — •Makar Simonov and Julian Bergmann for the FRS Ion Catcher-Collaboration — Justus-Liebig-Universität Gießen, Gießen, Germany

TOFControl is a software system that was developed to perform high-accuracy measurements utilizing MR-TOF-MS techniques in analytical chemistry at the Justus-Liebig University (JLU), Giessen, Germany and in accelerator-based physics research centers at GSI, Darmstadt, Germany and TRIUMF, Vancouver, Canada. The software allows to control timing settings and data acquisition hardware, monitor and optimise measurement performance. In addition, it is equipped with various tools for the interpretation and evaluation of mass spectra including data adjustment, peak detection, and recognition procedures.

In this talk, an overview of the TOFControl functionality for the acquisition and analysis of mass spectrometry data will be given. Several examples illustrating the software's capabilities to perform filtering, identification, and mass measurement of atomic and molecular ions will be provided.

MS 8: Accelerator Mass Spectrometry I

Time: Thursday 15:45–17:15 Location: HS 2 Chemie

Invited Talk MS 8.1 Thu 15:45 HS 2 Chemie

LABEC, the INFN-university of florence laboratory of nuclear techniques (IBA and AMS) for environment and cultural heritage — •Franco Lucarelli — Department of Physics and Astronomy and INFN, Firenze, Italy

The LABEC laboratory, located in the Scientific and Technological Campus of the University of Florence, is the joint INFN-University of Florence laboratory of nuclear techniques (mainly Ion Beam Analysis (IBA) and Accelerator Mass Spectrometry (AMS)) for environment and cultural heritage. Although those techniques are well-established, a strong effort is put on their upgrade, making them suitable for more and more applications. The laboratory is based on a 3 MV Tandetron accelerator. There are many beam lines; in particular one is devoted to IBA application to Cultural Heritage, one to IBA applications for the study of atmospheric aerosol composition, one to AMS applications, mainly 14C dating with the graphite sample masses down to a few tens of μg of carbon (also for modern art objects). Switching between IBA and AMS operation is very easy and fast, which gives high flexibility in programming the activities. The facilities presently available at the LABEC laboratory, their technical features and some success stories of recent applications will be presented.

MS 8.2 Thu 16:15 HS 2 Chemie

Sample size series for CO_2 measurements with an EA-IRMS-GIS-AMS system at CologeAMS — •Martina Gwozdz[1], Stefan Heinze[1], Janet Rethemeyer[2], Markus Schiffer[1], and Dennis Mücher[1] — [1]University of Cologne, Institute for Nuclear Physics, Cologne, Germany — [2]University of Cologne, Institute for Geology and Mineralogy, Cologne, Germany

CO_2 sample materials such as soil samples or wood samples measured with AMS can be very versatile and often only little material is available. At CologneAMS we want to measure precise ^{14}C data in the ranges of approximately 5-100 μg of carbon. Most importantly, ultra-small samples containing approximately 2-20μg of carbon, need to be measured reliably and with a constantly low background. At CologneAMS we established a connection between an elemental analyser (EA), an isotope ratio mass spectrometer (IRMS) and the 6MV AMS system of CologneAMS as well as an existing gas interface (GIS) to measure these small CO2 samples. This setup provides a fully automated, online-analysis of $^{14}C/^{12}C$, and it delivers precise values for δ^{13}C. We will present the first CO_2 sample size series of Ox-II standard measured with this system. Additionally, with the collaboration of the Dendrochronology laboratory in Cologne we want to use this system to establish a routine process for radiocarbon dating of pine trees, with the goal to improve dendrochronological archives in the ages of 13.000 years.

MS 8.3 Thu 16:30 HS 2 Chemie

Exposure dating using AMS of ^{36}Cl isotopes in $CaSO_4$ -containing sediments and evaporites — •Natasha Goaba Kalanke[1], Markus Schiffer[2], Erik Strub[3], Gregory Campbell Hillhouse[1], Michael Staubwasser[4], Steven Binnie[4], and Dennis Muecher[2] — [1]Department of Physics and Astronomy, Botswana International University of Science and Technology — [2]Institute of Nuclear Physics, University of Cologne — [3]Institute of Nuclear Chemistry, University of Cologne — [4]Institute of Geology and Mineralogy, University of Cologne

The cosmogenic nuclide ^{36}Cl is valuable for exposure dating due to its long half-life of 3.013E5 years, enabling accurate geochronological timelines. This study measures isotopic ratios of ^{36}Cl, ^{35}Cl and ^{37}Cl focusing on under-utilized gypsum ($CaSO_4$.2H2O) due to overlapping isotopic mass interference from ^{36}S. We are developing a novel chemical preparation method to suppress isobaric ^{36}S and enhance chlorine yield as AgCl(∼80-90%), validated by Inductively Coupled Plasma-Optical Emission Spectroscopy (ICP-OES). The Anion Laser Isobar Separator (ALIS), employs laser photo-detachment principles for isobar suppression and ^{36}Cl transmission. Furthermore, ions are cooled within an advanced radiofrequency quadrupole (RFQ) system with a high-power 532 nm continuous-wave laser (>10 W). Initial ALIS transmission measurements with chemically optimized samples will be presented, along with the chemical protocol, and integration of ALIS to a 6 MV Tandem accelerator for improved ion beam emittance and superior isobar suppression.

MS 8.4 Thu 16:45 HS 2 Chemie

Advanced chemical sample preparation of soil and concrete for AMS measurements of ^{90}Sr — •Oscar Marchhart[1,2,3], Markus Schiffer[3], Martin Martschini[1], Silke Merchel[1], Melisa Maslo[3], Erik Strub[3], Laura Frost[4], Tibor Dunai[3], Dennis Mücher[3], and Robin Golser[1] — [1]University of Vienna, Faculty of Physics, Austria — [2]University of Vienna, Vienna Doctoral School in Physics, Austria — [3]University of Cologne, Faculty of Mathematics and Natural Sciences, Germany — [4]JEN Jülicher Entsorgungsgesellschaft für Nuklearanlagen mbH, Germany

An advanced sample preparation method for measuring ^{90}Sr ($T_{1/2}$ = 28.91 a) by Accelerator Mass Spectrometry (AMS) in soil and concrete samples has been developed. Based in general on published recipes, it increases the AMS measurement efficiency of ^{90}Sr for soil samples by 50% within the first hour of sputtering time. As earlier and newly prepared SrF_2 have the same chemical yield, we interpret the higher ion source output as less CaF_2 and other contaminations in SrF_2. For the first time concrete samples have been processed with chemical yields of SrF_2 >90% for AMS measurements. These were performed using the unique Ion-Laser InterAction Mass Spectrometry (ILIAMS) setup at the Vienna Environmental Research Accelerator (VERA), which achieves an isobar suppression of $>10^{12}$ for ^{90}Zr. The sample preparation and AMS measurements were validated using IAEA reference materials for soil, and with known LSC results for concrete. Within 1-sigma the AMS results are in good agreement and yield results for samples below the LSC limit due to the low detection limit of <0.1 mBq.

MS 8.5 Thu 17:00 HS 2 Chemie

Actinide work at MILEA during 2024 — •Habacuc Pérez-Tribouillier[1], Marcus Christl[1], Nuria Casacuberta[2,1], and Chrisrof Vockenhuber[1] — [1]Laboratory of Ion Beam Physics, ETH Zürich, Switzerland — [2]Department of Environmenta Systems Sciences, ETH Zürich, Switzerland

Among the main applications of the Multi-Isotope Low-Energy AMS (MILEA) system is the precise measurement of various elements within the actinide group. This work provides a comprehensive overview of studies conducted in 2024 that utilized actinide measurements performed at MILEA, with a particular emphasis on their contributions to Environmental Sciences. These studies address a broad spectrum of topics, ranging from the analysis of oceanographic processes to the assessment of direct and long-term environmental impacts of nuclear incidents. The versatility, extremely low background, and excellent sensitivity of MILEA enable ultra-low-level determinations, providing valuable insights into the transfer of actinides among different environmental compartments.

MS 9: Actinide Analysis

Time: Thursday 17:30–19:00 Location: HS 2 Chemie

Invited Talk MS 9.1 Thu 17:30 HS 2 Chemie

Development of chemical ionization methods based on plasma driven reactant ion production — •Thorsten Benter, Hendrik Kersten, and Walter Wissdorf — University of Wuppertal, Wuppertal, Germany

Earlier this year, the DPG/professional association mass spectrometry (MS), and the German Society for Mass Spectrometry (DGMS) have reinitiated a collaboration initiative with the goal of fostering current and future research efforts regarding MS, particularly at research institutions, and providing a larger platform for the communication of

related results. One tool in this collaboration is the mutual invitation of keynote speeches at the annual conferences of both societies; this contribution is the first in a hopefully long line of future DPG/DGMS interactions.

This talk begins with a brief outline of the current research efforts at the institute for pure and applied mass spectrometry (ipaMS) and the Physical and Theoretical chemistry (PTC) at the university of Wuppertal. We will then discuss selected applications of low to medium pressure, low power plasmas in recently developed chemical ionization (CI) methods used in MS. Some of these methods are tailored towards operation in highly specialized environments, e.g., atmospheric chemistry or semiconductor production research, whereas others have been commercialized, e.g., in the ecTOF of the Swiss company TOFWerk. The latter approach is discussed in more depth, as electron and chemical ionization is (uniquely) running in parallel, providing correlated molecular (CI) and structural (EI) mass spectrometric data.

MS 9.2 Thu 18:00 HS 2 Chemie

Resonant Laser Ionisation Mass Spectrometry on hot particles from the Thule area — •Paul Hanemann[1], Tobias Weissenborn[1], Aaron Lehnert[1], Jixin Qiao[2], Sven Nilsen[2], and Clemens Walther[1] — [1]Leibniz University Hannover, IRS — [2]Technical University of Denmark

In resonant Laser-ionisation Secondary Neutral Mass Spectrometry (rL-SNMS) a set of lasers is used to selectively ionize atoms of a specific element for ToF-MS analysis. This method combines sub-micron spatial resolution with excellent elemental selectivity while keeping the sample structurally intact. In previous work [1-3], rL-SNMS was used for the characterisation of individual nuclear fuel fragments from the Chornobyl Exclusion Zone. To prove the versatility of rL-SNMS we applied this method to samples from the Thule area in Greenland, where a bomber carrying four thermonuclear bombs crashed in 1968. Individual hot particles were isolated from soil samples. In traditional SIMS analysis of Thule hot particles by Ranebo et al. [4] isobaric interferences posed a significant challenge. In this work isobaric interference free rL-SNMS measurements were performed successfully on multiple particles. The particles contain both weapons grade plutonium ($240Pu/239Pu > 0.05$) as well as highly enriched uranium ($235U/238U > 1.0$). The adaption of rL-SNMS from fragments of nuclear fuel to hot particles from nuclear weapon material shows the versatility of this method and its applications for nuclear forensics. References: 1: DOI: 10.1126/sciadv.abj1175 2: DOI: 10.1016/j.sab.2022.106377 3: DOI: 10.1016/j.jhazmat.2023.131338 4: DOI: 10.1017/S1431927607070353

MS 9.3 Thu 18:15 HS 2 Chemie

Nuclear Forensic Analysis of a single Chornobyl Hot Particl via Advanced Mass Spectrometry Techniques — •Laura Leifermann[1], Greg Balco[2], Autumn Roberts[2], Paul Hanemann[1], Tobias Weissenborn[1], Wolfgang Schulz[1], Manuel Raiwa[2], Martina Klinkenberg[3], Felix Brandt[3], Michael Savina[2], Brett Isselhardt[2], and Clemens Walther[1] — [1]Leibniz University Hannover, Hannover, Germany — [2]LLNL, Livermore, USA — [3]Forschungszentrum Jülich, Jülich, Germany

In the field of nuclear forensics, clarifying the origin and age of an unknown sample is the central question and common practice. Nuclear fuel samples rise to a number of new questions regarding burn-up, degree of enrichment, and operational conditions during the service life. The resonant-laser-SNMS method is ideally suited for this purpose. Actinides, fission and breeding products can be analyzed isotope and element selective. If this is combined with noble-gas-MS, many insights can be gained about a fuel sample. This provides a complete picture of the age, burn-up, neutron flux densities during reactor operation and source of a sample. The ratio of U-235/U-238 of a special particle from Chornobyl is 1,22% which indicates a relative low burn-up and matches the Xe-136(131+132) isotope ratios. This is in contrast to the Xe-134(131+132) ratio which indicates a high Pu-fission. This work addresses a unique particle that has raised questions that can be solved by a synthesis of different mass spectrometric analysis techniques.

MS 9.4 Thu 18:30 HS 2 Chemie

Isotopic purification of trans-uranium tracers using RIMS at RISIKO and their characterization with AMS (I) — •Raphael Hasse[1], Sebastian Berndt[1], Christoph E. Duellmann[1,2,3], Sebastian Raeder[2], and Klaus Wendt[1] — [1]Johannes Gutenberg-Universität Mainz, Mainz, Germany — [2]GSI Helmholtzzentrum für Schwerionenforschung, Darmstadt, Germany — [3]Helmholtz-Institut Mainz, Mainz, Germany

Ultra-sensitive accelerator mass spectrometry is regularly used to quantify low levels of actinide concentrations as well as isotopic ratios in environmental samples. Actinide quantification relies on a relative measurement to an added mono-isotopic spike of the respective element. Standard solutions are available at the required purity (up to 10^{-7}) for elements such as U, Pu and Am. However, no corresponding commercial high-purity spike solution exists so far for the trans-uranium elements Np and Cm. In this project, we establish a novel isotopic purification and characterization of isotopic spikes using a combination of RIMS and AMS starting with ^{248}Cm and later extending it to ^{236}Np.

Here, we present this novel isotopic purification approach, carried out at the RISIKO laser mass separator facility in Mainz, using element and isotope selective resonance ionization by two tuneable Ti:Sa lasers. For suitable isotopic purification of a ^{248}Cm spike, an efficient two step ionization scheme was developed. In this way, an overall efficiency well above 10% with a suppression of the neighbouring isotope ^{247}Cm by about 300 was achieved.

MS 9.5 Thu 18:45 HS 2 Chemie

Isotopic purification of trans-uranium tracers using RIMS at RISIKO and their characterization with AMS (II) — •Dominik Koll[1,2], Sebastian Fichter[2], Michael Hotchkis[3], and Anton Wallner[1,2] — [1]TUD Dresden University of Technology, Dresden, Germany — [2]Helmholtz-Zentrum Dresden-Rossendorf, Dresden, Germany — [3]Australian Nuclear Science and Technology Organisation, Lucas Heights, Australia

Ultra-sensitive accelerator mass spectrometry is regularly used to quantify low levels of actinide concentrations as well as isotopic ratios in environmental samples. Actinide quantification relies on a relative measurement to an added mono-isotopic spike of the respective element. Standard solutions are available at the required purity (up to 10^{-7}) for elements such as U, Pu and Am. However, no corresponding commercial high-purity spike solution exists so far for the trans-uranium elements Np and Cm. In this project, we establish a novel isotopic purification and characterization of isotopic spikes using a combination of RIMS and AMS starting with ^{248}Cm and later extending it to ^{236}Np.

Here, we present the characterization of an isotopically purified ^{248}Cm spike using AMS. A dilution series of purified ^{248}Cm with the initial ^{248}Cm solution containing certified amounts of Cm isotopes was measured for isotopic ratios to quantify the purified ^{248}Cm amount. High-sensitivity measurements of the purified spike were carried out for A=244,247 isotopes to assess the isotopic purity. A suppression factor of about 300 for the neighbouring isotope ^{247}Cm was achieved.

MS 10: Accelerator Mass Spectrometry II

Time: Friday 11:00–12:30 Location: HS 2 Chemie

Invited Talk MS 10.1 Fri 11:00 HS 2 Chemie

Rare-RI Ring facility: tool of precision mass spectrometry of short-lived nuclei — •Takayuki Yamaguchi — Saitama University, Saitama 338-8570, Japan

Today challenge is to precisely measure atomic masses of short-lived exotic nuclei, which contribute to the understanding of nuclear structure evolution, various interactions and symmetries, and astrophysical observations. The Rare-RI Ring (R3) facility is a unique storage ring facility coupled with the cyclotron complex through the high-energy fragment separator BigRIPS at the RIKEN RI beam factory [1]. Ions of interest are in-flight selected and are individually injected in the storage ring where the precision isochronous condition is realized. The event-by-event data processing is performed with information from auxiliary detectors at the BigRIPS. Thus obtained revolution times of stored ions provide the mass-to-charge ratios. Since successful developments of the related devices, several commissioning and physics runs have been conducted; a highlight is the masses in the vicinity

of the r-process nucleosynthesis [2]. In this talk, I will overview the BigRIPS-R3 facility and physics programs and will discuss possible extensions and collaborations in the future.

References

[1] D. Nagae et al., Phys. Rev. C 110, 014310 (2024).

[2] H.F. Li et al., Phys. Rev. Lett. 128, 152701 (2022).

MS 10.2 Fri 11:30 HS 2 Chemie

Upgraded LE side of the 6 MV Tandem Accelerator — •Christof Vockenhuber, Matthias Schlomberg, Thorben Wulff, Urs Ramsberger, Lukas Wacker, and Marcus Christl — Laboratory of Ion Beam Physics, ETH Zürich, Switzerland

At ETH, six AMS facilities are in operation, spanning terminal voltages from as low as 50 kV up to 6 MV. In the past decades, the focus of the instrumental development at the laboratory had been on the small, compact AMS system with the aim of making AMS measurements easier, more affordable and more precise. Yet, a few radionuclides still need larger accelerators for sufficient isobar separation, such as Cl-36 or Si-32. Some of the developments at the small AMS systems can be beneficial for the larger machines. Based on these experience we have rebuilt the LE side of the 60-year-old 6 MV EN Tandem accelerator over the past two years. A key part is the MICADAS-type ion source with some refinements for the need of the radionuclides measured at this accelerator. Especially the target design and the target position system were improved. The upgraded system will be presented and the performance, in particular the ion source output and cross talk, for the key-radionuclide Cl-36 discussed.

MS 10.3 Fri 11:45 HS 2 Chemie

Detecting Environmental ^{231}Pa Using Accelerator Mass Spectrometry — •Janis Wolf[1], Marcus Christl[2], Sebastian Fichter[1], Habacuc Perez Tribouillier[2], Stella Winkler[1], and Anton Wallner[1] — [1]Helmholtz-Zentrum Dresden-Rossendorf, Dresden, Germany — [2]ETH Zürich, Laboratory of Ion Beam Physics (LIP), Zürich, Switzerland

While many actinides (e.g., ^{236}U, ^{239}Pu, ^{241}Am) are routinely measured in environmental samples using accelerator mass spectrometry (AMS), the naturally occurring radionuclide ^{231}Pa ($t_{1/2} = 3.28 \cdot 10^4 a$) is not among them, even though it has been shown that its AMS detection limit is in the lower femtogram range[1]. Challenges in the measurement of ^{231}Pa include the complicated sample preparation and the lack of a long-lived isotope that one could use for normalization.

We developed chemical sample preparation procedures for environmental water and sediment samples, proven successful by our first beam time using MILEA at ETH Zürich. We could achieve a great abundance sensitivity on the mass 231, with no significant background contriburion of ^{232}Th. We also investigated complications caused by the short-lived ^{233}Pa ($t_{1/2}$ = 26.98 days), used for normalization. The ingrowth of ^{233}U in our samples causes a lower ^{231}Pa/^{233}X ratio to be measured, as UO^- has up to 10 times higher negative ion formation efficiency than PaO^- in the ion source. This needs to be accounted for by measurement of standards.

[1] M. Christl et al., Nucl. Instrum. Methods Phys. Res., B 262 (2007) 379

MS 10.4 Fri 12:00 HS 2 Chemie

ILIAMS assisted AMS measurements of long-lived radionuclides produced in fusion environment — •Carlos Vivo-Vilches[1], Esad Hrnjic[1], Martin Martschini[1], Lee W. Packer[2], Silke Merchel[1], Johannes H. Sterba[3], Karin Hain[1], and Robin Golser[1] — [1]University of Vienna, Faculty of Physics, Vienna, Austria — [2]UKAEA, Culham Campus, Abingdon, United Kingdom — [3]Center for Labelling and Isotope Production, TRIGA Center Atominstitut, TU Wien, Austria

To reliably assess the radionuclide inventories of future nuclear fusion reactors, foils of different materials were irradiated with deuterium-tritium neutrons in the Joint European Torus (JET) reactor, followed by γ-measurements of short-lived radionuclides. The activities of long-lived radionuclides are too low for radiometric techniques. At the Vienna Environmental Research Accelerator (VERA), the potential of AMS for the detection of ^{91}Nb ($T_{1/2}$ = 680 a), ^{94}Nb ($T_{1/2}$ = 20300 a) and ^{93}Mo ($T_{1/2}$ = 4839 a) is investigated. These three radionuclides are produced in Mo-containing materials, e.g. stainless steel SS316. Their measurement requires the use of VERA's Ion-Laser InterAction Mass Spectrometry (ILIAMS) setup for laser photodetachment to suppress their respective stable isobars: ^{91}Zr, ^{94}Zr and ^{94}Mo, and ^{93}Nb. For ^{91,94}Nb, NbO_3^- is selected for ILIAMS. Suppression of $^{91,94}ZrO_3^-$ is observed just by collisions with the He buffer gas. This suppression is enhanced by photons from a 355 nm laser, which also suppress $^{94}MoO_3^-$ by a factor 3900. For ^{93}Mo, MoO_2^- is selected, while isobaric $^{93}NbO_2^-$ is suppressed a factor $>10^6$ by our new 637 nm laser.

MS 10.5 Fri 12:15 HS 2 Chemie

Developments towards detection of ^{26}Al at ALIS — •Ferhat Altun, Markus Schiffer, Stefan Heinze, Timm-Florian Pabst, Gereon Weingarten, and Dennis Muecher — Institute for Nuclear Physics, University of Cologne, Germany

To expand the list of measurable isotopes for AMS, the Anion Laser Isobar Separator (ALIS) was installed at CologneAMS. The system uses element-selective photo-detachment for the suppression of the high abundant isobars. The process of laser isobar interaction requires the superposition of a high intense laser with the anion beam. For the decoupling of the laser and the anion beam, an electrostatic deflector with a hole in the outer electrode is used. Holes in electrodes of electrostatic devices lead to unwanted field inhomogeneities. Therefore, we developed an additional correction electrode for electrostatic deflectors, that is able to correct the inhomogeneity and hence ensures a precise energy filtering. In this talk, the electric field measurements of the electrostatic deflector will be presented including our newly developed measurement technique. The main focus of the ALIS setup is the measurement of environmental (^{90}Sr, ^{135}Cs), and cosmogenic isotopes (^{26}Al, ^{41}Ca). For the benchmark test of the new setup, we measured the efficiency and level of detection of an isotope that is routinely measured at CologneAMS, which can be improved for the users of the facility. Therefore, we aim to measure ^{26}Al with ALIS by use of the prolific molecular injection (AlO^-) where the suppression of ^{26}MgO is required. The measured ionization efficiencies of the ion beams will be discussed during the talk.