

Job Description and Selection Criteria

Job title	Postdoctoral Research Assistant in Electrodynamic manipulation of micron-sized particles
Division	Mathematical Physical and Life Sciences
Department	Physics
Location	Clarendon Laboratory, Parks Road, Oxford
Grade and salary	Grade 7 : £37,524 - £45,763 per annum
Hours	Full time
Contract type	Fixed term for 12 months
Reporting to	Prof. Chris Foot, Research group lead
Vacancy reference	175245
Additional information	Closing date – midday on 15 Oct 2024

For Research posts: Include table below **only** where relevant to role.

Research topic	Electrodynamic manipulation of micron-sized objects
Principal Investigator / supervisor	Professor Chris Foot
Project team	Ultracold Quantum Matter
Project web site	https://coldatoms.web.ox.ac.uk/
Funding partner	Leverhulme Trust
Recent publications	



The role

A post is available at the Department of Physics, University of Oxford for a Post-Doctoral Research Associate (PDRA) to undertake experimental work in electrodynamic manipulation of micron-sized objects, managed by Prof. Foot. This project aims to develop methods to control both the orientation of non-spherical objects and their position in space, using a new electrodynamic apparatus designed and constructed during this work. The workplan set out in the research proposal selected by the Leverhulme Trust covers a range of possible applications for this technique. Specific objectives include: (i) trapping metal foils a few microns thick by tens of microns wide for use as targets for high-repetition rate high-power laser systems, (ii) the electrostatic manipulation of graphene, carbon nanoribbons and other two-dimensional materials in a clean ultra-high vacuum environment for fabrication of novel devices as well as investigation of these materials at high temperatures via laser heating, and (iii) biological samples may also be investigated, e.g., using an electrospray to create highly charged non-spherical objects. Developing methods to charge particles and capture them in an electrodynamic trap will be the main experimental challenge, especially in vacuum where there is no damping of the motion by viscous drag and therefore the electric fields need to be switched with precise timing.

The postholder will be expected to carry out practical work in the laboratory to investigate and develop these methodologies by taking detailed measurements and analysis of the data. The postholder will collaborate with other PDRAs on technical aspects of the apparatus such as designing, modelling/simulating and constructing mechanical and electronic components, as well as managing the high-voltage safety requirements. Prior experience with developing experimental control systems or writing control sequences is desirable but not required since the primary role of the postholder to carry out experimental work in the laboratory and other members of the team are expert in the electronics etc. This project combines and greatly extends ideas drawn from Physics, (Physical) Chemistry and (Electronic) Engineering and it is suitable for someone with a background in these, or related fields, who is open minded and willing to explore this new research direction. The Leverhulme Trust supports individual research project that have the vision to go beyond the fields traditionally supported by other funding bodies and which have the potential for high rewards. It would also be desirable for the postholder to engage with potential end-users to demonstrate and adapt the instrument.

Please direct informal enquiries about the role to: christopher.foot@physics.ox.ac.uk

Responsibilities

The successful candidate will:

- Help design and commission a new electrodynamic trap.
- Test and develop methods for loading charged particles into the electrodynamic trap, both in air (atmospheric pressure) and in vacuum.
- Collect, analyse and interpret data and prepare results for presentation.
- Contribute ideas for improved designs.
- Share responsibility for safe laboratory working practices.

- Assist with other reasonable practical and administrative duties as required.
- Work well within a team (possibly including supervision of undergraduate projects).
- The post-holder will have the opportunity to teach.

Pre-employment screening

All offers of employment are made subject to standard pre-employment screening, as applicable to the post.

If you are offered the post, you will be asked to provide proof of your right-to-work, your identity, and we will contact the referees you have nominated. You will also be asked to complete a health declaration (so that you can tell us about any health conditions or disabilities so that we can discuss appropriate adjustments with you), and a declaration of any unspent criminal convictions.

We advise all applicants to read the candidate notes on the University's pre-employment screening procedures, found at: www.ox.ac.uk/about/jobs/preemploymentscreening/.

Selection criteria

Essential

- Hold (or about to obtain) a PhD/DPhil in Physics or related discipline;
- Proven practical skills in a relevant area including operating complex apparatus.
- Experience in experimental design, specification and purchasing of equipment.
- Motivation and the ability to work collaboratively.
- Good communication and presentation skills.
- Excellent verbal and written communication skills in English.
- Excellent problem-solving skills.

Desirable

- Experience of presenting results.
- Ability to analyse data and to prepare results.
- A sound background and experience in experimental design.

Pre-employment screening

Standard checks

If you are offered the post, the offer will be subject to standard pre-employment checks. You will be asked to provide: proof of your right-to-work in the UK; proof of your identity; and (if we haven't done so already) we will contact the referees you have nominated. You will also be asked to complete a health declaration so that you can tell us about any health conditions or disabilities for which you may need us to make appropriate adjustments.

Please read the candidate notes on the University's pre-employment screening procedures at: <https://www.jobs.ox.ac.uk/pre-employment-checks>

Hazard-specific / Safety-critical duties

This job includes hazards or safety-critical activities. If you are offered the post, you will be asked to complete a health questionnaire which will be assessed by our Occupational Health Service, and the offer of employment will be subject a successful outcome of this assessment.

The hazards or safety-critical duties involved are as follows:

Working with category 3b or 4 lasers (laser safety class) may be necessary for some parts of the project but prior experience is not a requirement. Training in safe working practices will be given, and systems will be inspected by a Laser Safety Officer.

About the University of Oxford

Welcome to the University of Oxford. We aim to lead the world in research and education for the benefit of society both in the UK and globally. Oxford's researchers engage with academic, commercial and cultural partners across the world to stimulate high-quality research and enable innovation through a broad range of social, policy and economic impacts.

We believe our strengths lie both in empowering individuals and teams to address fundamental questions of global significance, while providing all our staff with a welcoming and inclusive workplace that enables everyone to develop and do their best work. Recognising that diversity is our strength, vital for innovation and creativity, we aspire to build a truly diverse community which values and respects every individual's unique contribution.

While we have long traditions of scholarship, we are also forward-looking, creative and cutting-edge. Oxford is one of Europe's most entrepreneurial universities and we rank first in the UK for university spin-outs, and in recent years we have spun out 15-20 new companies every year. We are also recognised as leaders in support for social enterprise.

Join us and you will find a unique, democratic and international community, a great range of staff benefits and access to a vibrant array of cultural activities in the beautiful city of Oxford.

For more information, please visit www.ox.ac.uk/about/organisation.

Department of Physics

Oxford Physics is one of the largest and most eminent departments in Europe – pursuing forefront research alongside training the next generation of leaders in Physics.

With an academic staff of over one hundred our activities range from fundamental particles to the furthest reaches of the universe to manipulating matter on an atomic scale. Oxford physicists are probing new ways to harness solar energy, modelling the Earth's atmosphere to predict the future climate, exploring computation on the quantum scale and executing calculations that reveal the fundamental structure of space and time.

Atomic and Laser Physics sub-department

The post-holder will be based in the ALP sub-department, which is one of the six sub-departments that together make up the Department of Physics; these are Astrophysics, Atomic and Laser Physics, Atmospheric, Oceanic and Planetary Physics, Condensed Matter Physics, Particle Physics and Theoretical Physics, with a seventh function (Central Physics) providing administrative and technical support to these sub-departments. Members of all sub-departments take part in research, teaching and matters such as examinations, discussion of syllabi, lectures and liaison with undergraduates and postgraduate students.

For more information please visit: <http://www2.physics.ox.ac.uk/>

Mathematical, Physical & Life Sciences Division

The Mathematical, Physical and Life Sciences (MPLS) Division is one of the four academic divisions of the University of Oxford.

The MPLS Division's 10 departments and 3 interdisciplinary units span the full spectrum of the mathematical, computational, physical, engineering and life sciences, and undertake both fundamental research and cutting-edge applied work. Our research addresses major societal and technological challenges and is increasingly focused on key interdisciplinary issues. We collaborate closely with colleagues in Oxford across the medical sciences, social sciences and humanities, and with other universities, research organisations and industrial partners across the globe in pursuit of innovative research geared to address critical and fundamental scientific questions.

For more information please visit: <http://www.mpls.ox.ac.uk/>

Athena Swan Charter

The Department of Physics holds a silver Athena Swan award to recognise advancement of gender equality: representation, progression and success for all.

How to apply

Applications are made through our online recruitment portal. Information about how to apply is available on our Jobs website <https://www.jobs.ox.ac.uk/how-to-apply>.

Your application will be judged solely on the basis of how you demonstrate that you meet the selection criteria stated in the job description.

As part of your application you will be asked to provide details one referee and indicate whether we can contact them now.

Please upload all documents **as PDF files** with your name and the document type in the filename. All applications must be received by **midday** UK time on the closing date stated in the online advertisement.

Information for priority candidates

A priority candidate is a University employee who is seeking redeployment because they have been advised that they are at risk of redundancy, or on grounds of ill-health/disability. Priority candidates are issued with a redeployment letter by their employing department(s).

If you are a priority candidate, please ensure that you attach your redeployment letter to your application (or email it to the contact address on the advert if the application form used for the vacancy does not allow attachments).

If you need help

Application FAQs, including technical troubleshooting advice is available at: <https://staff.web.ox.ac.uk/recruitment-support-faqs>

Non-technical questions about this job should be addressed to the recruiting department directly recruitment@physics.ox.ac.uk. To return to the online application at any stage, please go to: www.recruit.ox.ac.uk.

Please note that you will receive an automated email from our online recruitment portal to confirm receipt of your application. **Please check your spam/junk mail** if you do not receive this email.

Important information for candidates

Data Privacy

Please note that any personal data submitted to the University as part of the job application process will be processed in accordance with the GDPR and related UK data protection legislation. For further information, please see the University's Privacy Notice for Job Applicants at: <https://compliance.admin.ox.ac.uk/job-applicant-privacy-policy>. The University's Policy on Data Protection is available at: <https://compliance.admin.ox.ac.uk/data-protection-policy>.

The University's policy on retirement

The University operates an Employer Justified Retirement Age (EJRA) for very senior research posts at **grade RSIV/D35 and clinical equivalents E62 and E82**, which with effect from 1 October 2023 will be 30 September before the 70th birthday. The justification for this is explained at: <https://hr.admin.ox.ac.uk/the-ejra>.

For **existing** employees on these grades, any employment beyond the retirement age is subject to approval through the procedures: <https://hr.admin.ox.ac.uk/the-ejra>.

There is no normal or fixed age at which staff in posts at other grades have to retire. Staff at these grades may elect to retire in accordance with the rules of the applicable pension scheme, as may be amended from time to time.

Equality of opportunity

Entry into employment with the University and progression within employment will be determined only by personal merit and the application of criteria which are related to the duties of each particular post and the relevant salary structure. In all cases, ability to perform the job will be the primary consideration. No applicant or member of staff shall be discriminated against because of age, disability, gender reassignment, marriage or civil partnership, pregnancy or maternity, race, religion or belief, sex, or sexual orientation.

Benefits of working at the University

Employee benefits

University employees enjoy 38 days' paid holiday, generous pension schemes, travel discounts, and a variety of professional development opportunities. Our range of other employee benefits and discounts also includes free entry to the Botanic Gardens and University colleges, and discounts at University museums. See <https://hr.admin.ox.ac.uk/staff-benefits>

University Club and sports facilities

Membership of the University Club is free for all University staff. The University Club offers social, sporting, and hospitality facilities. Staff can also use the University Sports Centre on Iffley Road at discounted rates, including a fitness centre, powerlifting room, and swimming pool. See www.club.ox.ac.uk and <https://www.sport.ox.ac.uk/>.

Information for staff new to Oxford

If you are relocating to Oxfordshire from overseas or elsewhere in the UK, the University's Welcome Service website includes practical information about settling in the area, including advice on relocation, accommodation, and local schools. See <https://welcome.ox.ac.uk/>. There is also a visa loan scheme to cover the costs of UK visa applications for staff and their dependants. See <https://staffimmigration.admin.ox.ac.uk/visa-loan-scheme>

Family-friendly benefits

With one of the most generous family leave schemes in the Higher Education sector, and a range of flexible working options, Oxford aims to be a family-friendly employer. We also subscribe to the Work+Family Space, a service that provides practical advice and support for employees who have caring responsibilities. The service offers a free telephone advice line, and the ability to book emergency back-up care for children, adult dependents and elderly relatives. See <https://hr.admin.ox.ac.uk/my-family-care>

The University has excellent childcare services, including five University nurseries as well as University-supported places at many other private nurseries.

For full details, including how to apply and the costs, see <https://childcare.admin.ox.ac.uk/>

Disabled staff

We are committed to supporting members of staff with disabilities or long-term health conditions. For further details, including information about how to make contact, in confidence, with the University's Staff Disability Advisor, see <https://edu.admin.ox.ac.uk/disability-support>

Staff networks

The University has a number of staff networks including the Oxford Research Staff Society, BME staff network, LGBT+ staff network and a disabled staff network. You can find more information at <https://edu.admin.ox.ac.uk/networks>

The University of Oxford Newcomers' Club

The University of Oxford Newcomers' Club is an organisation run by volunteers that aims to assist the partners of new staff settle into Oxford, and provides them with an opportunity to meet people and make connections in the local area. See www.newcomers.ox.ac.uk.