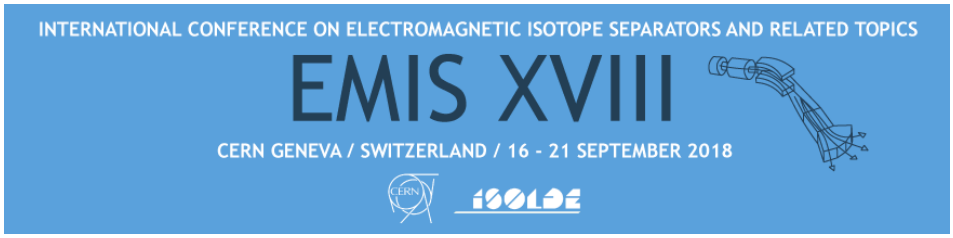

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Laser Isotope Separation revisited –radioisotope purification by resonance ionization mass spectrometry at Mainz University

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Laser Isotope Separation revisited –radioisotope purification by resonance ionization mass spectrometry at Mainz University
Klaus Wendt, Reinhard Heinke, Tom Kieck, Nina Kneip, Pascal Naubereit, Dominik Studer
As a spin-off of the on-going development of on-line laser ion sources and based on the suitability and reliability of present days laser systems for this specific task, resonance ionization mass spectrometry has demonstrated its great versatility in the field of radioisotope separation and ion beam purification. This application primarily profits from the universality of the technique, the high overall efficiency of the process and the unrivaled suppression of isobaric and other background in the final sample. For elimination of disturbances from neighboring isotopes specific techniques of ion source operation or ion-beam gating have been developed.
In the field of long-lived radioisotopes, as accessible at the ion source development set-up and off-line radioactive ion beam facility of the RISIKO laser mass separator at Mainz University, a number of applications in the field of fundamental and applied research are carried out, adding to spectroscopic activities e.g. in preparation of nuclear-medical species for CERN-Medicis [1].
One example of specific radioisotope purification concerns the isotope 163-Ho and its efficient implantation into the magnetic metallic calorimeter chips of the ECHo collaboration for investigation of the neutrino mass [2]. Purification of the isotope 53-Mn, delivered from beam dump recovery as part of the Meancorn project of PSI [3], is carried out for supporting lifetime measurements. A further activity concerns a radiometrical clean implantation of the isotope 225-Ra as standard for the PTB.
Advances and limitations of the technique, as realized at the Mainz University RISIKO mass separator, concerning the spectroscopic background, the laser and ion source optimization and finally, the optimization of the collection and implantation unit will be discussed.
[1] R. M. dos Santos Augusto et al., CERN MEDICIS –A New Facility, Appl. Sci. 4, 265-281 (2014)
[2] L. Gastaldo et al., The electron capture in 163Ho experiment –ECHo,
Eur. Phys. J. Special Topics 226, 1623–1694 (2017)
[3] R. Dressler et al., MeaNCoRN –Measurement of Neutron capture cross sections and determination of half-lives of short-lived Cosmogenic Radio-Nuclides, https://www.psi.ch/lrc/meancorn

Primary authors: WENDT, Klaus (Johannes Gutenberg Universitaet Mainz (DE)); HEINKE, Reinhard Matthias (Johannes Gutenberg Universitaet Mainz (DE)); Mr KIECK, Tom (University of Mainz); Mrs KNEIP, Nina (University of Mainz); NAUBEREIT, Pascal (Johannes-Gutenberg-Universitaet Mainz (DE)); STUDER, Dominik (Johannes Gutenberg Universitaet Mainz (DE))

Presenter: WENDT, Klaus (Johannes Gutenberg Universitaet Mainz (DE))

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