THE UNIVERSITY OF MANCHESTER

PARTICULARS OF APPOINTMENT

FACULTY OF SCIENCE & ENGINEERING

SCHOOL OF NATURAL SCIENCES

DEPARTMENT OF PHYSICS AND ASTRONOMY

RESEARCH ASSOCIATE IN ANTIMATTER PHYSICS

VACANCY REF: SAE- 018342

Salary:	Grade 6 £33,309 to £40,927 per annum, depending on relevant experience
Hours:	Full Time
Duration:	Fixed term from 01st March 2022 until 28th February 2023
Location:	Oxford Road, Manchester

Enquiries about vacancy shortlisting and interviews:
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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.

Overall Purpose of the Job:

This post will focus on commissioning and optimizing the operation of ALPHA's antihydrogen trapping experiments. This will include experimental design and data analysis for antihydrogen experiments ranging from antimatter gravitation measurements to antihydrogen spectroscopy work in ALPHA's experimental apparatus. Of particular interest int his post is the collection and analysis of annihilation data from ALPHA's array of detectors. This will include the systematic study of antihydrogen annihilation events in on ALPHA's silicon vertex detector, radial time projection chamber and barrel scintillator. A main focus on this work will be the identification and suppression of background signals. Additional studies will include acquisition and analysis of antiproton annihilations during experimental procedures which manipulate these particles directly.

Key Responsibilities, Accountabilities or Duties:

- Maintenance and expansion of particle data acquitision systems and code
- Development of vertex detection software and background suppression software
- Supervision of collaboration member use and development of data acquisition and analysis software
- Documentation of data analysis and acquisition software
- Preparation of relevant publication text related to data analysis and software
- Contribute to the social responsibility agenda of the University and demonstrate a commitment to Equality, Diversity and Inclusion policies and activities and support the development and delivery of related initiatives

PERSON SPECIFICATION

Essential Knowledge, Skills and Experience:

- Principles of annihilation vertex detection and reconstruction
- Operation experience with annihilation vertex detectors
- Expertise in C++ and related tools
- Expert experience in the MIDAS data logging environment
- Experience in the operation and monitoring of antimatter physics experiments
- PhD or in physics or an equivalent topic
- A strong personal commitment to equality, diversity, inclusion and accessibility.

Desirable Knowledge, Skills, Experience and Qualifications:

- Experience in atomic Monte Carlo simulations appreciated