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LISEL@DREAMS –The future of Accelerator Mass Spectrometry

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LISEL (**L**ow energy **I**sobar **SE**paration by **L**asers) is a future project at the DREAMS (**DRE**sden **A**ccelerator **M**ass **S**pectrometry) facility to widen the applications of AMS by extending the range of measurable (radio-) nuclides.

AMS has proven to be a versatile tool capable of detecting a large number of long-lived radionuclides at the ultra-trace level –i.e. isotope ratios down to 10E-16. However, being a mass spectrometric method, it is limited by the presence of strong isobaric background. To overcome this limitation, we propose to remove the isobars already at the low-energy side by laser photodetachment. This method allows to selectively neutralize isobars by laser radiation, leaving the ions of interest intact. First studies were performed at the University of Vienna and gave promising results [1,2] for the easier to be measured low-mass AMS isotopes Al-26 and Cl-36.

Within the LISEL project this method will be for the first time applied to an AMS facility based on a 6 MV tandem accelerator. The first isotopes to be addressed with the new method will be Mn-53 and Fe-60. Both are currently only measurable at AMS facilities with more than 10 MV terminal voltage (currently available only at the ANU in Canberra or the LMU and TU Munich in Garching). Further on we foresee to apply this method to other rare isotopes, making LISEL@DREAMS a versatile machine for "all" isotopes. This will subsequently widen the applications and also the user community.

[1] Forstner, O. et al., Nucl. Instr. and Meth. B 361 (2015) 217.
[2] Martschini, M. et al., Int. J. Mass Spectrom., 415 (2017) 9.

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