MS 3: Accelerator Mass Spectrometry (AMS) I

Zeit: Dienstag 8:30–10:15 Raum: 3E

MS 3.1 Di 8:30 3E

AMS in Munich — •Georg Rugel[1], Iris Dillmann[1,2], Thomas Faestermann[1], Gunther Korschinek[1], Klaus Knie[3], Johannes Lachner[1], Moumita Maiti[1], Mikhail Poutivtsev[1], and Anton Wallner[4] — [1]Technische Universität München, Fakultät für Physik, D-85747 Garching — [2]Institut für Kernphysik, Forschungszentrum Karlsruhe, Postfach 3640, D-76021 Karlsruhe — [3]Gesellschaft für Schwerionenforschung, D-64291 Darmstadt — [4]Vienna Environmental Research Accelerator, Institut für Isotopenforschung und Kernphysik, Universität Wien, A-1090 Wien

The combination of the high energy available at the Munich tandem accelerator with the gas-filled analyzing magnet system (GAMS) allows to measure isotope ratios down to sensitivities of 10^{-16} (even 10^{-20} with respect to the bulk material). This unique sensitivity – especially in the mass region around A= 60 – allows a lot of applications like cross section measurements for astrophysically relevant reactions. Examples for measurements with a focus on astrophysics and geology will be presented.

MS 3.2 Di 8:45 3E

Aufbau eines 6MV Beschleuniger-Masenspektrometers an der Universität zu Köln — •Alfred Dewald[1], Martin Melles[2], Jan Jolie[1], Andreas Zilges[1], Michael Staubwasser[2], Ulrich Radtke[3], Jürgen Richter[4] und Friedhelm von Blanckenburg[5] — [1]Institut für Kernphysik, Universität zu Köln — [2]Institut für Geologie und Mineralogie, Universität zu Köln — [3]Geographisches Institut, Universität zu Köln — [4]Institut für Ur- und Frühgeschichte, Universität zu Köln — [5]Institut für Mineralogie, Universität Hannover

Die Deutsche Forschungsgemeinschaft (DFG) fördert im Rahmen einer Großgeräte-Initiative den Bau eines 6 MV Beschleuniger-Massenspektrometers, das vor allem deutschen Nutzern aus den Geowissenschaften, der Umweltforschung und auch aus anderen Disziplinen, wie zum Beispiel der Astrophysik, zur Verfügung stehen soll. Die Messung der kosmogenen Nuklide 10-Be, 14-C, 26-Al und 36-Cl soll Schwerpunkt des künftigen Aufgabengebiets der Einrichtung sein. Darüber hinaus sollen aber auch schwere Isotope bis hin zu 244-Pu gemessen werden können. Die Anlage wird im Beschleunigerbereich des Instituts für Kernphysik (IKP) der Universität zu Köln aufgebaut und von der Universität zu Köln betrieben. Das Konzept, der Aufbau des Spektrometers im IKP und der aktuelle Status des Projekts werden vorgestellt.

MS 3.3 Di 9:00 3E

The French 5 MV AMS facility ASTERisques - Status after the first year — •Didier Bourlès[1], Maurice Arnold[1], Georges Aumaître[1], Lucilla Benedetti[1], Régis Braucher[1], Frédéric Chauvet[1], Robert C. Finkel[1,2], and Silke Merchel[1] — [1]CEREGE, CNRS-IRD-Université Aix-Marseille, F-13454 Aix-en-Provence, France — [2]CAMS, Lawrence Livermore National Laboratory, Livermore, CA 94550, USA

A new 5 MV accelerator mass spectrometry (AMS) system, fully dedicated to applied research, has been installed at CEREGE [1,2]. Since its acceptance test in March 2007, we have successfully established routine measurement conditions for the long-lived cosmogenic radionuclides ^{10}Be and ^{26}Al. Using ^{9}Be carrier derived in our laboratory from phenakite crystals originating from a deep mine, we determined a background-level as low as 5x10^{-16} (^{10}Be/^{9}Be).

For ^{41}Ca (extracted as CaF_3^-) and ^{129}I, background levels are in the range of 2x10^{-14}, whereas under optimum conditions the ^{36}Cl background can reach 3x10^{-16} (^{36}Cl/^{35}Cl). The total transmission varies from 0.02 (^{36}Cl with a post-stripping absorber foil) to 0.38 (^{26}Al).

The main focus of applications has been on geological and environmental topics with the broad goal of using isotopic techniques to help understand the timing and rates of processes in the earth system. Work so far has included reconstruction of past climate, determination of the rate and timing of seismic activity, volcanic eruptions and rock falls.

[1] M. G. Klein et al., NIMB, submitted. [2] D. Bourlès et al., DPG Frühjahrstagung AK AMOP (2007) MS3.2.

MS 3.4 Di 9:15 3E

^{36}Cl measurement program at Zürich 6 MV tandem accelerator — •Vasily Alfimov and Hans-Arno Synal — Ion Beam Physics, Paul Scherrer Institute and ETH Zurich, 8093 Zurich, Switzerland

Routine measurements of ^{36}Cl at Zürich 6MV tandem accelerator cover a time span of 20 years. In the present contribution, we summarize our practical experience of ^{36}Cl measurements with a special emphasis on the detection procedure and data reduction. We also outline a synopsis of our ongoing and past ^{36}Cl projects.

MS 3.5 Di 9:30 3E

Replacement Chargring Belts - A Review — •Klaus Bahner — AMS 14C Dating Centre, University of Aarhus, Ny Munkegade, Byg. 1520, DK-8000 Aarhus C

Manufacturing of the original High Voltage Engineering Corp. charging belts has been ceased many years ago, thus leaving users of these accelerators without access to a critical spare part. During the past 6 years we experimented with industrial conveyor belts, supplied by the Forbo Siegling GmbH as replacement charging belts. Our EN accelerator runs routinely on these belts over the past years and performs very well. Furthermore this so called "Siegling belt" has been adopted by other laboratories, indicating that a viable solution for the charging belt problem in general has been found. This review addresses both the technical aspects of finding a replacement charging belt and our specific experiences with the Siegling belt.

MS 3.6 Di 9:45 3E

Carrier free AMS measurements of natural 10Be/9Be ratios — •Peter W. Kubik[1], Marcus Christl[2], and Fabian Scheifele[2] — [1]Paul Scherrer Institute, Institute of Particle Physics, ETH Zurich, 8093 Zurich, Switzerland — [2]Institute of Particle Physics, ETH Zurich, 8093 Zurich, Switzerland

AMS measurements of 10Be/9Be ratios can in general only be used to calculate the 10Be concentrations in a sample because the 9Be concentration is completely dominated by the addition of Be carrier material. Often, however, as for applications in oceanography, it is of interest to know the temporal variations of natural 10Be/9Be ratios. In those cases, the 9Be concentrations before carrier addition will have to be measured independently with a different method such as ICP-OES. This leads to larger uncertainties in the final 10Be/9Be ratios and to higher analysis costs. A direct measurement of natural 10Be/9Be ratios by AMS alone could reduce both.

SIMS and Accelerator SIMS studies have shown that it is possible to measure 10Be samples with Be concentrations in the sub-microgram range. Both those methods have limits which severely reduce their usefulness for 10Be routine measurements requiring large numbers of samples. We currently develop a new method for the PSI/ETH 6MV Tandem accelerator facility which should allow us to use our standard 10Be sample preparation methods and AMS techniques albeit somewhat modified.

MS 3.7 Di 10:00 3E

The Jena AMS system — •Axel Steinhof, Istvan Hejja, Ruth Kaiser, Heike Machts, and Thomas Wagner — MPI für Biogeochemie, Jena

If the performance tests of the modifications of the 846 ion source will be completed until the conference they will be presented. Else wise the performance and routine operation at the Jena AMS system, a dedicated 3MV-14C-AMS system, will be reported.