Internship in experimental nuclear physics

New Judicious Experiments for Dark sectors Investigations
ANDROMEDE Experiment Analysis

Understanding the composition and functioning of our Universe are among the most fundamental and challenging questions in Physics. To date, the intrinsic nature of dark matter remains a mystery. The New JEDI project aims to study through several nuclear physics experiments a fascinating alternative scenario, such as the existence of an indirect interaction between ordinary matter, well described by the Standard Model, and the Darks Sectors of the Universe via portals (so called bosons). In other words, does a new fifth force of nature exist? The construction of a new detection system (named New JEDI as well) has been completed in 2021. As opposed to all other experiments, New JEDI is designed to be versatile in order to make a proposal for a large-scale broadband experimental program. The project relies on pathfinder experiments conducted at the ARAMIS facility (France). The commissioning of New JEDI has been completed successfully on June 2021 at a tandetron facility (Czech Republic). The first experiment took place Orsay from June to July 2022, at the ANDROMEDE facility. A complementary experiment (FASERED project) was also realized in October 2023, at the iThemba LABS laboratory (South Africa). We plan to develop a long-term research program in the MeV terra incognita energy range at the new SPIRAL2 facility (Fr), that will deliver unique high-intensity beams of light, heavy-ions and neutrons in Europe. This project outlines as well an ambitious experimental program to advance to new levels the precision on Big Bang Nucleosynthesis (BBN) modelling. The New JEDI project gathers world-wild experts on nuclear physics and astrophysics, dark sectors theory and BBN.
During the internship the student will get familiar with the scientific topic and will contribute to the data analysis of the new JEDI first experiment at the ANDROMEDE facility (calibration, comparison with simulation…). The student will participate actively on the New JEDI experimental program as well.
The main supervising team will be composed of: Beyhan BASTIN (GANIL), Isabelle Deloncle (IJCLab), Jurgen Kiener (IJCLab), and Alain Coc (IJCLab).

Expected skills
Experimental profile. Very good levels on C/C++ programming, English, Nuclear Physics and/or Particle Physics academic knowledge. Affinity for experimental work and work in an international environment.

This work does not lead to a PhD-thesis

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