



# UNIVERSITY OF PLYMOUTH

## JOB DESCRIPTION AND PERSON SPECIFICATION

**Role:** Post-doctoral Research Fellow in Modelling Propellantless Thrust

**Faculty and School:** FoS&E , SoBMS,

**Career Pathway:** Research

**Grade:** 7

**Reports to:** *Dr Mike McCulloch*

### Role Purpose:

The focus of the role will be to develop a predictive model based on a ground-breaking theory called quantised inertia. The numerical model will be used to design a new kind of thruster. The new theory assumes that inertia is caused by an interaction between Unruh radiation and matter. It explains, for example, galaxy rotation without dark matter, but in order to enable accurate experimental tests of the theory, it must be fully coded into a numerical model that can predict how Unruh radiation will push on any given configuration of matter. The post holder's role will be to do this coding.

The post holder will be required to undertake research in line with University/School's strategy.

All activities undertaken within this role will be compliant with the University's policies, including Health & Safety, Equality and Diversity, Ethics, Data Protection etc,

Key Accountabilities/Primary Responsibilities:	Indicators of Success:
<ul style="list-style-type: none"> <li>• Develop a numerical model of quantised inertia that predicts the interaction between Unruh radiation and configurations of matter, and the forces resulting.</li> <li>• Write a manual to fully describe the numerical model.</li> <li>• Identify, and contribute to securing, future funding sources.</li> <li>• Support and engage in research methodologies that add to the knowledge/understanding of the subject area.</li> <li>• Co-author publications.</li> <li>• Develop and sustain links with relevant industries and organisations to grow collaborations, employability and funding support.</li> <li>• Conduct research related administration e.g. risk assessment, organisation of meetings and documentation, and ensure accurate and timely formal reporting and financial control.</li> </ul>	<ul style="list-style-type: none"> <li>• Individual/School and University research profile</li> <li>• Value of external research funding</li> <li>• Participation in conferences/networks</li> <li>• High quality research outputs as judged by accepted standards of excellence in relevant discipline</li> <li>• Success rate in grant applications</li> <li>• External profile and reputation</li> <li>• Individual contribution to the UK REF or overseas equivalent</li> <li>• Performance Development</li> </ul>

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- Emphasis on specific accountabilities and indicators of success will be agreed as part of your PDR.

	Review (PDR) feedback
<ul style="list-style-type: none"> <li>Provide expert advice in own subject area to other staff and students.</li> </ul>	<ul style="list-style-type: none"> <li>Student satisfaction survey outputs</li> <li>Student retention/completion rates</li> <li>Student recruitment rates</li> <li>Staff turnover and satisfaction rates</li> <li>Peer feedback</li> <li>PDR feedback</li> </ul>
	<ul style="list-style-type: none"> <li>Translation of research outputs to taught programmes</li> <li>Teaching observation and peer review</li> <li>PDR feedback</li> <li>Module evaluations</li> <li>Peer Review feedback</li> </ul>

## PERSON SPECIFICATION

Criteria	Essential	Desirable	Point of assessment
<b>Knowledge, Education and Training:</b> <ul style="list-style-type: none"> <li>A BSc and PhD in physics and/or computational physics.</li> <li>Expertise in modelling light-matter interactions and/or relativistic horizons</li> <li>Good knowledge of quantum mechanics and relativity</li> <li>Good knowledge of Hawking/Unruh radiation</li> <li>A knowledge of COMSOL and java</li> </ul>	<p>X</p> <p>X</p> <p>X</p> <p>X</p>	<p>X</p>	<p><i>Shortlisting</i></p>
<b>Experience:</b> <ul style="list-style-type: none"> <li>Sustained peer reputation and growing national reputation in field.</li> <li>Working on coding light-matter physics into numerical models</li> <li>Working with COMSOL, java</li> <li>Working in a research environment</li> <li>Writing technical reports.</li> <li>A record of individual or contributions to research publications</li> <li>Project management</li> <li>Liaising with customers face to face/by telephone/in writing</li> <li>Working both independently and as part of a</li> </ul>	<p>x</p> <p>X</p> <p>X</p> <p>X</p> <p>x</p> <p>X</p>	<p>x</p> <p>x</p>	<p><i>Applicant shortlisting and interview</i></p>

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<ul style="list-style-type: none"> <li>team</li> <li>• Monitoring and reporting on financial information</li> <li>• Drawing on professional/specialist knowledge to solve presenting problems</li> <li>• Developing track record of published research at the appropriate level.</li> <li>• Good knowledge of quantum mechanics and relativity</li> <li>• Good knowledge of Hawking/Unruh radiation</li> <li>• A knowledge of COMSOL and JAVA</li> <li>• Has plans to develop impact within area of research.</li> <li>• Track record of grant applications and income at the appropriate level.</li> <li>• Track record of contributing to and/or developing collaborative research networks.</li> <li>• Track record of presenting research findings at meetings and conferences.</li> <li>• Developing track record of successful engagement with key research stakeholders, both internally and externally.</li> <li>• Track record of excellent research mentorship and /or supervision.</li> </ul>	<ul style="list-style-type: none"> <li>X</li> <li>X</li> <li></li> <li>X</li> <li></li> <li></li> <li></li> <li></li> <li></li> <li></li> <li></li> <li></li> <li></li> <li></li> <li></li> <li></li> <li></li> <li></li> <li></li> <li></li> </ul>	<ul style="list-style-type: none"> <li></li> <li></li> <li></li> <li></li> <li>X</li> <li></li> <li></li> <li></li> <li></li> <li></li> <li></li> <li></li> <li></li> <li></li> <li></li> <li></li> <li></li> <li></li> <li></li> <li></li> <li></li> </ul>	
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### Special Conditions

The post includes short trips to Dresden (Germany) and Madrid (Spain) therefore you must hold a full and valid passport and have the ability and willingness to travel when required.

**Skills and Attributes:**

**Drives innovation and action:**

- Ability to contribute to and develop innovative research proposals and attract research income
- Intellectual agility for the solving of problems

**Demonstrates self-leadership, balancing personal needs with the University's strategic objectives:**

- Self-awareness with the ability to accept different views and self-regulate approach appropriately.
- Skilled approach to planning, managing, organising and objectively assessing own research contributions.

**Develops self and others to deliver:**

- Ability to plan, manage, organise and assess own research contributions.
- Ability to mentor and support junior research staff and students.

**Leads and operates amidst change and ambiguity:**

- Ability to take a long-term holistic view and remain focussed during times of change and uncertainty.
- Ability to remain resilient, flexible and work with conflicting priorities.

**Builds and secures value from relationships:**

- Proactive in approach to seeking and managing research collaborations and opportunities for joint research projects.
- Working effectively and collegiately as a part of an interdisciplinary team.
- Fostering and developing good relationships between own School and the wider University, and with external partners.

**Creates and contributes to a shared vision, inspiring others:**

- Strong written, verbal and presentation skills.
- Ability to communicate new and complex information effectively, both verbal and written, engaging the interest and enthusiasm of the target audience.

**Uses sound business judgement:**

- Contribute to the monitoring of resources and budgets where appropriate.
- Support the identification of ways to diversify income and improve revenue.
- Make evidence informed decisions in a transparent way whilst remaining accountable to self, the University and students.

*This section is used by the panel to inform interview questions for formal interview.*

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