INSTITUT FÜR ISOTOPENFORSCHUNG UND KERNPHYSIK
DER UNIVERSITÄT WIEN

E I N L A D U N G

zum

S E M I N A R V O R T R A G

von

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# AMS throughout the Nuclear Chart

We describe the upgrade of the Vienna Environmental Research Accelerator (VERA) to a universal facility for Accelerator Mass Spectrometry (AMS). To suppress neighboring masses for the heavier radionuclides in the energy range of 10 to 20 MeV, the resolution of VERA was increased both by improving the ion optics of existing elements at the injection side and by installing a new high resolution electrostatic separator at the high energy side. Particular emphasis was put on measurements to understand the ion optics and the origin of background ions, which ultimately limit the sensitivity. Interfering ions which pass all beam filters are identified with a Bragg-type ionization detector and a high-resolution time-of-flight system, using two ultra-thin DLC (Diamond-Like Carbon) foils in the start and stop detector, which substantially reduce losses due to beam straggling.

This improved setup enables us to measure even the heaviest long-lived radionuclides, where stable isobaric interferences are absent (e.g. $^{129}$I, $^{210}$Pb, $^{236}$U, and $^{244}$Pu), down to the environmental levels. After testing the system with $^{210}$Pb/$^{208}$Pb isotope ratio measurements, we prove this by a measurement of $^{236}$U at natural levels in a material separated before 1918 and therefore free from anthropogenic contamination. An isotopic ratio of $^{236}U/^{238}U = (6.1\pm0.4)\cdot10^{-11}$ was found for this material. First results for measurement of $^{244}$Pu in deep sea sediments are also presented. Compared to heavy ion AMS at large tandem accelerators (TV ≥8 MV) and for cases where stable isobar interference is absent, a small facility like VERA (TV = 3 MV) is shown to be able to offset the disadvantage of lower ion energy.

Possible applications in geology ($^{129}$I, $^{236}$U), astrophysics ($^{182}$Hf, $^{244}$Pu), and nuclear safeguards ($^{236}$U, $^{244}$Pu) are presented.

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1090 Wien, Währingerstr. 17, "Kavalierstrakt",
1. Stock, Seminarraum von VERA

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