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UNIVERSITET

## **A joint UU-GANIL PhD position in experimental nuclear physics: Studies of neutron-induced reactions with Medley at GANIL.**

Uppsala University is a comprehensive research-intensive university with a strong international standing. Our mission is to pursue top-quality research and education and to interact constructively with society. Our most important assets are all the individuals whose curiosity and dedication make Uppsala University one of Sweden's most exciting workplaces. Uppsala University has 50,000 students, more than 7,000 employees and a turnover of around SEK 7 billion.

The Division of Applied Nuclear Physics, at Uppsala University (Uppsala, Sweden), conducts research in the areas of nuclear reactions, nuclear fuel diagnostics and safeguards, neutron diagnostics and nuclear data for fusion energy, as well as interaction of high-energy ions with various materials. The division offers training and expertise in nuclear measurement techniques and instrumentation as well as in numerical modeling and computer simulation of nuclear interactions.

The nuclear reactions research group focuses on studies of the fission process and light-ion production reactions. The driving force is applications' needs in high-quality nuclear data. We therefore also work with evaluation methodology and uncertainty quantification methods. Most of the experimental research is carried out together with our collaborators at world-leading European laboratories. More information about our research in Uppsala: <https://www.physics.uu.se/research/applied-nuclear-physics/groups/nuclear-data/>

GANIL (Grand Accélérateur National d'Ions Lourds, Caen, France) is operated jointly by the National Institute of Nuclear and Particle Physics (IN2P3) belonging to the National Centre for Scientific Research (CNRS) and Direction de la Recherche Fondamentale (DRF) of the Commissariat à l'Energie Atomique et aux Energies Alternatives (CEA). GANIL has 245 full-time employees. About 700 researchers from 30 different countries visit GANIL each year to perform experiments. GANIL pursues high-quality, front-line scientific research and actively participates in education and instruction of (graduate) students and postdocs (about 100 each year) in an international environment.

The Division of Applied Nuclear Physics at Uppsala University, together with Normandie Université (France) and GANIL, is looking for a doctoral student in experimental nuclear physics with focus on studies of neutron-induced reactions at the NFS (Neutrons For Science) facility at GANIL in Caen, France.

### **Description of the project**

The main goal of this Ph. D. project is to perform experimental studies of different nuclear reactions induced by neutrons: production of light-ions and fission. The experiments will aim at improving our theoretical understanding of different nuclear reaction mechanisms, at providing accurate nuclear data to fill gaps in the knowledge base for neutron cross-sections, and at increasing the accuracy of neutron reference cross sections.

The recently constructed NFS facility at GANIL (Caen, France) hosts the experimental setup Medley, developed by Uppsala University, which will be used to perform the envisaged measurements. Further upgrades of the setup, devoted to improve its performance, are ongoing and their implementation will also be a part of the Ph. D. project.

During this research project, you will gain profound knowledge in nuclear reactions and instrumentation used in nuclear physics research. You will get specialized in the field of nuclear reaction dynamics, ionizing radiation, and radiation measurements.

Your main task will be to conduct cross-section measurements for nuclear fission and production of light ions induced by neutrons in the energy range 1-40 MeV, to collect and analyze data, and to compare the results with existing datasets and predictions of different theoretical model codes for nuclear reactions.

As a doctoral student in this project, you will work in a multi-cultural environment and you will have an active role in the group activities such as seminars, workshops, and courses. At the same time, you will be expected to work independently and to take personal responsibility for the progression of the project. Since this Ph. D. project will lead to a double degree from Uppsala University (Sweden) and Normandie University (France), you will spend two years in Caen, and two years in Uppsala.

## Requirements

- A Master's degree or equivalent in a field that is relevant for the research project, such as (but not limited to) Physics, Engineering Physics, or similar, is required. However, you can apply already before you obtain the degree.
- Excellent communication skills are required in written and spoken English.

## Desirable qualifications and experience

- Documented experience of working in a physics-based research environment and practical laboratory experience with nuclear and/or particle physics instrumentation and detectors, as well as with pertaining data acquisition systems.
- Since the work involves rather complex data-analysis, we desire proven programming skills. Previous knowledge in ROOT framework and in simulation environments (e.g. GEANT4, MCNP, FLUKA...) would be highly appreciated. Please provide documentation of extent and type of experience.
- While the project is mainly experimental, experience and interest in theoretical nuclear physics would be an advantage.

## The application should include the following documents

- Your Curriculum Vitae (maximum 2 pages) (**mandatory**).
- A motivation letter (maximum 1 page) describing your reasons for applying (**mandatory**).
- A copy of your undergraduate thesis, or a draft and a detailed time plan for the rest of the work if it is not yet completed (**mandatory**).
- A copy of your degree diploma along with a transcript of your grades (if applicable).
- Maximum three references and recommendation letters: at least one such letter must be written by your undergraduate thesis supervisor (**mandatory**); additional ones can be provided, for example, by co-supervisors or second-level cycle university teachers.
- List of publications (if any).
- All other documents that you want us to consider.

## Employment conditions

The Doctoral student position is a 4-year appointment, shared between Uppsala University (Sweden) and Normandie University (France). The position is fully financed and the salary is in accordance with local guidelines at both universities. The candidate will primarily devote the time to his/her own research studies. Extension by several months in Uppsala is possible by including department duties at a level of at most 20%, typically teaching.

Information on post-graduate education, rules governing the enrollment as a doctoral student in The Higher Education Act and Higher Education Ordinance as well as the rules and regulations for doctoral students at Uppsala University can be found here: <http://www.teknat.uu.se/education/postgraduate/>

Rules governing PhD students are set out in the Higher Education Ordinance chapter 5, §§ 1-7 and in Uppsala University's rules and guidelines.

**Salary:** According to local agreement for PhD students.

**Starting date:** 01-10-2021, or as otherwise agreed.

**Type of employment:** Temporary position according to the Higher Education Ordinance chapter 5, §§ 1-7 and in Uppsala University's rules and guidelines.

**Scope of the employment:** 100 %

**For further information about the position, please contact:**

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**Please, submit your application by 30 July 2021 through Uppsala University's recruitment system:** <https://www.uu.se/en/about-uu/join-us/details/?positionId=406784> (UFV-PA 2021/2204).

**Are you considering moving to Sweden to work at Uppsala University?** If so, you will find a lot of information about working and living in Sweden at [www.uu.se/joinus](http://www.uu.se/joinus).

Please do not send offers of recruitment or advertising services.