

Talk:

Recent results on development of the SPES production target

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During the meeting of Eurisol-net working group, the status regarding the R&D activities in target and ion-source of the SPES RIB facility has been presented.

The SPES project at Laboratori di Legnaro of INFN (Italy) is concentrating on the production of neutron-rich radioactive nuclei by the Uranium fission at a rate of 10^{13} fission/s. The emphasis to neutron-rich isotopes is justified by the fact that this vast territory has been little explored, at exceptions of some decay and in-beam spectroscopy following fission. The Radioactive Ion Beam (RIB) will be produced by ISOL technique using a 8kW proton beam that induced fission on a Direct Target.

The most critical element of the SPES project is the Multi-Foil Direct Target which consists on seven UCx discs of 40 mm. diameter each, and about 1 mm. thick. Up to day the SPES target represents an innovation in term of capability to sustain the primary beam power. The design is carefully oriented to optimise the radiative cooling taking advantage of the high operating temperature of a ISOL target (up to 2200°C).

First of all the experimental test e results on thermal behavior of the target system dissipating 10 kW of power has been presented. During the talk has been also presented the developments on the fabrication, characterization, and on-line testing of uranium carbide targets. In particular it has been presented the recent yield measurement performed at HRIBF (ORNL), using the SPES UCx target prototype irradiated by a 40 MeV, 50nA proton beam. During the measurement several n-rich isotopes have been collected: the ion beam intensity reached are in good agreement with the Montecarlo calculation. These experimental yields have been published recently. Next the activity concerning the production of some dedicated targets for p-rich beams production, like LaCx, BC4 and ZrC carbides it has been presented. Developments related to the +1 ion-sources activity using both surface and plasma ion source techniques have been reported. In addition the preliminary result on 'no-selective' photoionization technique developed at LNL using a Excimer laser, in order to ionize Aluminum isotopes, it has been shown. Finally recent experimental test concerning the vertical handling of the SPES target chamber has been presented: the test performed in the LNL front-end laboratory, testify the feasibility of the proposed SPES handling architecture, which consists on the use of two dedicated devices (horizontal and vertical handling apparatus).