Postdoctoral Research Associate

Department: Physics

Hours of work: Full Time / 37 hours full week

Contract type: Fixed term / 24 months

Salary: £32,817 to £40,322 a year
Introduction

As part of a Science & Technology Facilities Council (STFC) Consolidated Grant 2017, this appointment will contribute to scientific activity of the new nuclear physics theory group at York established in 2015, and respond to the need to build up theoretical research in support of UK nuclear science.

The role will be to focus on developing novel and advanced nuclear density functionals with the overarching goal of improving the precision and predictive power of nuclear density functional theory (DFT). This goal will be realised by building functionals based on higher-order expansions of finite-range pseudopotentials. The two related tasks will be (i) to build and implement novel quasilocal and nonlocal EDFs based on higher-order derivative expansions and adjust their coupling constants to experimental data, and (ii) to study nuclear properties in the time-odd sector of nuclear mean fields.

In task (i), the role will be to implement self-consistent methods that employ EDFs generated by higher-order gradient corrections in axial and triaxial codes, both for zero-range and finite-range pseudopotentials, which generate quasilocal and nonlocal EDFs, respectively. This will be done both for paired and unpaired systems. In task (ii), in collaboration with groups that measure magnetic moments in odd nuclei, the role will be to pursue adjustments of pseudopotentials to describe these observables.

Main purpose of the role

- To conduct research under the supervision of senior colleagues and to contribute to the production of research outputs.
- To assist in the identification and development of potential areas of research and the development of proposals for independent or collaborative research projects

Key responsibilities

(Role holders will be required to undertake some or all of the duties below)

- To conduct individual and collaborative research projects, duties to include: analysis and interpretation of research data; use of appropriate research techniques and methods; writing up of research results and dissemination through publications, seminar and conference presentations and public engagement and outreach activities; contributing to the identification of possible new areas of research
- To contribute to the preparation of research proposals and applications to external bodies
- To undertake appropriate organisational and administrative activities connected to the research project, including conference organisation, and the development of promotional or educational material including website maintenance and development
- To develop and initiate collaborative working internally and externally, duties to include: the building of internal contacts and participation in internal networks; collaboration with colleagues on joint projects as required; participation in and identification of external networks in order to share information and identify potential opportunities for collaboration and possible sources of funding; attendance at and contribution to relevant meetings
## Person specification

<table>
<thead>
<tr>
<th>Qualifications</th>
<th>Essential / Desirable</th>
</tr>
</thead>
<tbody>
<tr>
<td>PhD in theoretical nuclear physics or equivalent experience</td>
<td>Essential</td>
</tr>
</tbody>
</table>

### Knowledge

- Knowledge in theoretical nuclear physics to engage in high quality research **Essential**
- Proficiency in numerical methods and computing **Essential**
- Proficiency in methods of nuclear DFT **Desirable**
- Proficiency in describing basic nuclear properties by the mean-field methods **Desirable**

### Skills, abilities and competencies

- Highly developed communication skills to engage effectively with a wide ranging audience, both orally and in writing, using a range of media **Essential**
- Ability to write up research work for publication in high profile journals and engage in public dissemination **Essential**
- Ability to develop research objectives, projects and proposals for own and joint research, with the assistance of a mentor if required **Essential**
- Competency to conduct individual and collaborative research projects **Essential**
- Ability to identify sources of funding and contribute to the process of securing funds, with collaborators if required **Essential**
- Competency to make presentations at conferences or exhibit work in other appropriate events **Essential**

### Experience

- Experience of carrying out both independent and collaborative research **Essential**
- Experience of writing up research work for publication **Essential**
- Ability to work as part of a team and also to work independently using own initiative **Essential**
- Postdoctoral experience in theoretical nuclear physics **Desirable**

### Personal attributes

- Attention to detail and commitment to high quality **Essential**
- Collaborative ethos **Essential**
<table>
<thead>
<tr>
<th>Interest in and enthusiasm for the subject matter of the project(s)</th>
<th>Essential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive attitude to colleagues and students</td>
<td>Essential</td>
</tr>
<tr>
<td>Willingness to work proactively with colleagues in other work areas/institutions</td>
<td>Essential</td>
</tr>
<tr>
<td>Ability to plan and prioritise own work in order to meet deadlines, including using initiative to plan research programmes</td>
<td>Essential</td>
</tr>
<tr>
<td>Commitment to personal development and updating of knowledge and skills</td>
<td>Essential</td>
</tr>
</tbody>
</table>