



UNIVERSITY OF LIVERPOOL



POSTDOCTORAL RESEARCH ASSOCIATE IN NUCLEAR STRUCTURE PHYSICS

Job Ref: 008546



Faculty: Science and Engineering, School of Physical Sciences, Department of Physics

Location: University Campus

Grade: 7

Salary: Depending on qualifications and experience

Range: £33,518 - £38,833 pa

Tenure: Until 30 September 2018

Hours of work: Full-Time

Closing Date: 8 December 2017

Interview Date: To be confirmed

Informal enquiries to Professor R Herzberg, email: R.Herzberg@liverpool.ac.uk



The Post

The Nuclear Physics Group is seeking a Postdoctoral Research Associate with experience in experimental nuclear structure physics to support the experimental programmes to study the nuclear structure of heavy and exotic nuclei using a variety of spectroscopic tools. You will play an important role in the preparation of a project bid focusing on the science opportunities from the MARA Low-Energy Branch, in which a gas cell will be coupled to the new MARA recoil separator at Jyväskylä. You will be responsible for preparing experimental proposals, leading the experiments, analysing and interpreting the data, and publishing the results in a timely manner. You will work closely with the postgraduate research students at Liverpool and collaborators from UK and international institutions. A willingness to travel for extended periods and the ability to communicate effectively within a large multi-national collaboration are essential.

THE DEPARTMENT OF PHYSICS

The Physics Department, now part of the School of Physical Sciences, was one of the first departments established in the University in 1881 and has a long tradition of excellence in physics research. The Department has scored highly in three consecutive reviews by HEFCE - the national Research Assessment Exercise (RAE). This considerable achievement reflects the Department's international reputation in the fields of condensed matter physics, nuclear physics, particle physics and accelerator science.

The first Professor of Physics at Liverpool was Sir Oliver Lodge, who made the world's first public radio transmission in 1894. Two years later, Lodge demonstrated the use of X-ray photography by taking an image of a bullet in a boy's wrist. It was the first time an X-ray had been used for surgical purposes in the UK. Professor Charles Glover Barkla's research into X-Rays won him the Nobel Prize for Physics in 1917, and Sir James Chadwick was awarded the Nobel Prize for Physics in 1935 for discovering the neutron. More recently, Sir Joseph Rotblat was awarded the Nobel Peace Prize in 1995 for his work on limiting the threat posed by nuclear weapons.

The Department is very well funded for research. There are currently approximately 44 academic staff who are responsible for the teaching and supervision of around 360 undergraduate and 170 postgraduate students. Over 40 full time research and computer physicists, professional, technical and electronic support staff together with extensive laboratory, workshop and design office facilities, support the research groups. Much of our research is carried out in the leading international centres for physics research: ILL (Grenoble), ESRF (Grenoble), ELETTRA (Trieste), CERN (Geneva), DESY (Hamburg), SLAC (Stanford), FNAL (Chicago), JYFL (Jyväskylä), GANIL (Caen), GSI (Darmstadt) and ATLAS (Argonne).

The Department performs extremely well in both teaching and research as evidenced by excellent scores in teaching quality assessment, research assessment exercises and the national student survey. Further details of the department can be found on the web site www.liverpool.ac.uk/physics



NUCLEAR PHYSICS GROUP

The academic members of staff are currently Professors Butler, Chartier, Herzberg, Nolan and Page, Drs A. Boston, H. Boston, Cheal, Harkness-Brennan, Joss and Paul. The funding for the Group's work is mainly through EPSRC and STFC grants. These have funded major investments in detectors as well as postdoctoral research associates, postgraduate research students and support staff. The group has additional funding for some of the applied work it carries out.

The group carries out its research work at a number of the world's leading accelerator laboratories. In the recent past a lot of this work has been aimed at nuclei at the extremes of isospin and also heavy nuclei. Studies of the limits of nuclear existence for proton-rich heavy nuclei aim to determine the nuclear structure of nuclei at and beyond the proton drip line, covering the transition from a well-bound to an open quantum system. Studies of super heavy elements have begun to reveal the properties of isotopes of nobelium, and to identify properties of newly discovered elements that are even heavier. Another frontier is the study of high-spin nuclei. Competition between single-particle excitations and collective behaviour is explored, and the observation of tri-axial structures at ultra-high spins. In other studies, at low-spin, octupole shapes have recently been observed, and reported in the journal Nature. Recently the nuclear physics group has broadened its research activities to include laser spectroscopy. This technique provides a comprehensive probe of the structure of nuclear states, complementing methods that study nuclear decay. At another extreme, the energy of the nuclear collisions at the LHC is sufficient to produce partonic matter, and the thermodynamics of these strongly interacting particles is investigated using the ALICE detector. In addition to nuclear structure research, the group has a strong interest in exploring the applications of nuclear physics. This includes: the detection of gamma rays in the environment, image reconstruction techniques for use in medicine, methods for efficient nuclear decommissioning and sensitive detection of material for security purposes.

A very important part of the work involves the development of new detector systems. There is a well-equipped detector laboratory in Liverpool for this work. Among the major developments led by the Liverpool group was the GREAT spectrometer, which involved new silicon strip detectors for studying exotic nuclei produced in fusion-evaporation reactions. The Total Data Readout method developed for GREAT was the first triggerless system used in nuclear physics experiments. The developments of the SAGE and LISA spectrometers and their application to the study of exotic nuclei are continuing this tradition. Currently the group is building Si detector systems ALICE and the solenoidal spectrometer at CERN-ISOLDE.

The Group website is: <https://www.liverpool.ac.uk/physics/research/nuclear-physics/>



Person Specification

ESSENTIAL CRITERIA

DESIRABLE CRITERIA

(Identified from – Application form, CV, Supporting Statement, Interview, References)

EXPERIENCE

1.	Experience of good publication record in peer-reviewed journals in the area of nuclear structure physics	Experience writing experimental proposals
2.	Experience in the building and commissioning of gas cells coupled to recoil separators	Experience with studies of exotic nuclei and/or the heaviest elements
3.	Experience in the analysis of nuclear spectroscopy data	Experience using semiconductor detectors and associated instrumentation for nuclear spectroscopy
4.		Experience preparing grant applications Track record in outreach activities

EDUCATION, QUALIFICATIONS AND TRAINING

1.	PhD in experimental nuclear physics	
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SKILLS, GENERAL AND SPECIAL KNOWLEDGE

1.	Excellent practical nuclear laboratory skills	Previous use of commonly used analysis codes: (e.g. RADWARE, GRAIN) and/or simulation codes (e.g. GEANT4) relevant to nuclear physics experiments
2.	Good verbal presentation and writing skills	Programming capability (e.g. C++, Java)
3.	Substantial knowledge in the area of nuclear physics experiments	

PERSONAL ATTRIBUTES AND CIRCUMSTANCES

1.	Willingness to travel to international facilities for extended periods	
2.	Ability to communicate effectively within a large collaboration	
3.	Ability to take responsibility for projects and manage workload	



A World Class University



The University of Liverpool is one of the UK's leading research institutions with an annual turnover of £480 million, including £102 million for research. Ranked in the top 1% of higher education institutions worldwide, Liverpool is a member of the prestigious Russell Group of the UK's leading research universities. The University has 33,000 students, 7,500 of whom travel from all over the world to study here, and 211,000 alumni in 171 countries. Its global focus has led the institution to establish a university in Suzhou near Shanghai, in partnership with Xi'an Jiaotong University, as well as a campus in London. The University is the largest provider of 100% online postgraduate degree courses in Europe with over 10,000 students studying for Liverpool degrees around the world.

As one of the top 25 UK universities targeted by global graduate employers, and 18th in the top universities in the UK for graduate employability our students enjoy high employability rates, with 88% of all of the University's graduates in employment or further study six months after graduation. For undergraduate leavers this rises to 90% and to 95% for UK-based undergraduate leavers. The University is committed to continually improving the quality of its student experience, and, supported by a £600 million phased investment in our campus our approach has had a significant impact on the University's student recruitment position in recent years.

Liverpool graduates have become pioneers in every field, with Nobel prize winners including: Sir Ronald Ross (1902; discovery of mode of spread of malaria), Professor Charles Glover Barkla (1917; discovery of the electromagnetic properties of x-rays), Professor Sir Charles Sherrington (1932; functional analysis of motor unit in a muscle), Professor Sir James Chadwick (1936; discovery of the neutron), Professor Sir Robert Robinson (1947; investigation into alkaloids and other plant products), Professor Har Gobind Khorana (1968; genetic code of protein synthesis), Professor Rodney Robert Porter (1972; structure of antibodies); Professor Sir Joseph Rotblat (1995; work to diminish the role of nuclear arms in international politics) and Ronald H. Coase – awarded the Nobel Prize in Economics 1991 for his research into the significance of transaction costs and property rights for the institutional structure and functioning of the economy.

Over 6,000 talented staff help create the inspiring learning environment our students thrive in, it's no wonder given over 81% of our research is seen as 'world leading' and 'internationally excellent'. What's more, we provide a supportive and high-quality environment for our people across the University and a range of initiatives ensure that there are equal opportunities for all, including our partnership with Athena SWAN which celebrates good employment practice for women working in science, technology, engineering and medicine.

Life Changing, World Shaping



The City of Liverpool



As the seventh largest city in the UK, Liverpool is diverse, energetic and exciting. Built on an illustrious heritage that stretches back 800 years, Liverpool has a global reputation for sport, music, architecture and culture.

Today the city is enjoying a resurgence, driven by its designation as European Capital of Culture in 2008. Record levels of inward investment have transformed the city.

The regeneration of Liverpool City Centre has been spearheaded by the £1 billion Liverpool One project - one of Europe's biggest shopping/mixed-use schemes, which has positioned the city as one of the UK's top five retail destinations.

The successful European Capital of Culture experience in 2008 has been followed by the designation of Liverpool's stunning waterfront as a UNESCO World Heritage Site and massive investment in new cultural and leisure attractions, including Albert Dock. Liverpool is a major cultural hub in the UK. In fact, there are more museums, theatres, and galleries in Merseyside than in any other region outside London.

Liverpool Philharmonic Hall, home to the Royal Liverpool Philharmonic Orchestra, one of Europe's leading orchestras, is the classical counterpoint to the city's many contemporary music venues and the visually stunning Echo Arena.

Home to two of Europe's most famous football teams – Liverpool FC and Everton FC– the city's achievements in sport are internationally recognised. Aintree Racecourse, home of the Grand National, and two internationally acclaimed golf courses at Royal Birkdale & Royal Liverpool in Hoylake are on the doorstep.

Compared to many other UK cities Liverpool has less congestion, is closer to countryside, has more parks, has more cultural and recreational opportunities, better schools and more accessible transport. Liverpool is uniquely situated 1 hour from Manchester, 3 hours from London by train and the city's Liverpool John Lennon Airport (one of the Europe's fastest growing airports) connects to more than 650 world wide destinations.

For more information on the city of Liverpool, visit: www.itsliverpool.com



Application Process



HOW TO APPLY

To apply for a Vacancy at the University you must register on the University of Liverpool E-Recruitment site, <https://recruit.liverpool.ac.uk>

If you have any questions relating to applying for a Vacancy please contact the Recruitment Team by email – Jobs@liverpool.ac.uk

ACKNOWLEDGING YOUR APPLICATION

Once you have submitted your application you will receive an automatic acknowledgement. Your application can be viewed at any time in the Application History section of your E-Recruitment Account.

SHORTLISTING AND INTERVIEWING

Shortlisting and interview arrangements are the responsibility of the recruiting Department. Please contact **Ian Bamber** on **0151 794 3772**, email: bamperi@liverpool.ac.uk for enquiries after the closing date.

OUTCOME OF APPLICATIONS

Vacancies at the University often attract a large number of candidates and it is not always possible to respond individually to every application. If you have not heard from the recruiting department by **Early January 2018** please take it that your application has not been successful.



General Information

Asylum & Immigration

The University will comply with the Immigration, Asylum and Nationality Act 2006, which requires all employees to provide documentary evidence of their legal right to work in this country prior to commencing employment. Please be aware that you will be required to bring your passport (and visa if applicable) to interview so that it can be copied and verified by a member of the Selection Panel. For posts requiring a recognised degree level or equivalent qualification, and where there is no suitable UK or European Economic Area candidate, the University will take the necessary steps to secure UK Border Agency permission for a foreign national to take up employment.

Should a candidate require a Certificate of Sponsorship in order to take up a post they will need to meet the UK Border Agency Tier 2 Points Based Criteria. A self-assessment tool can be found on the UK Border Agency website at: www.ukba.homeoffice.gov.uk/pointscalculator

A candidate may also be required to undertake an English Language test prior to commencing work at the University. Details of Home Office approved tests can be found at: <https://www.gov.uk/government/publications/guidance-on-applying-for-uk-visa-approved-english-language-tests>

Further information on the eligibility criteria for Certificates of Sponsorship can be found at: www.ukba.homeoffice.gov.uk/employers/points

National Insurance Number

All employed individuals must possess a UK National Insurance Number. Further information and how to apply for a unique National Insurance Number can be found at: <https://www.gov.uk/apply-national-insurance-number>

Diversity and Equality

The University of Liverpool is committed to diversity and equality of opportunity. All employees and applicants for jobs will be considered on their abilities and will not be discriminated against on the grounds of age, caring responsibilities, colour, disability, employment status, gender, gender identity, marital status, nationality, race or ethnic origin, religion or belief, sexual orientation, socio-economic status or any other irrelevant distinction. Training is available to support career progression within the University.

Two Ticks Disability: Guaranteed Interview Scheme (GIS)

The University of Liverpool is committed to the employment of disabled people, and as part of our commitment, we guarantee to interview all disabled applicants who meet the essential criteria for a post and consider them on their abilities. If your disability prevents you completing the application form by the specified closing date, or when the vacancy closes early, due to a high volume of applications, please call the Recruitment Team to discuss alternative arrangements.

<http://www.liv.ac.uk/working/jobvacancies/guaranteedinterviewscheme/>

Volition Programme

The University of Liverpool supports the Liverpool Anglican Cathedral Volition Programme. Applicants who have successfully completed the programme and meet the essential criteria for the post will be offered a guaranteed interview. Please note that individuals will be confirmed through the Volition Programme directly.

<http://www.liv.ac.uk/working/jobvacancies/volitionprogramme/>

GiveGetGo Volunteer Programme

Applicants who have successfully completed the GiveGetGo Volunteer Programme at the University in Partnership with the Transform Lives Company who meet the essential criteria for the post will be offered a guaranteed interview. Please note that individuals will be confirmed through the GiveGetGo Volunteer Programme directly.

<https://www.liverpool.ac.uk/working/jobvacancies/givegetgo/>

Accessibility

If you require copies of documentation in alternative formats, for example, large print or Braille, please contact jobs@liverpool.ac.uk or telephone 0151 794 6771.

If you have any other requirements which will help you access the application or interview process or employment opportunities at the University of Liverpool, please let us know by contacting jobs@liverpool.ac.uk or telephone 0151 794 6771.

Pension

The Occupational Pension Scheme associated with this appointment is the Universities Superannuation Scheme (USS). You are encouraged to familiarise yourself with the full particulars of the scheme which can be found [here](#)

