Candidate Information

Position:	Research Fellow in Laser-driven Particle Sources (Physics)
School/Department:	School of Mathematics and Physics
Reference:	22/110482
Closing Date:	Monday 2 January 2023
Salary:	£35,333 per annum
Anticipated Interview Date:	Week Commencing 16 January 2023
Duration:	Fixed Term for 12 months (with the possibility of an extension for an additional 12 months)

JOB PURPOSE:

To play a lead role in the project: “Ultra-short and tuneable positron beams for high-resolution and volumetric inspection of materials” sponsored by the New Horizons scheme of the Engineering and Physical Sciences Research Council (EPSRC) and in its follow-up impact for the large-scale next-generation plasma-facilities in UK and Europe (post part-funded by the Central Laser Facility and an Impact Acceleration Award from STFC).

This will mainly involve planning and delivery of a series of experiments, using both the in-house laser system TARANIS and international laser facilities, focussed on designing and testing a beamline for the capture and manipulation of laser-driven positron beams, aimed at its use in practical applications in manufacturing and material inspection. The design work will form the basis for dedicated user end-stations in both EPAC in the UK and EuPRAXIA in the Eu.

The following describes the type of work that is typically required of research staff at this level. It is not expected that anyone carries out all the activities mentioned below and some carry out additional duties.

MAJOR DUTIES:

1. Develop and plan an area of research and expertise in laser-driven particle acceleration and generation of secondary positron beams, with a particular emphasis on industrial applications.
2. Perform extensive numerical modelling of a positron beamline suitable for the capture and handling of low-energy positrons.
3. Optimise laser-driven positron generation, using different schemes, for manufacturing and material inspection.
4. Build and experimentally test a positron beamline suitable for industrial applications.
5. Inform EPAC and EuPRAXIA on the design for a user end-station delivering low-energy positron beams.
6. Present regular progress reports on research to members of the research group or to external audiences to disseminate and publicise research findings.
7. Prepare, often in consultation with supervisor, material for publication in national and international journals and presentations at international conferences.
8. Assist grant holder in the preparation of funding proposals and applications to external bodies.
9. Carry out routine administrative tasks associated with the research project/s to ensure that project/s are completed on time and within budget. These might include organisation of project meetings and documentation, financial control, risk assessment of research activities.
10. Contribute to the supervision of PhD and postgraduate students within the research group.
11. Read academic papers, journals, and textbooks to keep abreast of developments in laser-driven particle acceleration and related disciplines.
12. Carry out any other duties designated by a line manager and which fall within the general ambit of the post.
13. Identify areas for future development of the research and build contacts with the private sector for the exploitation of the work.

ESSENTIAL CRITERIA:

1. Hold or be about to obtain a Ph.D. (or equivalent) in Plasma Physics or related disciplines.
2. At least 3 years relevant research experience.

3. Research interests in the field of high power laser-matter interactions and laser-driven particle acceleration.
4. Demonstrable practical experience with high-power laser systems and/or laser-plasma interactions.
5. Willingness to supervise postgraduate and final year undergraduate students.
6. Ability to contribute to broader management and administrative processes.
7. Sufficient breadth and depth of specialist knowledge in the discipline of laser-driven particle acceleration and/or high-intensity laser-matter interactions.
8. Ability to communicate complex information clearly.
9. Ability to build contacts and participate in internal and external networks.
10. Ability to communicate effectively in English, both verbally and in writing.
11. Demonstrate a logical mind and intellectual ability.
12. Ability to assess and organise resources.
13. Ability to work in a team.
14. Willingness to travel.

DESIRABLE CRITERIA:

1. Evidence of post-doctoral experience or employment in the private sector in related subjects.
2. Expertise in numerical and analytical modelling.
3. Expertise in Particle Tracing and Monte-Carlo simulation codes.
4. Expertise in laser-driven electron or ion acceleration.
5. Remarkable track record of publication and presentations at international conferences, commensurate with stage of career.
6. Track record of significant contribution in outreach programs involving interaction with industry, community groups, and general public.