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Achievements and perspectives of ERAWAST

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Abstract. The ERAWAST initiative (Exotic Radionuclides from Accelerator Waste for Science and Technology) was started at PSI in 2006 and is aimed to acquire resources from the PSI accelerator facilities for the preparation of rare long-lived radionuclides for several scientific purposes [1]. One of the application fields where such radionuclides like ^{60}Fe, ^{53}Mn, ^{44}Ti, ^{26}Al, $^{7/10}$Be are urgently needed is nuclear astrophysics.

First laboratory-scale separations have been carried out, with the result that two samples of around 10^{16} atoms of ^{60}Fe each could be provided for experiments [2]. A re-determination of the half-life of ^{60}Fe was performed with the first one [3], and the neutron capture cross section of ^{60}Fe at stellar energies was measured for the first time [4] using the second one. These successes encouraged us to put more efforts into the development of remote-controlled separation systems in order to gain higher amounts and the exploitation of new sources of the desired isotopes. These works are currently ongoing and for the first time, separation of about 5 GBq ^{7}Be from the cooling water of the Swiss Spallation Neutron Source (SINQ) was succeeded. Moreover, about 50 g of ^{10}Be are now available after its separation from graphite samples of the target E station at PSI [5]. Considerable amounts of ^{60}Fe, ^{53}Mn, ^{26}Al and others from an irradiated copper beam dump can be expected in the near future.

In addition, a scientific program was originated to determine half-lives and neutron capture cross-section of astrophysical interesting radionuclides. In a first step a confirmation of the new measured ^{60}Fe half-life in two independent experiments was started. First studies aimed to re-measure the half-life of ^{10}Be are currently ongoing. Experiments to determine the neutron capture cross-section of ^{53}Mn using cold and ultra-cold neutrons as well as its half-life at PSI are planned.

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