

Post-doc position for ENSAR2 /BEAMLAB

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A post-doctoral position is opened in the frame of ENSAR2/BEAMLAB related to target developments at GANIL. Duration: 1 year, with a possibility of extension of 1 additional year.

Detailed description:

The upgrade of SPIRAL1, using the ISOL production process, and the S^3 in-flight production set-up (“Super Separator Spectrometer”) which will use as a driver the superconducting linear accelerator (LINAC) of the new SPIRAL2 infrastructure, will be soon in operation. Such facilities will extend the research on very exotic nuclei to regions of the nuclide chart difficult to access, *i.e.* neutron-deficient drip line and Super-Heavy Nuclei (SHN, $Z>103$).

In flight and ISOL production methods both need thin targets for different reasons. The fusion-evaporation reaction process involved in S^3 requires very thin target to allow the reaction products to go through the target material. In the case of ISOL targets, the release time must be as short as possible, and is strongly related to the target thickness. For both methods, a major experimental concern is the behaviour of targets under highly intense heavy ion beam irradiation, as target materials undergo severe damage due to heating, radiation and mechanical stress.

Active collaborations are already active on these subjects with CERN, IPN Orsay, GSI, CIMAP, Legnaro.

The main tasks of the postdoctoral researcher will be related to the development of very thin targets for SPIRAL 1. Such development will be carried out in the frame of the task 4 of Beamlab: Specific targets designs for non-volatile elements, which aims at developing targets for difficult (refractory, reactive and or short-lived) ISOL beams. The choice of the target to be developed will have to be guided by its physical characteristics (e.g. emissivity, thermal expansion coefficient, interlayer chemistry, porosity, resistivity...) and behavior under irradiation (phase transition, dimensional changes, microstructure etc..) which will be analyzed from literature, and discussions with physicists of material departments of previous laboratories or from the INTDS¹ network. He (She) will compare the production techniques for each material in terms of thickness and qualities obtained.

Then, he will develop processes to prepare them with various techniques available at the GANIL target laboratory and at IPNO.

Finally, he will conduct characterization of the targets such as thickness with alpha energy loss measurement and weighting, relative thickness with attenuation of an electron beam at GANIL, and emissivity with a dedicated set-up. He will manage other analysis with external laboratories using microscopy methods (MEB, AFM) and porosity test bench. According to GANIL beam schedule, irradiation tests could be performed where he(she) will take in charge the preparation of the experiment and analysis of the data.

The candidate will work closely with technician of the GANIL target laboratory, the ion source group and the physicists in charge of the SPIRAL1 facility and of S^3 targets.

Good knowledge in solid materials is required. A real taste for a fieldwork closely related to physical concepts is important.

The postdoctoral researcher should demonstrate the ability to work in a research environment, prepare research results for publication and for presentation at scientific meetings. He (She) will have in charge the regular reporting concerning his (her) missions in ENSAR2.

Interesting candidates should contact Pierre Delahaye delahaye@ganil.fr.

¹ International Nuclear Target Development Society (intds.org)