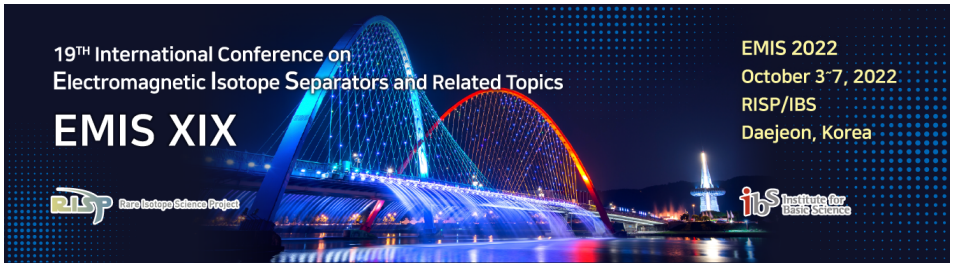

Contribution ID: **53** Type: **Poster Session**

Reconditioning of the Leuven Isotope Separator as a test bench for radioactive ion beam development

Monday, 3 October 2022 17:58 (8 minutes)

Radionuclides have already revolutionised the field of nuclear medicine and the diagnosis and treatment of cancer patients. Some of the novel medical radionuclides can only be made using the Isotope Separation Online technique (ISOL). The radioactive species collected for medical applications need to be pure, which requires mass separation [1]. Terbium has been identified as a particularly promising radionuclide –there is a quadruplet of isotopes that can be used for both diagnostics and therapy [2]. However, there is a bottleneck when it comes to terbium production –it is hard to extract from the target and ionize. This is the most significant in the timeline needed to extract the alpha-emitter, Tb-149, which would fill the current gap in the targeted alpha therapy, but has a half-life of only 4.1h.

Consequently, it is key to understand the ion source and ensure that it works not only with high efficiency but that it can also handle the high throughput needed for medical samples. At KU Leuven, we are working on refurbishing the Leuven Isotope Separator, a mass separator previously used for implantations of radioisotopes in solid-state samples for characterization of their properties and Mössbauer spectroscopy [3]. We aim to use it to systematically study the CERN FEBIAD ion source VADIS to help overcome the terbium production bottleneck [4]. In the past couple of years, the machine has undergone some significant updates and has been adapted to integrate the target ion source units used at ISOLDE, CERN. In the future, it is also intended to be used as a test bench for the sources developed for ISOL@MYRRHA and to investigate radioactive sample separation, such as K-40 for muoni
c X-ray spectroscopy.

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