



LABORATOIRE DE PHYSIQUE CORPUSCULAIRE DE CAEN

CNRS – IN2P3 – ENSICAEN – UNICAEN

UMR6534

Master 2 (M2) Thesis Offer / Offre de Stage Master (M2)

Academic Year 2026/27

We're looking for M2 student to join our team in Caen on Monte Carlo calculations for dosimetry research. (La thèse peut également être effectué en français).

Topic: "Monte Carlo calculations of Linear Energy Transfer in proton treatment plans"

Location: Corpuscular Physics Laboratory, Caen, France

Duration: February – June 2027 (negotiable)

Supervisors: Mateusz SITARZ (University of Caen), Nicolas ARBOR (University of Strasbourg)

Context:

Linear Energy Transfer (LET) describes the average ionization density caused by particle beams. It is a widely used parameter in dosimetry, radiobiology, and radiotherapy. However, it remains challenging to measure and calculate precisely.

The goal of this project is to employ Monte Carlo method to calculate proton LET (and other relevant quantities) in various reference treatment plans. The internship will focus on the simulations in GATE10 environment and manipulation of medical files (DICOM format).

The results of this and similar works will be compared in a study coordinated by The European Radiation Dosimetry Group and Danish Centre for Particle Therapy.

Literature:

- F. Kalholm et al., Radiother. Oncol. 2021, 161:211-221, <https://doi.org/10.1016/j.radonc.2021.04.007>
- H. Paganetti, Technol. Cancer Res. Treat. 2003, 2(5):413-426, <https://doi.org/10.1177/153303460300200506>
- D. Sarrut et al., Phys. Med. Biol. 2026, 71(1), <https://doi.org/10.1088/1361-6560/ae237b>

Objectives:

- Implement virtual set-up in GATE10
- Design a chain to upload treatment plans and score dose, LET and fluence distributions
- Compare results with available data

Candidate Profile:

- Active enrollment in a second-year Master's degree (M2) program in Physics
- Proficiency in Python
- Desired: basic knowledge on radiation interaction with matter, experience with Monte Carlo codes

Application: send CV + short cover letter to: sitarz@lpccaen.in2p3.fr

LPC CAEN, 6 Boulevard Maréchal Juin 14050 CAEN CEDEX

sitarz@lpccaen.in2p3.fr | Tél : (+33)2 31 45 25 16

www.lpc-caen.in2p3.fr