



PhD position in experimental nuclear physics

Fission yield measurements for decay heat evaluation of used nuclear fuel

Description:

The fission process is a violent reaction in which a heavy nucleus is split in two components, the fission fragments. While it releases an important quantity of energy, the distribution of the produced fission fragments is very broad; more than 300 different radioactive isotopes may be produced in fission and their radioactive decay is an important issue for the handling and the safe storage of the used nuclear fuel.

The experimental set-up available at GANIL allows for a precise and complete identification of the fission fragments, before their radioactive decay. An experimental campaign was carried out at VAMOS in 2024 to study the fission of different actinides produced in multi-nucleon transfer reactions, based on inverse kinematics technique.

The resulting data are an important benchmark for nuclear models and also for simulation codes of the heat released in the decay of the used nuclear fuel.

These innovative data will contribute to improve decay-heat and source term calculations and the safety analysis of standard or new types of reactors of Gen IV concept for electricity production, multi-recycling of Spent Nuclear Fuel from Light Water Reactors or minor actinides burning.

The candidate will be in charge of the analysis of the VAMOS data related to the fission fragment detection to produce high-resolution fission yields of different actinides of interest for the decay heat evaluation of used nuclear fuel. In collaboration with a team of SUBATECH, Nantes, the impact of the resulting fission yields on decay heat estimation will be estimated.

Expected skills:

The PhD candidate is expected:

- To have a good background in nuclear physics as well as in the radiation-matter interaction.
- To have skills on computing languages such as C++ and Python, 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.
- To be motivated to work in an international research team

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