THE UNIVERSITY OF MANCHESTER

PARTICULARS OF APPOINTMENT

FACULTY OF SCIENCE & ENGINEERING

SCHOOL OF NATURAL SCIENCE

DEPARTMENT OF PHYSICS & ASTRONOMY

RESEARCH ASSOCIATE (SIMONS OBSERVATORY:UK PROJECT)

VACANCY REF: SAE-020412

Salary:	Grade 6 £34,308 to £42,155 per annum, depending on relevant experience
Hours:	Full time
Duration:	Fixed-term from 01/04/2023 - 31/03/2026
Location:	Oxford Road

Enquiries about the vacancy, shortlisting and interviews:
Name: Michael Brown
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Background

The Jodrell Bank Centre for Astrophysics seeks a Post-Doctoral Research Associate in the area of instrumentation to work on 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). It is currently under construction in the Atacama Desert in Chile, with early science operations due to begin in 2023. SO:UK is a major UK contribution to SO. In addition to a significant contribution to the SO Data Management, SO:UK will deliver two additional SATs and a receiver system for the LAT. The University of Manchester is one of six UK universities that form the SO:UK collaboration and, amongst other contributions, will be assembling and testing one of the two SO:UK SATs.

The successful candidate will work with Prof. Lucio Piccirillo, Prof. Michael Brown and the wider SO:UK team – both at Manchester and across the UK institutes – to deliver this major instrumentation project. In particular, we are seeking to appoint an individual to work on two critical aspects/sub-systems of the instrument: setting requirements and validating the performance of the detector/readout combination, and implementation of the rotation system for the Half-Wave Plate.

Key Responsibilities, Accountabilities or Duties

- Setting sub-system level requirements on the Kinetic Inductance Detectors (KIDs) and associated readout system, based on RFSoC (Radio Frequency System on Chip) technology.
- Design, realisation and testing of a sub-Kelvin test cryostat for validating the performance of candidate implementations of the SO:UK detectors/readout combination.
- Design, realisation and testing of a dedicated test cryostat for testing the special rotation mechanics for the Half-Wave Plate (HWP).
- Contributing to the interfacing of the detector and HWP encoder readouts with the existing SO Observatory Control System (OCS) software.
- Production and upkeep of all the relevant documentation.
- Presentation of the results of his/her work at collaboration meetings and national/international conferences.

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 the design and testing of Kinetic Inductance Detectors.

- 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.
- Specialist knowledge and experience of CMB instrumentation techniques.
- Ability to present in both written and oral publications.

The University of Manchester

The University of Manchester (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.

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^2 research space over five floors and includes 1500m^2 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.

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.