

## Radioactive lanthanides – from isotope production to nuclear physics experiments

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Nuclear astrophysics requires precise knowledge on cross section data for isotopes involved in stellar nucleosynthesis. For the s-process occurring during stellar evolution, so-called branching point isotopes are especially important, since here neutron capture and  $\beta$ -decay competes. The measurement of cross section data for these radioactive isotopes is a challenging endeavour due to the limited availability and high activity of the material involved.

We will report on the production of such branching point isotopes at the high flux reactor at ILL, Grenoble, France, and the following isotope separation performed at our institute. We have successfully separated 150 GBq  $^{171}\text{Tm}$  and 3 GBq  $^{147}\text{Pm}$  from hundreds of milligrams of irradiated, enriched lanthanide seed materials. Two suitable targets containing the separated radioisotopes were successfully prepared by molecular plating and provided to CERN n\_TOF for neutron capture cross-section measurements. We will briefly report on the production of targets for these isotopes and give preliminary results of their cross section measurements.

This work will also focus on the production, separation and characterization of weighable amounts of the  $^{163}\text{Ho}$  isotope, which has also gained a huge interest in the physics community aiming to measure the neutrino mass. Approximately 2 mg of  $^{163}\text{Ho}$  have been successfully separated from hundreds of mg of irradiated  $^{162}\text{Er}$ . This isotope is also foreseen for neutron cross-section measurements at CERN n\_TOF in the near future.

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