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I N V I T A T I O N

for a

V E R A - S E M I N A R

with

Zheng-Tian LU

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An atom-trap method for analyzing ^{41}Ca/Ca in bones and rocks at the 10^{-16} level

Calcium is a major element in the biosphere and lithosphere. Its rare isotope ^{41}Ca, with a half-life of 99 thousand years and isotopic abundances in the range of 10^{-16} – 10^{-15}, can trace environmental processes at an age scale beyond the reach of ^{14}C. Accelerator Mass Spectrometry (AMS) has been used to measure ^{41}Ca/Ca down to the 10^{-15} level in natural samples, where it was limited by isobar interferences. We present the physics of the magneto optical trap method called Atom Trap Trace Analysis (ATTA), which is used for ^{41}Ca/Ca analysis. We reached a precision of 10% at the level of 10^{-16} with samples of bones, rocks and seawater, and achieving a detection limit at the 10^{-17} level, well below the distribution of natural abundances. This table-top method is poised for studies of calcium-containing samples of Middle- and Late-Pleistocene in geoscience and archeology.

ATTA is also used to analyze the environmental radioactive isotopes ^{85}Kr, ^{39}Ar, and ^{81}Kr. In collaboration with earth scientists, we are dating groundwater and mapping its flow in major aquifers around the world, and dating old ice from the deep ice cores of Antarctica, Greenland, and the Tibetan Plateau. For an update on this worldwide effort, please google “ATTA Primer”.

Thursday, 13. October 2022, 16:30 o'clock

Zoom-Meeting starts at 16:15 o‘clock

https://univienna.zoom.us/j/98906007827?pwd=cmd6QVZjT3JGdllxRTdqMFMxcFJmdz09

Login details: Meeting ID: 989 0600 7827 - *password: VERAsem*

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