

## PhD position in experimental nuclear physics

---

### FISSION STUDIES WITH VAMOS++ AND FALSTAFF SPECTROMETERS

---

The fission mechanism is a violent complex reaction in which a heavy nucleus is split in two fission fragments. This process is strongly determined by the nuclear structure along with the nuclear dynamics that drives the system from an initial state to the final break-up through different states of extreme deformation.

Despite more than 80 years of intense research on fission, the complex interplay between intrinsic and collective degrees of freedom still prevents from a full microscopic description and hence, the theoretical knowledge of the process is still limited.

From the experimental point of view, the relative production of the different fission fragments, pre- and post-neutron evaporation isotopic fission yields, together with their kinetic energies are good candidates to reveal the mechanism behind the fission process. However, the access to the complete identification of fission fragments is still very challenging due to the large number of produced species ---more than 300 different isotopes are produced from one fissioning system--- and their low kinetic energy.

A new setup based on low pressure gaseous detectors, the FALSTAFF spectrometer, offers a new opportunity to identify fission fragments in terms of mass, nuclear charge and velocity vector. In combination with the VAMOS++ magnetic spectrometer and the associated setup, both fission fragments will be identified at the same time and their energy will be measured.

This experiment, to be run at GANIL in 2022, will benefit from the inverse-kinematics technique using a beam of  $^{238}\text{U}$  and light targets in order to produce fissioning systems from different incoming channels, either fusion or transfer reactions.

The objectives of this PhD are two-fold: the full characterization of the FALSTAFF spectrometer, and the determination of isotopic fission-fragment yields and the scission configuration of exotic minor actinides. For this, the selected candidate will be in charge of the data analysis of both spectrometers, the production and interpretation of results, and dissemination of the experimental data in national and international conferences. The scientific results of this work are expected to be published on international journals of high impact.

#### Expected skills:

The PhD candidate is expected:

- To have a good background in nuclear structure and reactions and in the physics of fission as well as in the radiation-matter interaction.
- To have skills on computing languages such as C++ and knowledge on software packages of data analysis and simulation such as ROOT and GEANT4.
- To be a motivated person with strong communication skills and good English level.

Contact: Diego Ramos

GANIL, BP 55027, 14076 Caen France

Phone: +33 (0)2 31 45 49 43

mail: [diego.ramos@ganil.fr](mailto:diego.ramos@ganil.fr)