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## HAMSTER –a new universal 1-MV AMS facility at HZDR with ion cooler and SIMS capabilities

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The new dedicated AMS facility HAMSTER (Helmholtz Accelerator Mass Spectrometer Tracing Environmental Radionuclides) is being set up at HZDR as a universal and flexible AMS system that allows for routine measurements of nuclides across the whole chart of nuclides but has also a focus on implementing new technical developments.

HAMSTER is based on a 1-MV Pelletron accelerator. It consists of three independently operating beam injection systems: an MC-SNICS ion source is coupled via a 90° ESA to a third-order correction low-energy injection magnet. Upstream a second MC-SNICS connects via a 45° ESA to an ion-cooler setup which is sandwiched between two magnets. This system then merges to the beamline mentioned above towards the injection magnet. Both of these two low energy beamlines include fast beam switching, beam attenuators and at all waists full beam diagnostics capabilities for low-intensity ion currents. Finally, another ion beam from a dynamic SIMS setup (CAMECA IMS 7f Auto), previously connected to the DREAMS 6-MV system (HVEE Tandatron), can be injected into the AMS beamline for Trace Element Accelerator Mass Spectrometry (TEAMS) measurements.

The high-energy side corresponds to NEC's 'Actinide AMS' system, as first realized at the VEGA system at ANSTO, Sydney. It includes two high-energy magnets, both with fast bouncing capability, and with the option of quasi-simultaneous measurements of up to 8 isotopes. As an additional feature, we have added a Wien filter before the first high-energy magnet for further background reduction, primarily for heavier isotopes.

HAMSTER accordingly requires a significantly larger footprint compared to state-of-the-art compact AMS systems. It allows to analyse 'all isotopes' from Be up to the super-heavies. Special focus was a setup aiming for a high measurement efficiency as well as implementing the options of full beam diagnostics at all waists with the objective to facilitate further technical developments for rare isotope detection.

A new ion cooler LTIS (Ion Linear Trap for Isobar Suppression) had been developed in-house in collaboration with the Univ. of Vienna (J. Lachner et al., this conference) to utilise and explore the potential of ion-laser interaction for detection of new AMS nuclides. NEC's Accelnet software will be integrated into our general EPICS-based control software, which is presently under development at HZDR.

HAMSTER will be located in a dedicated new building that houses also three labs for sample handling and sample preparation, which add to the two chemistry labs already in use since about 15 years. The new facility is operated as a dedicated AMS system - with the 6-MV DREAMS facility still being used in parallel. However, considering the improved isobar suppression, the new actinide AMS capabilities and the stable isotope capabilities, with HAMSTER we will extend our research portfolio significantly beyond DREAMS's primary focus on cosmogenic nuclides.

### Student Submission

No

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