



# PhD in Accelerator Physics

## University of Liverpool and Cockcroft Institute

A PhD studentship is available in the Liverpool University accelerator physics group, based at the Cockcroft Institute in the Daresbury Science and Innovation Campus. The project will focus on the development of an online model, commissioning, and design of experiments for the EMMA accelerator, currently under construction at Daresbury.

The project will be in collaboration with the Accelerator Science and Technology Centre, ASTeC of the Science and Technology Facilities Council (STFC) a major stakeholder within the Cockcroft Institute partnership. The student will have the opportunity to contribute to the building of a new accelerator, and work alongside professional accelerator scientists.

## Project Details

EMMA is a small accelerator, with a circumference of 16.57 m, and accelerates electrons from 10 MeV to 20 MeV. It is the first non-scaling Fixed Field Alternating Gradient (FFAG) accelerator in the world. An FFAG has fixed magnetic fields. This means that the orbit increases in circumference as the electrons are accelerated, resulting in complex beam dynamics that have to be understood in order to achieve optimal performance. The student will be involved in developing detailed calculations of the beam trajectory, carrying out the diagnostics required to achieve the first beam, and designing experiments to test predictions about the beam behaviour. EMMA is built as a proof of concept for a non-scaling FFAG. As a result of the compact size and rapid acceleration that is possible, such accelerators have potential applications ranging from nuclear and particle physics (e.g. neutrino factory and muon colliders) to cancer therapy.

## Entry Requirements

Candidates should have a good honours degree (1<sup>st</sup> Class or 2:1 minimum, or the equivalent) in physics, applied mathematics or a related physical science.

## Funding

The project is funded by the Cockcroft Institute Core grant from STFC for 42 months. This studentship will cover tuition fees and maintenance allowance of £12,940 per annum. Due to STFC regulations, only UK/EU applicants with a minimum of 3 years residency in the UK are eligible.

## **Applications**

Applicants should submit a full CV with the contact details of three referees by post or by email to: Dr Kai Hock, Cockcroft Institute, Daresbury Laboratory, Warrington WA4 4AD, UK. Email: [k.m.hock@dl.ac.uk](mailto:k.m.hock@dl.ac.uk)