Istituto Nazionale di Fisica Nucleare
Laboratori Nazionali di Legnaro - progetto SPES

Legnaro (PD) 29/03/2023

Subject: definition of a list of possible beams for the first day operation of SPES .

Dear members of the AGATA collaboration,
the installation of the SPES facility is progressing and we are doing our best to be able to provide the first post-accelerated radioactive ion beams by the end of 2025.
This is not an easy task given the huge amount of installation and commissioning activities that still need to be completed. Anyway the SPES project and Legnaro Laboratories are fully committed to this goal and the support and motivation by the User community are highly appreciated.

Following your request, we attach a list of possible beams that could be considered for the first operation of the facility. The information provided are clearly indicative as we will need to develop each beam on the actual machine before being able to declare realistic numbers in terms of intensity, purity and final energy. Nevertheless, the declared numbers come from test experiences, simulations and rescaling of known parameters and can be considered reliable in a first order approximation. We have selected a list of beams that are feasible without High Resolution mass separation (not ready in the first phase) and that can be produced with reasonable intensities with a reduced primary beam current (5 microA in the first phases). More detailed analysis and simulations can be performed for each case, if the community will consider it of interest. We shall initiate a constructive discussion to optimize our efforts on the listed beams, prioritizing those of larger potential in terms of scientific output.

List of possible first SPES beams:

Primary target	Beam	Intensity (pps)	Max energy (MeV/A)
TiC	43Sc	2,40E+07	10
TiC	44Sc	2,25E+08	10
TiC	42K	3,70E+07	10
UCx	130Sn	3,95E+06	10
UCx	132Sn	7,70E+05	10
UCx	132Te	2,11E+07	10
UCx	132Sb	9,50E+05	10
UCx	134Te	1,50E+04	10
UCx	94Rb	6,80E+06	10
UCx	75Ga	1,10E+05	10

The intensities are to be considered at the target position.

We are available for further discussions and we will proceed with more detailed evaluations of possible contaminations induced both by the ISOL target and the Charge Breeder sections.
We look forward for your input on the scientific interest and priority of the proposed beams.

With my best regards.

Tommaso Marchi
SPES project leader