Department of Physics
Clarendon Laboratory
Parks Road, Oxford OX1 3PU

UNIVERSITY OF OXFORD

Job Description and Selection Criteria

Job title	PDRA in astronomical instrumentation and for extra-solar planet characterisation
Division	Mathematical Physical and Life Sciences
Department	Physics
Location	Denys Wilkinson Building
Grade and salary	Grade 7: £36,024 per annum (with a discretionary scale points up to £ 44,263 based on experience)
Hours	Full time (part time will also be considered, up to the equivalent of 4 days a week)
Contract type	Fixed-term 30 months *Extension possible subject to successful funding renewal*
Reporting to	Dr Matthias Tecza
Vacancy reference	174469
Additional information	Closing date – midday on 30th August 2024

Research topic	Instrumentation for direct imaging of extra-solar planets
Principal Investigator / supervisor	Dr Matthias Tecza
Project team	
Project web site	https://www.physics.ox.ac.uk/research/group/extremely-large-telescope/elt-pcs
Funding partner	The funds supporting this research project are provided by UKRI
Recent publications	

The role

Over the last 20 years the Oxford Astrophysics instrumentation group has been and is currently involved in several large instrumentation projects. We lead the design and development in some of the projects, e.g. HARMONI for ELT, WEAVE for the WHT, and have been partners in international consortia for others. We are looking for a young, motivated researcher who will widen the set of available skills by contributing to the opto-mechanical design, assembly, integration, testing and exploitation of our astronomical instruments. They would add to the group's expertise in any of the following specialist areas: optics, mechanics, and software.

One of the projects we are involved with is ELT-PCS, the Planetary Camera and Spectrograph for ESO's Extremely Large Telescope, for which we lead the R&D work package of the integral-field spectrograph. In particular, we are investigating the use of both lenslet-array and image-slicer based integral field spectrographs for ELT-PCS with the aim to determine the best suitable technology for PCS.

The successful candidate will work in a small team and help setup a laboratory experiment to quantify and determine the limitations on the contrast ratio achievable with both types of integral field spectrographs. Most of the spectrograph optics is already available and partly pre-aligned, as are prototype image-slicer and a lenslet-array integral field unit. You will be involved in the characterisation of both integral field units, the alignment and characterisation of the remaining spectrograph optics, and the setup of the experiment including light sources, camera, and control software. In addition, you will conduct the contrast measurements, and analyse the acquired data. The experiment will also be taken to ESO's headquarters in Garching, Germany, where we will integrate it into the GHOST adaptive optics bench and repeat the contrast measurements.

Following the completion of the current R&D phase of ELT-PCS, the project will have kick-off and start its design and build phase, which depends on the technological readiness level of other PCS sub-systems. Once the preliminary and final design phases of PCS have kicked-off, you will play a leading role in the design of the PCS integral-field spectrograph, analysing and documenting its performance for review within the PCS consortium and for ESO.

Additionally, the role could include supporting or taking a leading role in the design of other instruments being developed in the sub-department.

Responsibilities

During the ELT-PCS R&D and subsequent preliminary design phases

- Play a leading role in the remaining design tasks of the spectrograph and integral field units and engage actively in the mechanical design with the PI and mechanical design engineer.
- Oversee the procurement and manufacturing of its components.
- Assemble, integrate, align, test, and characterise the spectrograph and its components.
- Measure the maximum achievable contrast of the two types of integral field spectro-graphs.
- Document research activity through technical reports and journal articles.
- Contribute to the design and analysis of other instrumentation projects within the group.
- Participate in group meetings and seminars within the department.
- The post-holder will have the opportunity to teach. This may include lecturing, small group teaching, and tutoring of undergraduates and graduate students.

Pre-employment screening

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

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 use of an imaging interferometer for the wavefront error characterisation of the optical components and systems. The interferometer is operating using a Laser at a wavelength of 1064nm, which is classified as 3b. This poses the following hazards or safety-critical activities which will require successful pre-employment health screening through our Occupational Health Service before the successful candidate will be allowed to start work:

- Working with category 3b lasers (laser safety class)

Selection criteria

The successful candidate will be chosen from amongst the applicants based on the fulfilment of the following criteria:

Essential

- Doctoral degree (or close to obtaining) in Astronomy, Physics, Engineering, or related field.
- Proven record of academic research including experimental work.
- Writing skills (technical reports / research papers / instrument manuals / review documents)
- Experience in at least one of: (1) optical design; (2) mechanical design; (3) assembly; (4) integration; (5) testing of a relevant astronomical instrumentation project, either at pre-doctoral or post-doctoral level.
- Demonstrated abilities of data analysis / scientific computing.

Desirable

- Decision-making, problem-solving, planning, and organising skills.
- Experience with designing / building / analysing data from an adaptive optics assisted integral field spectrograph at visible / near-IR wavelengths.
- Experience with high-contrast observations, in particular the field of "Direct Imaging", and their data analysis, in particular the field of "Speckle Suppression" using angular differential imaging, spectral deconvolution, or molecular mapping.
- Advanced experience in optical design and optical design software, e.g. ZEMAX, and familiarity with mechanical design software, e.g. Autodesk Inventor.

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.

Astrophysics Sub-department

The post-holder will be based in the Astrophysics 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.

Oxford Astrophysics has a long track record of participation and leadership in state-of-the-art instrumentation at world-leading observatories (e.g. FMOS at Subaru, KMOS at VLT, SWIFT at Palomar). We have designed and built instrumentation at visible, near- and mid-infrared, terahertz and radio wavelengths, and are currently engaged in ELT, SKA, and WHT instrumentation (ground-based) and are involved in EUCLID, PLATO, ARIEL and JWST projects (space-based).

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 of **two referees** and indicate whether we can contact them now.

You will be asked to upload a CV and a supporting statement. The supporting statement must explain how you meet each of the selection criteria for the post using examples of your skills and experience. This may include experience gained in employment, education, or during career breaks (such as time out to care for dependants)

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.