Laboratoire de Physique Corpusculaire
CNRS – IN2P3 – ENSICAEN – UNICAEN
UMR6534

Contribution to the MORA project

The internship research task is proposed by the GRIFON group (Groupe Interactions FOndamentales et nature du Neutrino) the main studies of which focus on weak interaction and ν nature at LPC Caen. It concerns a new project, MORA (Matter's Origin from the RadioActivity of trapped and laser oriented ions), presently developed in the frame of a European collaboration between researchers from France (GANIL, LPC Caen, IPN Lyon), Finland (JYFL), Belgium (IKS-Leuven), England (U. Manchester) and Switzerland (CERN/ISOLDE).

The final goal of MORA is the search for new sources of CP violation contributing to the disappearance of antimatter, via the measurement of the triple correlation *D* parameter in the β decay of oriented radioactive nuclei. To perform this measurement, the radioactive source will be confined in a transparent Paul trap and the polarization of the trapped ions will be achieved using laser optical pumping method. This technique has never been implemented so far and constitutes the originality of the project. In the final experiment, recoiling ions will be detected by MCPs with position readout while silicon detectors and phoswich scintillators will be used for β particles.
The first steps of the project, mainly based on simulations, will consist in the design of the whole system, its complete integration and the first experimental tests performed at the JYFL facility in Finland.

The trainee will be involved in one aspect of the first phase of the MORA project, either in the basic simulations of the setup, or in the tests of the detection system.

Background in nuclear instrumentation and basic knowledge of Monte Carlo simulations are recommended.

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