Scientific supervisor	
Name	Ming-Liang Wong
E-mail	ming.wong@uj.edu.pl
Department	Hadron physics
Laboratory	SiFi-CC
Group webpage	https://bragg.if.uj.edu.pl/gccbwiki

Proposed research topic

Readout system for the SiFi Compton Camera

Short description (< 1000 characters)

We aim to develop a solution for the on-line monitoring of proton therapy with a Compton Camera (CC). Here, a cancer tumour is irradiated with a proton beam with parameters adjusted such that protons deposit a large portion of their energy in the tumour region, leading to the destruction of tumour cells with minimal impact on the surrounding healthy tissue.

For this purpose, a treatment plan is prepared individually for each patient, usually based on computed tomography (CT) or positron emission tomography (PET) images. However, the human body changes constantly, which may lead to an incorrect radiation dosage. Therefore methods for on-line monitoring in proton therapy are sought for, as they would allow for better and safer treatment plans for patients.

This on-line monitoring method would involve a CC constructed with scintillating fibers. We are currently working on a readout system that would need to perform event selection, event building and low level event reconstruction in order to reconstruct the exact position of the proton Bragg peak. It is suggested to the student to take part in one or more of the following set of tasks:
- *automate noise pedestal calibration,*
- *automate the setting of photo-multiplier(SiPM) bias voltages*
- *low-level event selection*

The student would be exposed to modern data-taking systems relevant to today's physics experiments by writing software in C++/python and picking up basic linux administration skills. In addition, (s)he would also be working in cutting edge detector physics. It is a rare opportunity to be able to be involved in a table top experiment where one could learn the whole experiment.

Main research tool

Front-end electronics, scintillating fibers, computers

Additional requirements to the candidate

Some C++/python

Possibility to continue student internship in the form of:

Diploma thesis (master's or bachelor's degree)	X
PhD study	X