MS 9: Poster 1

Time: Thursday 16:15–18:15 Location: Redoutensaal

MS 9.1 Thu 16:15 Redoutensaal

^{36}Cl, a Tool to Determine Atmospheric Neutrons in Aircrafts. — •Manuel Lebert, Christoph Busser, Thomas Faestermann, J. M. Gomez-Guzman, Angelina Kinast, Dominik Koll, Gunther Korschinek, and David Krieg — Technische Universität München, Garching, Germany

For ultra-sensitive AMS measurements, the initial radioisotope concentration must not be altered by transportation or storage.
To investigate if transportation by aircrafts leads to alteration, NaCl was transported by plane for around 90 hours and afterwards the ^{36}Cl ($t_{1/2} = 3 \cdot 10^5$ a) concentration, produced by ^{35}Cl(n,γ)^{36}Cl reactions, was measured with AMS at the MLL in Munich. We found that these atmospheric neutrons had no effect on the samples.
In addition to that, the small concentration of $^{36}Cl/Cl$ of few 10^{-16} which we found in the samples will be studied further. The effect of high energy muons formed in the atmosphere and the emission of neutrons by spontaneous fission of uranium in the salt stock beside others will be considered. Further measurements of unprocessed NaCl from the same salt mine are going to be performed.

MS 9.2 Thu 16:15 Redoutensaal

Optimierter Gasionisatioinsdetektor zum Nachweis von ^{26}Al am 6MV Tandetron am CologneAMS — •Gereon Hackenberg, Richard Altenkirch, Alexander Stolz, Markus Schiffer, Susan Herb, Claus Müller-Gatermann, Stefan Heinze und Alfred Dewald — Institut für Kernphysik, Universität zu Köln

Um am CologneAMS bei ^{26}Al-Messungen den statistischen Fehler zu reduzieren, ist geplant neben elementarem Al auch AlO für Standardmessungen zu nutzen, da dies zu einem höheren Quellenoutput führt. Zur Unterdrückung des dabei auftretenden Isobars ^{26}Mg wurde ein neuer Gasionisationsdetektor entworfen und direkt hinter dem Gas gefüllten Magneten installiert.

Dabei musste beachtet werden, dass der Detektor leicht aus dem Strahlgang entfernbar ist, um den dahinter liegenden Aufbau für Be-Messungen unverändert nutzen zu können.

Der neue Detektor verfügt über 5 Anoden, von denen 2 diagonal gesplittet sind. Hierdurch wird es möglich gestreute Strahlen in der dispersiven Ebene zu trennen. Zusätzlich wurden X-Schlitze in die Detektorkammer integriert. Außerdem verfügt der Detektor über eine große Akzeptanz auf Grund seines $4cm^2$ großen SiN-Eintrittfensters.

Neben dem Aufbau und den Detektoreigenschaften werden erste Messungen und Ergebnisse vorgestellt.

MS 9.3 Thu 16:15 Redoutensaal

Improving the accuracy in the analysis of 99Tc using AMS — •Christoph Busser[1], Thomas Faestermann[1], José Manuel Gómez-Guzmán[1], Karin Hain[2], Angelina Kinast[1], Dominik Koll[1], Gunther Korschinek[1], Florian Kortmann[3], David Krieg[1], Manuel Lebert[1], Christoph Lierse v. Gostomski[3], Peter Ludwig[1], and Francesca Quinto[4] — [1]Physics Department, Technical University of Munich, Garching — [2]Isotope Research and Nuclear Physics, University of Vienna, Vienna — [3]Radio Chemistry Munich, Technical University of Munich, Garching — [4]Institute for Nuclear Waste Disposal, Karlsruhe Institute of Technology, Karlsruhe

Significant amounts of Tc-97 are released in to the environment by nuclear bomb tests, nuclear reprocessing plants, nuclear accidents and nuclear medicine. Further, as a fission product, Tc-99 is a concern for the storage of spent nuclear fuel concerning the high mobility of the pertechnetate ion. Hence quantitative ultra trace analysis of it is of great importance. However the lack of stable Tc isotopes hampers the measurements by AMS. Our approach to overcome this obstacle is to utilize the long lived isotope Tc-97. Therefore we have produced Tc-97 in two ways, by Ru-96(n,γ)Ru-97 -> Tc-97 in our research reactor FRMII and by the nuclear reaction of Li-7 with Nb-93 at our tandem accelerator. An important issue is the proceeding sample chemistry to suppress Mo-97 and Ru-99 to achieve low backgrounds for the AMS measurements. In this presentation we will report on the nuclide production, our sample chemistry and details of the first AMS measurement.

MS 9.4 Thu 16:15 Redoutensaal

Concept of the automatic measurement using AMS setup at the Cologne FN Tandem Accelerator — •Susan Herb, Nima Saed-Samii, Claus Feuerstein, Markus Schiffer, Richard Altenkirch, Mario Cappellazzo, Stefan Heinze, Claus Müller-Gatermann, Gereon Hackenberg, and Alfred Dewald — Institut für Kernphysik, Universität zu Köln

The parameters of the hardware components of the AMS setup at the FN Tandem Accelerator are controlled by the in-house developed control software (phoenix software). In a first test phase AMS measurements at the FN Accelerator were performed manually using a standard amperemeter and the rare isotope data were processed by the commercial analog MPA3-system from FAST ComTec. In this contribution, we describe the concept and realization of an automated AMS-measurement. The timing for the sequential isotope injection is handled by an Arduino micro-controller which provides logical signals used to control the bouncer unit and as trigger for the acquisition. The detection signals are processed via a new in-house programmed digital DAQ-system based on CAEN digitizers. The phoenix software and the data acquisition are coupled over an Ethernet interface. Therefore the complete AMS data analysis is provided by the phoenix software.

MS 9.5 Thu 16:15 Redoutensaal

Development of an efficient high-current ion source for Accelerator Mass Spectrometry — Felipe Lipp Bregolin[1], •Hans Hofsäss[1], Georg Rugel[2], Shavkat Akhmadaliev[2], Silke Merchel[2], and Jenny Feige[3] — [1]Georg-August-Universität Göttingen — [2]Helmholtz-Zentrum Dresden-Rossendorf — [3]Technische Universität Berlin

A new high-current negative ion source for Accelerator Mass Spectrometry (AMS) is being built to quantify the ratios of long-lived cosmogenic radionuclides in micrometeorites, which are of great astrophysical interest. Measuring these extremely small ratios is at the technological limits of present AMS systems. The new source is designed specifically to provide a higher AMS detection sensitivity by having an optimal ion-optics design, incorporating new concepts for the construction and operation of the Cs ionizer, optimized Cs ion beam currents and Cs vapor transport. The operation with higher cathode, extraction and pre-acceleration voltages than usual is possible. Moreover, its design is modular providing ease of access and simplifying maintenance while having better mechanical stability at the same time. Several operational parameters can be controlled and measured during operation to achieve a higher ion source performance. Detailed ion-optics simulations of the ion source are compared with test measurements, and the design optimized based on its results. The authors would like to thank the Federal Ministry of Education and Research of Germany for its financial support (project 05K2016), and the HZDR's Ion Beam Center for its essential contribution to the realization of this project.