



Physics Education Research at CERN

an activity of the Teacher and Student Programmes Section of IR-ECO

Ph.D. Thesis Offer on Tabletop Particle Accelerators in Education

Description

The topics of particle acceleration, beam optics, and diagnostics are prime examples of applied physics with many intertwined physics concepts in a modern context. These topics are not only key to the success of high energy physics experiments, they can also serve as the basis for very rich and engaging hands-on learning activities in high school and university education. However, careful consideration from an education perspective and an iterative design process is required to develop suitable hands-on experiments for students.

The successful candidate will work in CERN's Physics Education Research team together with CERN Accelerator Schools to design and evaluate tabletop accelerators and their educational use cases. The setup will involve several electron guns in differently shaped vacuum tubes with various magnets (dipole and quadrupole magnets) and beam instrumentation using 3D manufacturing techniques if applicable.

Try-outs with students will be performed in S'Cool LAB (<http://cern.ch/s-cool-lab>), CERN's hands-on learning laboratory for high school students, and in the framework of CERN Accelerator Schools with university students. In addition, feedback from high school teachers can be collected during the national and international teacher programmes at CERN (<http://cern.ch/teachers>). Empirical qualitative and quantitative data from students will be analysed and used to guide the iterative design process of experimental equipment and learning activities.

Training Value

The successful candidate will strengthen skills in beam physics, electronics, and 3D-design, while improving skills in communication, effective learning strategies, and evaluation methods.

Supervision

The thesis will be jointly supervised by a university professor and a supervisor from CERN's Physics Education Research team.

For this thesis, it is possible to propose the university and university professor supervising the thesis.

How to apply?

Applications are handled by CERN HR, please find the application information for CERN's doctoral student programme at <http://cern.ch/jobs/join-us/doctoral-student-programme>. **The application deadline for the current round is October 16th, 2017!**