

THE UNIVERSITY OF MANCHESTER

PARTICULARS OF APPOINTMENT

FACULTY OF SCIENCE & ENGINEERING

SCHOOL OF NATURAL SCIENCES

DEPARTMENT OF PHYSICS & ASTRONOMY

RESEARCH ASSOCIATE OR RESEARCH FELLOW IN COSMIC MICROWAVE BACKGROUND  
INSTRUMENTATION (SIMONS OBSERVATORY:UK PROJECT)

VACANCY REF: SAE-027033

<b>Salary:</b>	Grade 6 £36,924 to £45,163 per annum, depending on relevant experience or Grade 7 £46,485 to £56,921 per annum, depending on relevant experience
<b>Hours:</b>	Full time (1 FTE)
<b>Duration:</b>	Fixed term for 36 months
<b>Location:</b>	Jodrell Bank, Cheshire

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**Enquiries about the vacancy, shortlisting and interviews:**

Name: Professor Michael Brown

Email: [m.l.brown@manchester.ac.uk](mailto:m.l.brown@manchester.ac.uk)

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**Background**

The Jodrell Bank Centre for Astrophysics seeks to appoint either a Research Associate (Grade 6) or a Research Fellow (Grade 7), depending on experience, to work on Instrumentation for the Simons Observatory:UK (SO:UK) project. [Simons Observatory](#) (SO) is a next-generation Cosmic Microwave Background observatory, comprised of a single large aperture telescope (LAT) and multiple small aperture telescopes (SATs). Several SO telescopes are now operational in the Atacama Desert in Chile, with others to be added over the coming 2—3 years. SO:UK is a major UK contribution to SO. In addition to a significant contribution to the SO Data Management, SO:UK is delivering two of the SO SATs. The University of Manchester leads the SO:UK project. In addition to other contributions, the Manchester team is responsible for assembling, testing, deploying and commissioning the first SO:UK SAT.

The successful candidate will work with Prof. Michael Brown, Prof. Lucio Piccirillo and the wider SO:UK team – both at Manchester and across the UK – to deliver this major instrumentation project. We seek to appoint an individual to work on the assembly, integration and testing of the first SO:UK SAT at Jodrell Bank Observatory. For appointment as a Research Fellow (Grade 7), they will, in addition, be expected to play a key role in coordinating the preparation of the SO:UK

site infrastructure and act as a key interface between the SO:UK project team and the SO site team. The successful candidate may also contribute to the testing and validation of the SO:UK Kinetic Inductance Detectors and associated readout technology, using a dedicated test cryostat at The University of Manchester's city-centre campus. They will join the SO:UK deployment team, travelling to the observing site in Chile to deploy and commission the receiver on its purpose-built telescope mount. The deployment and commissioning phase is currently scheduled to be complete before the end of 2026. During subsequent operations, they will work with other members of the SO:UK team to ensure smooth running of the SO:UK telescopes and will contribute to the SO SATs data analysis effort.

### **Key Responsibilities, Accountabilities or Duties**

#### **For appointment at Grade 6 (Research Associate) and Grade 7 (Research Fellow)**

- Contributing to the assembly, testing and verification of the SAT receiver system at Jodrell Bank Observatory, as an integral part of the Manchester SO:UK instrumentation team
- Contributing to the testing and validation of the SO:UK Kinetic Inductance Detectors and associated warm readout system, as an integral part of the Manchester SO:UK instrumentation team
- Contributing to the interfacing of the detector and HWP encoder readouts with the existing SO Observatory Control System (OCS) software
- Contributing to the interfacing of the SAT receiver with the SAT platform, including development and implementation of the multiple environmental enclosures required
- Contributing to the deployment and commissioning of the SAT receiver at the SO observing site in Chile
- Production and upkeep of all the relevant documentation
- Presentation of the results of his/her work at collaboration meetings and national/international conferences

#### **Additional duties if appointed at Grade 7 (Research Fellow)**

- Coordination of the preparation of the infrastructure (civil works, electrical works etc.) required by SO:UK at the observing site in Chile
- Act as the primary point-of-contact between the SO:UK project team and the SO site team in Chile

### **Person Specification**

#### **Essential**

- Have, or be about to obtain, a relevant PhD (or equivalent)
- Experience in astronomical instrumentation development
- Proficiency in modern coding languages and practices including Python, C, C++, Github etc
- Experience in working on Linux and MacOS
- Excellent communication and interpersonal skills

- Excellent time management and organisational skills
- Ability to present in both written and oral publications
- Ability to work independently and as part of a team
- Ability to liaise confidently and effectively with a range of individuals
- Willingness to learn and develop
- Ability to meet deadlines
- Ability to contribute to broader management and administrative processes
- Ability to assess and organise resources

### **Desirable**

- Experience in instrumentation development for CMB telescopes
- Experience in cryogenics systems with special familiarity to sub-Kelvin refrigeration systems and associated components
- Working knowledge of RF software like HFSS, ADS
- Working knowledge of mechanical CAD software like, AutoCAD or similar
- Working knowledge of RF test equipment like Vector Network Analysers, Spectrum Analysers, RF Signal Generators, etc
- Experience in working in large collaborations
- Ability to present in both written and oral publications
- Ability to coordinate with a wide range of individuals to deliver complex logistical projects

### **The University of Manchester**

The University of Manchester ([www.manchester.ac.uk](http://www.manchester.ac.uk)) enjoys a global reputation for its research and its innovative approach to learning, with an on-going £1 billion investment in facilities, staff and buildings. This builds on our tradition of success that stretches back over 180 years. The birth of the modern computer, the splitting of the atom, the founding principles of modern economics, the discovery of graphene, and the birthplace of chemical engineering – these and many more world changing innovations have their roots at our University. We are at the forefront of the search for solutions to some of the world's most pressing problems, boasting strong collaborative links with industry and public services.

Manchester has the largest student community in the UK, with more than 28000 undergraduates and 11000 postgraduates attracted by the high international standing of the academic staff, by the superb research and teaching facilities, and by the cultural assets both of the university and the city of Manchester itself. For further information, please consult [www.manchester.ac.uk](http://www.manchester.ac.uk).

### **Faculty of Science and Engineering**

The Faculty of Science and Engineering is one of the largest in the UK with over 10,000 students, 2,000 staff and strategic links with over 300 industrial companies. We are leading research efforts in energy, nuclear science and technology, computer science, atmospheric

science, bioscience and biotechnology, photon science and photonic materials, imaging and visualisation, security, and advanced materials, attracting an annual income of over £200 million.

Founded in 1824, we have a history of breaking new ground in science and engineering. Rutherford began his work here on splitting the atom and later received the Nobel prize in 1908 for his work on radioactivity. The 'Baby', the world's first stored-program computer, and Manchester Mark 1 came into being here. It is the birthplace of Chemical Engineering. The world's first steerable radio telescope at Jodrell Bank was built here by Bernard Lovell. Since 1906, when former student Joseph Thomson won the Nobel prize for physics, the University has produced more than 20 Nobel Laureates, the most recent of which were Professor Andre Geim and Professor Konstantin Novoselov in 2010 - for their pioneering work with the world's thinnest material, graphene.

### **Department of Physics and Astronomy**

The Department of Physics and Astronomy is one of five Departments in the School of Natural Sciences which is in the Faculty of Science and Engineering. There are 95 academic staff in the Department with expertise in areas such as condensed matter physics (which includes Prof. Andre Geim and Prof. Konstantin Novoselov who won the 2010 Nobel Prize in Physics for their work on graphene), atomic physics, liquid crystal physics, biological physics, accelerator physics, nuclear physics, particle physics, astrophysics, astronomy, cosmology, complexity and theoretical physics. Jodrell Bank Observatory (part of Jodrell Bank Centre for Astrophysics) also forms part of our Department. We have approximately 150 research staff, 250 PGR students and 1200 UG/PG students.

The Department has ranked in the top fifteen in the Academic Ranking of World Universities for Physics since 2011. In the Research Excellence Framework (REF) 2014 the Department was in the top three institutions for its proportion of "world-leading" components and was first for non-academic impact.

The Department values teaching highly and scored 90% in the 2019 National Student Survey. The Department has the largest undergraduate intake of any Physics department in the UK. Student cohorts are around 1120 and 100 for undergraduate and postgraduate taught programmes respectively. Taught postgraduate courses include Masters programmes in Photon Science, Nuclear Science and Technology, and Radio Imaging and Sensing.

P&A research is based in four topical divisions: Accelerator, Nuclear and Particle Physics; Condensed Matter (which includes Prof. Andre Geim and Prof. Konstantin Novoselov who won the 2010 Nobel Prize in Physics for their work on graphene); and Jodrell Bank Centre for Astrophysics. The Department operates the world-renowned Jodrell Bank Observatory (JBO). The Jodrell Bank site also provides the permanent home for the international headquarters of the Square Kilometre Array (SKA) Organisation. The Department is deeply involved in the £61 million National Graphene Institute (NGI), opened in 2015. The NGI building has 7350 m<sup>2</sup> research space over five floors and includes 1500m<sup>2</sup> of cleanrooms, lab facilities, office space and seminar rooms.

The Department of Physics and Astronomy is committed to promoting Equality, Diversity, Inclusion and Access through contributing to the University's social responsibility agenda, demonstrating a commitment to its policies, activities and delivery of initiatives including the Athena SWAN charter for promoting women's careers in STEMM subjects (science, technology, engineering, mathematics and medicine) in higher education. The Department has held JUNO

Champion status since 2016 for its commitment to achieving gender equality which positively promotes inclusivity for all.

Further information on the Department of Physics and Astronomy can be found at [www.physics.manchester.ac.uk](http://www.physics.manchester.ac.uk).

### **Jodrell Bank Centre for Astrophysics**

Jodrell Bank Centre for Astrophysics (JBCA) is one of the largest academic astronomy research groups in Europe, studying a very broad range of astrophysical research, in particular Cosmology, Galaxy formation and evolution, AGN and Star-formation, Galactic Astronomy, Time-domain astrophysics (including Pulsars, Masers and Exoplanets) and Solar Physics. Research staff are located in the Alan Turing Building on the main Manchester campus, and comprises around 30 academic staff, 50 postdoctoral researchers, and 60 post-graduate students. The Group publishes in excess of 400 refereed papers per year with many appearing in the highest impact journals. Academic staff are involved in many international collaborations with colleagues in Europe and North America but increasingly involves developing countries in Africa, Asia and South America. JBCA operates both the 76-metre Lovell Telescope, and the UK national radio astronomy facility, e-MERLIN/VLBI. JBCA's telescope facilities are located at Jodrell Bank Observatory, which also hosts the Headquarters of the Square Kilometre Array (SKA) organisation. JBCA and SKA staff have close links, with several SKA staff enjoying honorary university appointments. Several large compute facilities are operated by the group both on campus and at the observatory.