

## **Doctoral Student Programme 2021-1**

PhD thesis on **production and purification of metastable xenon for the gamma-MRI project at CERN.**

We are looking for a motivated and enthusiastic PhD candidate for the gamma-MRI project, which has been recently funded within the EU Future and Emerging Technologies Programme (FET-OPEN).

Gamma-MRI combines in one modality the physics principles of Magnetic Resonance Imaging and nuclear medicine, by relying on rf excitations of hyperpolarised unstable nuclei placed in inhomogeneous magnetic field. With several partners from Spain, France, and Switzerland, our CERN team works towards turning the technique into a new medical imaging modality.

The doctoral project is based at ISOLDE, CERN's facility for production and studies on unstable nuclei. As a PhD student, you will work on the production and purification of isomeric states of several Xe isotopes ( $^{129m}\text{Xe}$ ,  $^{131m}\text{Xe}$ ,  $^{133m}\text{Xe}$ ). Several paths will be explored: production by proton fragmentation of heavy targets at CERN (ISOLDE, MEDICIS), neutron irradiation, and decay of commercial  $^{131}\text{I}$  samples. The aim is to establish the best approach the FET-OPEN project and for the prospective pre-clinical studies. You will prepare the experimental setups to collect Xe, purify it from possible contaminants, capture it in an enclosed vial, ready to be used in hyperpolarisation experiments.

You should ideally have a nuclear chemistry or nuclear physics background, or strong interest to gain this expertise at the start of the project. Some experience with radioisotope production or purification would be a big asset. You should be also interested in working in an interdisciplinary team of physicists and chemists.

If this project sounds interesting for you, please state it in your application form.