

JOB DESCRIPTION
Research Associate: Laser Plasma Interaction Physics
Vacancy Ref: A1475

Job Title:	Research Associate in Laser Plasma Interaction Physics x 5	Present Grade: 6P
Department/College:	Department of Physics and the Cockcroft Institute, Daresbury	
Directly responsible to:	Prof A Thomas & Dr L Willingale	
Supervisory responsibility for:	N/A	
Other contacts		
Internal:	Department and faculty colleagues and PhD students, including those in the Engineering Department and its Cockcroft Institute E-MIT sub-group, the Library, ISS and central administration	
External:	Cockcroft Institute partners at the Universities of Liverpool, Manchester, Strathclyde and Daresbury Laboratory, and wider collaborative academic & research networks	
Major Duties:		
	<p>Research Associate #1 in Laser Plasma Ion Acceleration</p> <p>The main duty of the Research Associate is to perform research advancing the frontiers of laser driven ion beams. The Research Associate will be expected to be able to lead experimental research on relativistic intensity laser systems to investigate laser driven ion acceleration mechanisms. These studies will contribute to the Physics Department and the Cockcroft Institute's development and expansion in this area of research. Such research is expected to be relevant to very high power laser systems, including the Extreme Light Infrastructure, and the future development of compact next generation particle accelerators and light sources.</p> <ul style="list-style-type: none"> • Plan, execute, and analyze high-intensity laser plasma experiments studying novel ion acceleration mechanisms on large laser systems, such as those housed at the Central Laser Facility, at SCAPA or on systems worldwide. • Work closely with students and other collaborators to ensure the success of the projects. • Author and publish papers in leading international peer-reviewed academic journals (and other appropriate forms of research output, including international conference proceedings and the Joint Accelerator Conference Website, JACoW). • Foster links with other researchers within the Cockcroft Institute, including those in non-plasma areas of accelerator research. <p>Research Associate #2 in High Intensity Laser-Plasma Physics</p> <p>The main duty of the Research Associate is to perform research advancing the frontiers of ultra intense laser physics through experimental studies using extremely powerful laser systems. The Research Associate will be expected to plan and lead experiments to study phenomena such as absorption mechanisms, radiation friction, relativistically induced transparency, particle acceleration and pair-plasma generation. These studies will contribute to the Physics Department and the Cockcroft Institute's development and expansion in this area of research. Such research is expected to be relevant to very high power laser systems, including the Extreme Light Infrastructure, and the future development of compact next generation particle accelerators and light sources.</p> <ul style="list-style-type: none"> • Plan and carry out experimental research on high intensity laser-plasma interactions. • Act as target area operator on experiments on large scale laser systems such as those of the Central Laser Facility, at SCAPA or on systems worldwide. • Develop new diagnostics for experiments. 	

- Publish papers in leading international peer-reviewed academic journals (and other appropriate forms of research output, including international conference proceedings and the Joint Accelerator Conference Website, JACoW)
- Present research at international conferences and workshops, including the European Advanced Accelerator Conference, and invited seminars.
- Support experimental efforts by running particle-in-cell codes to help understand experimental measurements.
- Work closely with students and collaborators to ensure the success of all projects, including traveling to external institutions.

Research Associate #3 in Simulation of Laser Plasma Accelerators

The main duty of the Research Associate is to perform research advancing the frontiers of laser plasma based particle acceleration through theoretical studies with an emphasis on numerical simulation. The Research Associate will be expected to be able to run kinetic plasma simulation codes. These studies will contribute to the Physics Department and the Cockcroft Institute's development and expansion in this area of research. Such research is expected to be relevant to very high power laser systems, including the Extreme Light Infrastructure, and the future development of compact next generation particle accelerators and light sources.

- Carry out fundamental theoretical research into laser plasma accelerators and high field physics.
- Run advanced particle-in-cell codes for simulating laser-plasma interactions on high power computing systems.
- Develop and code physics models to improve simulation capabilities
- Publish papers in leading international peer-reviewed academic journals (and other appropriate forms of research output, including international conference proceedings and the Joint Accelerator Conference Website, JACoW)
- Present research at international conferences and workshops, including the European Advanced Accelerator Conference, and invited seminars.
- Support experimental efforts by other Research Associate / students by running particle-in-cell codes to help understand experimental measurements.
- Work closely with students and collaborators to ensure the success of all projects, including traveling to external institutions.
- Foster links with other researchers within the Cockcroft Institute, including those in non-plasma areas of accelerator research.

Research Associate #4 in Laser Wakefield Acceleration and Radiation

The main duty of the Research Associate is to perform research advancing the frontiers of laser wakefield particle acceleration and compact next-generation light sources through experimental studies using ultrashort pulse laser systems. The Research Associate will be expected to plan and lead laser wakefield acceleration experiments and X-ray/gamma-ray measurements. These studies will contribute to the Physics Department and the Cockcroft Institute's development and expansion in this area of research. Such research is expected to be relevant to very high power laser systems, including the Extreme Light Infrastructure, and the future development of compact next generation particle accelerators and light sources.

- Plan and carry out experimental research on laser driven plasma wakefield accelerators and X-ray and gamma-ray generation.
- Act as target area operator on experiments on large scale laser systems such as those of the Central Laser Facility, at SCAPA or on systems worldwide.
- Develop new diagnostics for experiments.
- Publish papers in leading international peer-reviewed academic journals (and other appropriate forms of research output, including international conference proceedings and the Joint Accelerator Conference Website, JACoW)
- Present research at international conferences and workshops, including the European Advanced Accelerator Conference, and invited seminars.
- Support experimental efforts by running particle-in-cell codes to help understand experimental

measurements.

- Work closely with students and collaborators to ensure the success of all projects, including traveling to external institutions.
- Foster links with other researchers within the Cockcroft Institute, including those in non-plasma areas of accelerator research.

Research Associate #5 in The Physics of Plasma Based Acceleration

The main duty of the Research Associate is to perform research advancing the frontiers of plasma wakefield based particle acceleration. These studies will contribute to the Physics Department and the Cockcroft Institute's development and expansion in this area of research. The Research Associate will take an active role in planning for potential future experiments beam driven and laser driven particle acceleration schemes. Some of these issues include quantum electrodynamic effects in the plasma, including electron-positron pair production mechanisms. The Research Associate will use advanced plasma simulations and theoretical analysis to understand these physics issues in plasma wakefield accelerators and develop new ideas for colliders and accelerator technology based on plasma, including positron sources.

- Conduct particle-in-cell code studies and theoretical analysis to plan for plasma wakefield experiments and understand potential physics issues and develop new plasma based elements for colliders.
- Carry out fundamental theoretical research into quantum effects in plasma based accelerators, laser-plasma positron sources.
- Publish papers in leading international peer-reviewed academic journals (and other appropriate forms of research output, including international conference proceedings and the Joint Accelerator Conference Website, JACoW)
- Present research at international conferences and workshops, including the European Advanced Accelerator Conference, and invited seminars.
- Work closely with students and collaborators to ensure the success of all projects, including traveling to external institutions.
- Foster links with other researchers within the Cockcroft Institute, including those in non-plasma areas of accelerator research.