The 16th International Conference on Accelerator Mass Spectrometry



Contribution ID: 118 Contribution code: PSB-66

Type: Poster

Enhanced Sensitivity in the Detection of 129I Using Accelerator Mass Spectrometry at the University of Notre Dame

Wednesday, 23 October 2024 17:55 (20 minutes)

The isotope ¹²⁹I, with a half-life of 15.7 million years, serves critical roles ranging from an environmental tracer of fission products to a significant marker in nuclear astrophysics. Due to its low natural terrestrial abundance (approximately one part per trillion), accelerator mass spectrometry (AMS) offers a robust method for its detection, accurately distinguishing the ¹²⁹I signal from the stable isotope ¹²⁷I in aqueous samples. Recent advancements in our beamline configuration and time-of-flight detection systems at the University of Notre Dame' s Nuclear Science Laboratory have significantly increased our measurement sensitivity for ¹²⁹I. This study presents a comprehensive analysis of reference standards, highlighting the enhanced detection capabilities achieved. The modifications to the AMS system, improved time-of-flight resolution, detailed analysis results, and implications for environmental and astrophysical applications will be discussed. In particular, we will highlight our collaboration with the nuclear theory group at Notre Dame, and how future experiments may be used to build upon advancements made by Wang et al. (2021, 2023) on the understanding of certain astrophysical processes (Wang, X., Clark, A. M., Ellis, J., et al. 2021, *r*-Process Radioisotopes from Near-Earth Supernovae and Kilonovae), (Wang, X., Clark, A. M., Ellis, J., et al. 2023, Proposed Lunar Measurements of *r*-process Radioisotopes to Distinguish the Origin of Deep-sea ²⁴⁴Pu).

This work is supported by the National Science Foundation Grant No. NSF PHY-2011890.

Student Submission

Yes

Primary authors: LUND, David (University of Notre Dame); BACALL, Calvin (University of Notre Dame); BAI-LEY, Thomas (University of Notre Dame); Prof. COLLON, Philippe (University of Notre Dame); MULCAHY, Griffin (University of Notre Dame); PEELER, Will (University of Notre Dame)

Presenter: LUND, David (University of Notre Dame)

Session Classification: Poster Session B

Track Classification: Reference Materials, Carriers, Intercomparisons