PhD studentship in Mathematics or Interdisciplinary Mathematics

University of Warwick

**“Nonlinear dynamics for stellarator design”**

28 September 2018 – 31 August 2022

We seek a highly motivated and intelligent student with training in dynamical systems theory, especially Hamiltonian dynamics, for a PhD project in stellarator design.

The project is to explore the possibilities to make magnetic confinement devices for plasma with integrable or nearly integrable guiding-centre dynamics (to maximise the confinement) and no or small toroidal current (to minimise the need for current drive and associated instabilities), called stellarators. The latter condition requires significant deviation from axisymmetry, which is otherwise the straightforward way of achieving the former and is the principle of the tokamak. Integrability is guaranteed, however, for a generalisation called quasisymmetry. The questions are to what extent quasisymmetry can be realised by magnetohydrodynamic equilibria and how small the toroidal current can be made.

The studentship is funded by a maintenance grant from the Simons Foundation under an international collaboration on “Hidden symmetries and fusion energy” at the standard EPSRC rate and fees paid by the Mathematics department for an EU citizen (with possibility to negotiate for fees for a non-EU citizen). The Simons Foundation grant will also pay for the student to participate in collaboration meetings in the USA.

Interested applicants are invited to contact R.S.MacKay@warwick.ac.uk