

INTERNSHIP OPPORTUNITY

MicroScint – high resolution and high frame rate beam profilers based on microscintillators

Description of the project:

Proton therapy has been proved to be extremely important for medical purposes, as for cancer treatments. Till today, real-time beam profiles characterization remains a challenge due to the high-dose to which materials are exposed. The aim of our project is developing novel resin-based scintillators with micrometer resolution for beam profile monitoring in particle accelerators, addressing the disadvantages associated with the existing technologies. Our final goal is to realize a device, where its microfabricated active area can be easily replaced at every annual maintenance of the accelerator. To reach this goal, we are developing scintillating active areas, where microchannels made by scintillating material are coupled with a photodetection system. The photons due to the scintillation are detected by the photodetectors and converted into electric signal. This allows to reconstruct the beam profile of a particle beam (see Fig. 1).

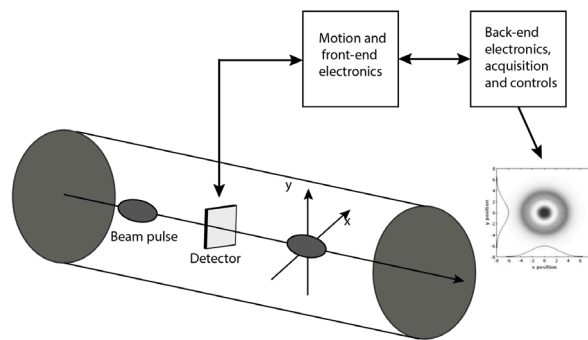


Fig. 1: Sketch of the beam profiler operation.

In this framework, we're looking for an enthusiastic and motivated person, willing to take part of the project as intern. Within the framework of the internship, the candidate will be in charge of optimizing the GEANT4/GATE simulations, and of the design and cleanroom fabrication of microstructured scintillating devices. Once manufactured the candidate will assemble the scintillating device to the opto-electronic readout circuit. This demonstrator will be tested first with UV LEDs and then with proton beams.

Requested profile and qualifications:

- Master degree in Micro/Nanotechnology, Physics or related fields (graduated less than 12 months ago);
- Willing to learn how to use GEANT4/GATE softwares (previous experience is a plus);
- Willing to work in a cleanroom environment (previous experience is a plus);
- Motivated and enthusiastic person;
- Team spirit;
- Swiss or EU citizenship.

Project Type: Internship funded by ENABLE (duration 6 months, total amount: 17'400 CHF)

Starting date: 01/11/2022

Supervisors: Veronica Leccese, Michele Caldara

Lab: LUMES (Laboratory of Ultrafast Microscopy and Electron Scattering, <https://www.epfl.ch/labs/lumes/>)

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