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Setting-up Super-SIMS at HAMSTER

Wednesday, September 24, 2025 9:40 AM (20 minutes)

Accelerator Mass Spectrometry (AMS) is an ultrasensitive method for detection of naturally or anthropogenically produced long-lived radionuclides in our environment.
To combine this method with the capabilities of a secondary-ion mass spectrometer (SIMS: IMS 7f-Auto from Cameca) is challenging. The idea is to use the micron-scale spatial resolution of the SIMS and the high selectivity through molecule suppression by the stripping process at an AMS system. The aim is to detect background-limited trace elements more sensitively than regular SIMS or other techniques.
After first steps at the DREsden AMS-facility (DREAMS) at the Helmholtz-Zentrum Dresden-Rossendorf (HZDR) [1] the system moved to the new compact facility HAMSTER (Helmholtz Accelerator Mass Spectrometer Tracing Environmental Radionuclides) dedicated for AMS measurements and designed to incorporate Super-SIMS capabilities. HAMSTER is based on a 1-MV tandem accelerator from NEC (National Electronics Corp.) and has dedicated instruments for tuning low current ion-beams < nA from the SIMS. In this presentation, I will highlight the current status after arrival of the HAMSTER system and future initiatives.

[1] Rugel, G., Ziegenrücker, R., Renno, A. D., Koll, D., Lachner, J., Noga, P., Vivo-Vilches, C., Wallner, A., & Wiedenbeck, M. (2022). Super-SIMS at
DREAMS: Status of a unique and complex endeavour. Nuclear Instruments and Methods in Physics Research Section B: Beam Interactions with Materials and Atoms, 532, 52-57. https://doi.org/10.1016/j.nimb.2022.09.023

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