**[PhD Studentships in Fusion Research](http://www4.dcu.ie/ncpst/news/phd-vacancies.shtml)**

Applications are invited for two (2) fully funded Physics PhD positions in fusion research at the National Centre for Plasma Science & Technology, Dublin City University, Dublin 9 Ireland. The duration of the scholarships will be for 3 years, starting in October 2014. Students will receive a stipend of €18,000 per annum. The Supervisor will be Professor Miles Turner.

Initial enquiries: C.V. and covering letter should be emailed to Huw Leggate ([leggate.huwjonathan2@mail.dcu.ie](mailto::leggate.huwjonathan2@mail.dcu.ie)) by **Friday, 5th September 2014**.

**1. PhD Position : BOUT++ Code**

Nuclear fusion offers a clean and sustainable energy source for the future. This is achieved by confining a Deuterium-Tritium plasma in a strong magnetic field and heating it to the point where fusion can occur, releasing large amounts of energy. Non-hydrogenic impurities enter the plasma due to interactions with the walls and structures of the plasma vessel and due to the deliberate addition of impurities to reduce the heat loads to plasma facing components. The impurities have a significant effect on plasma performance and can induce a collapse of the plasma as well as reducing the fuel available for fusion reactions. Simulations of the fusion plasma play an important role in fusion research, the BOUT++ code is a C++ framework for writing plasma fluid simulations with an arbitrary number of equations in 3D curvilinear coordinates. It has been developed from the original BOUndary Turbulence 3D 2-fluid edge simulation code written by X.Xu and M.Umansky at LLNL.

A fully funded PhD position is now available at the NCPST, Dublin City Universtiy to incorporate impurity transport into the BOUT++ code. This will begin by incorporating impurities as tracer particles in 2 dimensional turbulent simulations. This project will involve collaboration with the BOUT++ team based at The University of York and the Culham Science Centre, Oxfordshire, and some time will be spent working at these institutions.

Links

<http://www.iter.org/>

<http://www.ccfe.ac.uk/>

[http://www-users.york.ac.uk/~bd512/bout/](http://www-users.york.ac.uk/~bd512/bout)

**2. PhD Position : Study of Magnetized Radio Frequency Sheaths Using Kinetic Simulations**

Nuclear fusion offers a clean and sustainable energy source for the future. This is achieved by containing a Deuterium-Tritium plasma in a strong magnetic field and heating it to the point where fusion can occur, releasing large amounts of energy. One of the main methods for heating the plasma is to use high power radio frequency antenna to accelerate the plasma ions and electrons. There are several problems associated with this method, notably unreliable coupling to the intended species and damage to the antennae that produces unwanted impurities that may enter the core plasma. A significant effort is underway within the European fusion community to understand the causes of these problems including experimental and computational investgation of the magnetized Radio Frequency (RF) sheaths that form around the antenna and computational simulation of the sheath and bulk plasma. A project has also been started in collaboration with the Institute of Plasma Research (IPR), Gandhinagar, Gujarat, India to study magnetized RF sheaths, initially in a Capacitively Coupled Plasma (CCP) device and in the future in a linear plasma device.

A fully funded PhD position is now available at the NCPST, Dublin City Universtiy to study the characteristics of magnetized radio frequency sheaths using kinetic simulations. This will involve extending an existing 1D Particle-in-Cell (PIC) code to 2 dimensions and adding the ability to simulate an external magnetic field. The code will then be used to study the plasma sheath in conditions created in experiments in both Europe and India with the aim of improving the understanding of ICRF heating in fusion devices. The project duration will be a minimum of three years and will require travel to both Europe and India.

 Links

<http://www.iter.org/>

<http://www.ccfe.ac.uk/>

<http://www.ipr.res.in/>