Postdoctoral position in investigating ionic liquid ion sources for materials fabrication

Astronautics Group, Department of Aeronautics and Astronautics, University of Southampton, UK

Duration of post: 3 years

Start of post: October/November 2021, but can be flexible up to March 2022 with good applicant

Pay: £30,942 to £33,797 per annum

Applications are invited for a Post-Doctoral Research Assistant (Research Fellow) position within the Astronautics Group, in the Department of Aeronautics and Astronautics.

Gallium Liquid Metal Ion Sources (LMIS) are the standard choice for ion beam material etching, facilitating ion beam lithography as the go-to technique for in situ microfabrication. Many microfabrication applications would benefit though from a more flexible ion beam source, with different ion beam species significantly influencing the physical and chemical nature of the milling results, for example reducing ion implantation or enhancing etching through using chemically reactive ions.

One such option is Ionic Liquid Ion Sources (ILIS), where rather than extracting ions from a liquid metal such as gallium, ions can be extracted from an molecular ionic liquid. Through the use of Ionic Liquids, there is a far greater choice of ion type that can be emitted, across a much larger range, offering the ultimate flexible ion source.

Recently there have been great improvement in the operation of ILIS's through the development of their use for ion thrusters for spacecraft. Our research group at Southampton has developed an electrospray ion thruster for micro spacecraft propulsion. This project will develop this thruster for application as an ILIS for Focused Ion Beam etching of materials.

The post will work on the development of Ionic Liquid Ion Sources as focused ion beam sources for material fabrication. It will involve detailed characterisation of these sources and their interaction with substrates, in collaboration with the Optoelectronics Research Centre and their world class clean room facilities, through collaboration with Dr Oleksandr Buchnev, ORC. The work is a direct spin out of our work on electrospray ion thruster technology, and we welcome people who have worked in this field to apply. We also welcome applicants from other disciplines such as ion beam technology, experimental plasma physics, materials engineering, etc.

The post is offered on a full-time, fixed term basis for 3 years. There will be excellent flexibility within the post to investigate various aspects of ionic liquid ion source technology, as part of this large Research Council funded project:

https://gow.epsrc.ukri.org/NGBOViewGrant.aspx?GrantRef=EP/V04995X/1

It is desirable that the person has experience in designing and testing ion thruster technology or ion beam experience, or a demonstrated aptitude for learning new fields of research. The person should have a PhD in aerospace engineering, experimental beam physics, or materials engineering focused on ion beam uses. It is desirable that the person has experience of operating large vacuum chamber facilities, and a strong aptitude towards experimental testing. Additionally, a strong track record of high-quality journal publications is an advantage.

If you are interested in this position, further information and the application procedure can be found here:

https://jobs.soton.ac.uk/Vacancy.aspx?id=26421&forced=2

Closing date: 9th of September 2021.

For informal enquiries, please contact Dr Charlie Ryan, Assistant Professor in Astronautics, University of Southampton, UK. c.n.ryan@soton.ac.uk.