

# Research Associate

## Department of Physics

Closing date: 7 October 2024  
Job Reference: KA43153



## Research Associate on the LHCb experiment

**Salary:**

£31,396 - £33,966

£36,024- £44,263 (Grade 7)

**Contract:**

Fixed Term until 30/09/2026

**Location:**

Cambridge

**Faculty / Department:**

Physics

**Responsible to:**

Dr Paula Alvarez Cartelle

**Working Pattern:**

Full Time

**Purpose of the role**

The High Energy Physics group at the University of Cambridge seeks to appoint an outstanding researcher to join its effort on the LHCb experiment. The Cambridge group is actively involved in the LHCb physics programme, and has responsibilities in the RICH project, Real-Time-Analysis project and in data processing. The group supports the maintenance, operation and upgrades of the RICH subdetectors, and carries out research and development on the RICH electronics and MightyTracker device with a view to its use in the next phase upgrade of LHCb (Upgrade-II). The group has diverse interests in the exploitation of LHCb data, searching for physics beyond the Standard Model. Particular interests include studies of rare  $B$ -hadron decays and of  $CP$ -violating effects in charmless  $B$  decays.

The role holder will undertake research and development for future upgrades of the LHCb Ring-Imaging Cherenkov detector system. Experience in the application and characterization of single photon sensitive devices, data acquisition and analysis of data is essential.

The successful candidate is expected to take a leading role in these or other associated areas, and to contribute to several aspects of the Group's activities on the LHCb project.

The position is available initially until 30/09/2026, with the possibility of extension thereafter (funding dependent). The post is foreseen to be based in Cambridge with the possibility of long-term attachment at CERN and various other shorter travel where appropriate.

Appointment at research associate (Grade 7) is dependent on having a PhD including those who have submitted but not yet received their PhD (in which case appointment will initially be made at research assistant – Grade 5, and amended to research associate when the PhD is awarded).

The University of Cambridge is a signatory of the San Francisco Declaration on Research Assessment (DORA). DORA recognises the need to improve the ways in which the outputs of scholarly research are evaluated. The University expects candidates to apply the principles of DORA when preparing their



applications. We do not use journal-level metrics when assessing the quality of research outputs. Applicants should not include journal-level metrics, such as the Journal Impact Factor, anywhere in their application materials. More information about DORA, its principles and aims can be found at: <https://sfdora.org/> and <https://www.research-strategy.admin.cam.ac.uk/research-policy/DORA>.

### Key duties and responsibilities

#### Research and scholarship

- undertake research, development and characterization of single photon sensitive devices for application in particle physics Cherenkov detectors;
- develop readout and data acquisition for such devices;
- analyse data taken in the laboratory environment or during beam tests;
- conduct research as part of the LHCb collaboration RICH project;
- participate in collaboration research meetings;
- write up research work for presentation and publication.

#### Teaching and learning support:

- may assist in the supervision of student projects;
- provide limited supervision/instruction to classes;
- may assist in the development of student research skills; may plan and deliver seminars relating to research area

#### Liaison and networking:

- liaise with colleagues and students;

- build internal and external contacts and participate in networks for the exchange of information and to form relationships for future collaboration

#### Planning and organising

- plan the use of research resources, laboratories and workshops as appropriate;
- plan and manage own research activity in collaboration with others; contribute to planning of joint research projects led by principal investigator.

# Person Specification

This section details the knowledge, skills and experience we require for the role.

Criteria	Essential	Desirable
<b>Education &amp; Qualifications</b>		
A good first degree (2.1 or equivalent)	✓	
PhD (or close to obtaining) in Experimental Particle Physics or a closely related discipline	✓	
<b>Specialist knowledge &amp; skills</b>		
Deep understanding of physical principles of solid state and other single photon sensitive devices and how their properties impact on the performance of Cherenkov detectors for particle physics applications.	✓	
Practical experience and proven ability in measuring and characterisation of such devices including all aspects of the design of the experimental apparatus, data acquisition and analysis of the data.	✓	
Ability to identify critical sensor parameters and willingness to explore new instrumental and analytical methods for their study.	✓	
An understanding of the technological constraints imposed by the harsh operating environment at high intensity particle colliders.	✓	
Evidence of ability to identify new research opportunities or develop new techniques		✓
<b>Interpersonal &amp; Communication Skills</b>		
Proven organisational, communication and team working skills.	✓	
Ability to work effectively independently and as part of a research team	✓	
Ability to write reports, present results and contribute to academic papers	✓	
Excellent planning and time management skills to ensure research objectives are achieved on schedule	✓	
<b>Relevant Experience</b>		
Detector instrumentation for particle physics experiments.	✓	
Instrumentation, programming and analysis skills including familiarity with tools commonly used in the field including the C++, python and Java programming	✓	

languages and the ROOT data analysis framework or equivalent.		
Evidence of working in an international collaborative environment	✓	
<b>Additional Requirements</b>		
Familiarity with a range of laboratory bench top instrumentation for measurement of low-noise and high-speed devices and their effective application.	✓	
A solid understanding of the principles of electronic circuits and in particular the impact of analogue amplifier design on the measured characteristics of low noise sensors.	✓	
An appreciation of high-speed signal propagation especially in relation to the high precision measurement of signal time-of-arrival.	✓	

# Department of Physics | Cavendish Laboratory



**The Cavendish Laboratory was founded in 1871, with the simultaneous appointment of James Clerk Maxwell as the first Cavendish Professor. It has a distinguished history of contribution to science.**

**Twenty-nine Nobel prize winners have worked for considerable periods within the laboratory, and the Cavendish is associated with many notable discoveries, including the identification of the electron and neutron, the structure of DNA, and the discovery of pulsars.**

A new era is beginning for Physics at Cambridge, with construction work underway for a new purpose-built centre for world-leading research, replacing our current buildings which date from 1971. The new building, the Ray Dolby Centre, and our strategic plan, both represent a renaissance in the way we carry out physics research and achieve our research goals. The spirit of adventure and innovation will be fostered in the Cavendish tradition,

but adapted to the new needs of frontier research.

## **About the Department**

At the heart of the new approach is a more flexible alignment of our research activities into

research themes.

This change of emphasis has been inspired by a number of changes in the nature of contemporary physics research. See: <https://www.phy.cam.ac.uk/research>.

In addition to serving as a home for physics research at Cambridge, the new Cavendish Laboratory will be a top-class facility for the nation—much of the specialised research equipment in the new building will be made available to other institutions. The new facility has been designed to match the more exacting standards of current research, and to serve the educational needs of future generations of students much better than is possible at our existing site. Capacity for public events has also been incorporated into the design, so that our extensive programme of outreach work with schools, and with the general public, will continue to serve the local population well into the future. We are looking forward to moving into our new home in 2024.

## **Key information**

Currently the Department comprises about 55 academic staff, 200 postdoctoral researchers, and 300 graduate students. Together with



administrative and technical support staff and academic visitors, the Department hosts around 1000 people.

### Research themes

Research activities at the Cavendish span a wide range of physics.

There are seven strategic themes: Astrophysics, High Energy Physics, Biological and Biomedical Physics, Energy Materials, Emergent Quantum Phenomena, Assembly and Function of Complex Systems, and Quantum Devices and Measurements.

The themes encompass a growing range of research groupings: Astrophysics; Atomic, Mesoscopic and Optical Physics; Biological and Soft Systems; High Energy Physics; Microelectronics; Molecular Engineering; NanoPhotonics; Optoelectronics; Quantum Matter; Quantum Sensors; Scientific Computing; Semiconductor Physics; Surfaces, Microstructure and Fracture; Theory of Condensed Matter and Thin Film Magnetism.'

Information about the current research activities in these areas is available at: [www.phy.cam.ac.uk/research/](http://www.phy.cam.ac.uk/research/).

### Recent developments

The Department is engaged in a number of new inter- and cross-disciplinary research programmes.

In 2008 it established a new **Physics of Medicine** programme focusing on biological and biomedical applications of physics which is based in a purpose-built interdisciplinary centre on the Laboratory site. The **Battcock Centre for Experimental Astrophysics** opened in October 2013, adjacent to the **Kavli Institute for Cosmology** in Cambridge and to the main buildings of the Institute of Astronomy. This has enabled all Cambridge astronomers to be brought together in a single complex of buildings for the first time. The **Maxwell Centre**, designed to promote industrial collaboration, opened in April 2016.

### The future

The complete replacement of the main laboratory buildings which date from the 1970s, has been approved, and the Ray Dolby Centre is due to open in 2024, housing the majority of the laboratory's activities.

# The school

The School of the Physical Sciences is one of the six Schools in the University of Cambridge and comprises the following Departments:

- Applied Mathematics and Theoretical Physics (DAMTP)
- Chemistry
- Earth Sciences
- Geography (including the Scott Polar Research Institute)
- Institute of Astronomy
- Issac Newton Institute of Mathematical Sciences
- Materials Science and Metallurgy
- Physics (Cavendish Laboratory)
- Pure Mathematics and Mathematical Statistics (DPMMS)

The School is responsible for allocating core funds to departments and provides broad strategic focus across its constituent departments in a number of areas including; research activity, undergraduate and graduate education, estate needs, fundraising and human resources. As part of the University's annual planning cycle, the School prepares a financial and academic plan which sets out strategic objectives, determines budgets as well as the flow of resources to departments. The School manages a wide range of administrative activities and projects across its departments and works alongside other Schools to further interdisciplinary research.

The School has over 1500 members of staff, over 3000 students and an annual budget of over £100 million.



## **Athena SWAN**

The Cavendish Laboratory is committed to providing a community where all have the opportunity to reach their full potential. We are incredibly proud of our efforts over the last 5-10 years which have increased the representation of women throughout our teaching and research activities. This has been accompanied by a culture change at every level which has greatly improved equality, diversity and inclusiveness within the department. We are currently working on efforts to target EDI issues surrounding race and LGBTQ+.

The Department is the holder of a prestigious [Athena SWAN Silver award](#) and is an [Institute of Physics' Project Juno Champion](#)

The Department is keen to promote support for staff with family commitments and a summary of some of the services on offer is at

[http://www.phy.cam.ac.uk/internal\\_resources/resources/families-at-the-cavendish-web.pdf](http://www.phy.cam.ac.uk/internal_resources/resources/families-at-the-cavendish-web.pdf)



# Terms of Appointment

**Tenure and probation** - Appointments will be made on a fixed -term basis, initially until 30/09/2026, with possible extension, due to limited funding. Appointments will be subject to satisfactory completion of a six month probationary period

**Hours of work and Working Pattern** - The appointment is full time.

**Pension** - You will automatically be enrolled to become a member of USS (Universities Superannuation Scheme) – a defined benefits pension scheme. For further information please visit: [www.pensions.admin.cam.ac.uk/](http://www.pensions.admin.cam.ac.uk/).

**Annual leave** - Full time employees are entitled to annual paid leave of 41 days inclusive of public holidays. For new part-time employees, annual leave will be pro rata'd based on days worked. The leave year runs from 1 October to 30 September

## General information

**Pre-employment checks Right to work in the UK** - we have a legal responsibility to ensure that you have the right to work in the UK before you can start working for us. If you do not have the right to work in the UK already, any offer of employment we make will be conditional upon you gaining it.

**Health declaration** - Once an offer of employment has been made the successful candidate will be required to complete a work health declaration form.

**Qualifications** - The person specification for this position lists qualifications that are essential and/or desirable. Please note that if you are offered the post you will be asked to provide your relevant original certificates of these qualifications.

**References** - offers of appointment will be subject to the receipt of satisfactory references.

**Information if you have a disability-** The University welcomes applications from individuals with disabilities. We are committed to ensuring fair treatment throughout the recruitment process. We will make adjustments to enable applicants to compete to the best of their ability wherever it is reasonable to do so and, if successful, to assist them during their employment. Information for disabled applicants is available at <http://www.admin.cam.ac.uk/offices/hr/staff/disabled/>

We encourage you to declare any disability that you may have, and any reasonable adjustments that you may require, in the section provided for this purpose in the application form. This will enable us to accommodate your needs throughout the process as required. However, applicants and employees may declare a disability at any time.

If you prefer to discuss any special arrangements connected with a disability, please contact, the Department Administrator, who is responsible for recruitment to this position.

# The University

**The University of Cambridge is one of the world's oldest and most successful universities. We are a renowned centre for research, education, and scholarship that makes a significant contribution to society. The University is consistently ranked amongst the top universities in the world. Our affiliates have won more Nobel Prizes than any other University.**

Our sustained pursuit of academic excellence is built on a long history of first-class teaching and research within a distinctive collegiate system. For eight centuries our ideas and innovations have shaped the world. Our principal goal is to remain one of the world's leading universities in an increasingly competitive global higher education sector. Today the University of Cambridge is at the centre of a cluster of over 4,300 businesses employing 58,000 people.

Our capital investment projects include the West Cambridge site, the North West Cambridge development and the growth of the Biomedical Campus in the south of the city. The North West Cambridge development includes the opening of a primary school – the first in the UK to be managed by a University. So we are deeply embedded in, and committed to serving, our local community. These are all conspicuous signs of a University that is not only adapting to new needs, but also anticipating the future.

Our mission is to contribute to society through the pursuit of education, learning, and research at the highest international levels of excellence. Our core values are:

- freedom of thought and expression; and
- freedom from discrimination.



# About Us

**The University is one of the world's leading academic centres. It comprises 150 faculties and departments, together with a central administration and other institutions. Our institutions, museums and collections are a world-class resource for researchers, students and members of the public representing one of the country's highest concentrations of internationally important collections.**

The University has an annual income of £2 billion. Research income, won competitively from the UK Research Councils, the European Union (EU), major charities and industry, exceeds £500 million per annum and continues to grow.

The Colleges and the University remain committed to admitting the best students regardless of their background and to investing considerable resources both in widening access and financial support. The 31 Colleges are self-governing, separate legal entities which appoint their own staff. Many academic staff are invited to join a College as a Teaching Fellow, which provides a further social and intellectual dimension. The Colleges admit students, provide student accommodation and deliver small group teaching.

The University awards degrees and its faculties and departments provide lectures and seminars for students and determine the syllabi for teaching and conducting research.

Our instinct for seeking out excellence and setting up enduring and mutually beneficial collaborations has led us to establish strategic partnerships across the globe. Whether it is the successful Cambridge-Africa Programme involving universities in Ghana, Uganda and elsewhere on the African continent; or the close association with the government of India to pursue new research in crop science; or the creation, with Germany's Max Planck Institutes, of a Cambridge-based centre for the study of ethics, human economy and social change – international partnerships are now an inextricable part of the University's make-up.

“Cambridge graduates and researchers have made – and continue to make – a colossal contribution to human knowledge and the understanding of the world around us. Their work touches on the lives and livelihoods of everyone from patients diagnosed with life-threatening diseases, to residents of areas critically affected by climate change, to children growing up in conflict zones. It has a lasting impact on our society, our economy and our culture: the world is truly a better place thanks to their efforts.”

*Stephen Toope, Vice Chancellor 2019*



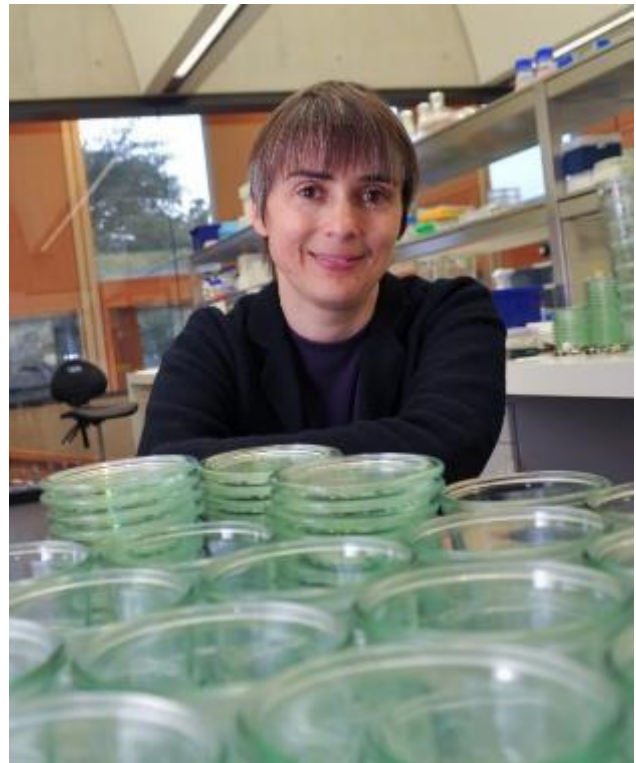
# Working at the University

**Working at Cambridge you will join a diverse, talented and innovative community, with more than 18,000 students and over 16,000 staff from all walks of life and corners of the world.**

The University continually explores strategies to attract and retain the best people. It is committed to supporting its staff to achieve their best. We are a fair, diverse and inclusive society and we believe our staff are our greatest asset. There is strong commitment to developing institutional leadership and supporting and encouraging staff development at all levels.

We offer a variety of roles including academic, research, professional, managerial and support roles. We also offer extensive benefits and excellent learning opportunities within a stimulating working environment.

The University's estate is undergoing the most significant transformation in its history. Cambridge has been able to create a new science and technology campus to the west of the city centre, and is now expanding further to the north west of Cambridge including investing in affordable homes for University key workers and community facilities. Even with our continued development, the University remains within walking or cycling distance across the campus. The University is a major partner on the Cambridge Biomedical Campus and we continue to redevelop our historic city centre sites demonstrating our determination to ensure that we can offer the best facilities and opportunities for our staff and students.



## Equality & diversity

The University has built its excellence on the diversity of its staff and student community. We aim to be a leader in fostering equality and inclusion, and in promoting respect and a sense of belonging for all. We encourage applications from all sections of society. All appointments are made on the basis of merit. We have an Equal Opportunities Policy, along with a range of diversity networks for women, black and minority ethnic and lesbian, gay, bisexual and transgender staff. More details are available here: <http://www.equality.admin.cam.ac.uk/>

The University has a bronze Race Equality Charter aware, with framework for improving the representation, progression and success of minority ethnic staff and students within higher education. Furthermore, the University's Athena SWAN award recognises and celebrates good practice in recruiting, retaining and promoting women.

# Living in Cambridge

**Cambridge is rich in cultural diversity. From beautiful University and College buildings, museums and art galleries, quaint gardens and punts on the River Cam, to a vibrant restaurant and café scene, our employees are surrounded by the wonderful features of this unique city.**

You can find a wide-range of high street shops and 3 shopping centres, with independent alternatives at the historic market and nestled within the passageways in the city centre. You will find a cinema, bowling alley, a nightclub and various live performances At the Cambridge Leisure Park, with further entertainment options at the Corn Exchange, Arts Theatre and the ADC Theatre. Further information can be found on the Visit Cambridge website.

If you prefer the faster pace of life, London is a 45 minute train journey away. For those travelling from overseas, Stansted Airport is just 45 minutes away and Heathrow Airport under 2 hours away. The University is a short distance from a host of other attractions such as Ely Cathedral, Newmarket Races and various wildlife parks and stately homes. Cambridge is also within easy reach of the beautiful Broads and coastlines of Norfolk and Suffolk.

## Relocation Support

The University recognises the importance of helping individuals to move and settle into a new area. We provide support and guidance to those relocating internationally or domestically to take up a post at the University of Cambridge, liaising with other University offices and selected partners to ensure comprehensive relocation support is available. This includes: accommodation, childcare, schools, banking, immigration and transport. If you would like further information, please visit <https://www.accommodation.cam.ac.uk/>. The Shared Equity Scheme and the Reimbursement of Relocation Expenses Scheme provide financial assistance to qualifying new members of staff with the costs of relocating to Cambridge.

## Accommodation Service

The University Accommodation Service helps staff, students and visiting scholars who are affiliated to the University in their search for suitable accommodation in Cambridge. The dedicated accommodation team can provide access to a wide range of University-owned furnished and unfurnished properties, and has a database of private sector accommodation available for short and long-term lets. For further information and to register with this free service please visit <https://www.accommodation.cam.ac.uk/>



# What Cambridge can offer

**We offer a comprehensive reward package to attract, motivate and retain high performing staff at all levels and in all areas of work.**

The University offers a wide range of competitive benefits, from family leave entitlement, to shopping and travel discount schemes. Our generous annual leave package contributes to the positive wellbeing of our University employees. Sabbatical leave enables academics to focus on research and scholarship, whilst still maintaining their full salary. The University also has a career break scheme for academic and academic-related staff, with additional flexible working policies for all other staff.

## Pay and benefits

The University salary structure includes automatic service-related pay progression in many of its grades and an annual cost of living increase. In addition to this, employees are rewarded for outstanding contribution through a number of regular pay progression schemes. The University offers attractive pensions schemes for employees, with an additional benefit of a salary exchange arrangement providing tax and national insurance savings. Payroll giving is also a simple, tax-efficient way for employees to make monthly donations to charity.



## CAMbens employee benefits

We offer a CAMbens scheme for University employees, providing access to online and in-store shopping discounts and cashback. With more than 2,000 participating retailers, employees can save money on a wide range of household expenses, from groceries and clothes, to holidays and insurance and much more. A range of local discounts are also available, helping employees to save money whilst also supporting local Cambridge businesses and a CAMbens Cycle to Work salary sacrifice scheme is also available, which enables employees to save money on transport costs. A 10% discount rate on the purchase of train season tickets, bulk buy tickets and an interest free travel to work loan are also available for staff of the University.



# What Cambridge can offer

## Family-friendly policies

The University recognises the importance of supporting its staff. We have a range of family-friendly policies to aid employees' work-life balance including a generous maternity, adoption and shared parental leave entitlement of 18 weeks full pay and emergency family care support via My Family Care.

Other family-friendly support includes:

Our highly regarded workplace nurseries, a childcare salary exchange scheme and a high quality holiday Playscheme may be available to help support University employees with caring responsibilities (subject to demand and qualifying criteria). Further childcare information can be found here:

<https://www.childcare.admin.cam.ac.uk/>

The Newcomers and Visiting Scholars Group is an organisation within the University run by volunteers whose aim is to help newly arrived wives, husbands, partners and families of Visiting Scholars and members of the University to settle in Cambridge and give them an opportunity to meet local people. The Office of Postdoctoral Affairs supports the postdoctoral community within Cambridge. Further details are available here: <https://www.opda.cam.ac.uk/>

## Your wellbeing

The University's Sport Centre, Counselling Services and Occupational Health are just some of the support services available to University employees to promote their physical and mental wellbeing. There are many societies in Cambridge catering for almost every taste and interest. Whether you want to take part in a sport, participate in music or drama, pursue a hobby, or join a political group, you will almost certainly find that a society exists for this purpose. The University also hosts the [Cambridge Science Festival](#) and [Cambridge Festival of Ideas](#), as well as [Open Cambridge](#) weekend, which together attract over 50,000 visitors per year. The festivals are a great opportunity to get your first taste of public engagement, through volunteering, supporting hands-on activities or proposing a talk.

## Development opportunities

We support new employees to settle in through various activities. The encouragement of career development for all staff is one of the University's values and we put this into practice through various services and initiatives. Our Personal and Professional Development Department provides development opportunities and courses for all University employees. These include face-to-face sessions, online learning modules and webinars. Employees may also apply for financial support to undertake training that will lead to a qualification. We offer reduced staff fees for University of Cambridge graduate courses and the opportunity to attend lectures and seminars held by University departments and institutions. The CareerStart@Cam programme also supports employees in assistant staff roles who do not hold higher education qualifications to develop their skills, experience and qualifications.



# How to apply

Applications should be submitted online via the University of Cambridge jobs page [www.jobs.cam.ac.uk](http://www.jobs.cam.ac.uk) by clicking “Apply online” in the job advert. You will need an email address to register for our online system.

Conversations about flexible working are encouraged at the University of Cambridge. Please feel free to discuss flexibility prior to applying (using the contact information below) or at interview if your application is successful.

Informal enquiries are welcomed and should be directed to:

**Dr Paula Alvarez Cartelle**

**Email:** [palvarez@hep.phy.cam.ac.uk](mailto:palvarez@hep.phy.cam.ac.uk)

If you have any queries regarding the application process please contact [Rutherford.hr@phy.cam.ac.uk](mailto:Rutherford.hr@phy.cam.ac.uk)

The closing date for applications is: **07/10/2024**

The interview date for the role is: **October 2024**