

Seminar general

Nuclear Astrophysics, Geology and Accelerator Mass Spectrometry: The end of an era, or the conception of a beautiful new beginning?

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The accelerator mass spectrometry (AMS) system at the Maier-Leibnitz tandem accelerator laboratory (MLL), Technische Universitaet Muenchen, has been a world unique facility for astrophysical research since circa 2000. With it, the detection of both ^{60}Fe (half life = 2.6 Myr) and ^{53}Mn (half life 3.7 Myr) were made, with their locations in geological time occurring 2.1 Myr before the present. Both are produced in core collapse supernovae (CCSN), with ^{60}Fe almost exclusively made in CCSN. Present research goals, in collaboration with members of INFN, are find long-lived actinides ^{244}Pu and/or ^{247}Cm in geological reservoirs, coincident in geological time with these $^{60}\text{F}/^{53}\text{Mg}$ signals, and thereby prove that CCSN are a production site in our universe for the heavy elements beyond the iron-peak region of atomic masses. The MLL laboratory has been decommissioned, meaning the potential loss of this world unique AMS system for such research.

In this talk I will give an overview of the astrophysical science and results that have been achieved with this AMS system, the state of the current actinide search, and future prospects for simultaneous discovery of ^{60}Fe with actinides, provided this AMS system can be relocated to a suitable laboratory with a closely matching tandem accelerator and staff with AMS expertise. Thus, in the later part of this talk, I will discuss the potential suitability of this system with the 9 MeV tandem accelerator of IFIN-HH.

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Zoom & Sala de seminar Prof. Marius Petrașcu (DFN)