

## **PhD Studentship in Planetary Science**

The Centre for Astrophysics & Planetary Science at the University of Kent in Canterbury in collaboration with the Max Planck Institute for Solar System Research (MPS) in Germany offer a fully funded PhD studentship for commencement in September 2011.

*Project Description:*

### **Understanding the Asteroidal YORP Effect via Rosetta Imaging and Ground-Based Observations**

The YORP effect is a torque that can modify the rotation rates and spin-axis orientations of small asteroids in the solar system. YORP torques are caused by the combined effects of incident solar radiation pressure and the recoil effect from anisotropic emission of thermal photons. Several observed phenomena in asteroidal science indicate that such a torque acts upon the surfaces of asteroids and meteoroids, for which the YORP effect is the only realistic mechanism. Despite its importance, there existed only indirect evidence for the presence of YORP on solar system objects, until recently.

A major aspect of the project is to work on data from the MPS-led OSIRIS camera instrument on board ESA's Rosetta spacecraft. On route to its primary target comet 67P/Churyumov-Gerasimenko the probe has completed flyby's of two asteroids, Steins and Lutetia. Based on high-resolution in-situ images from OSIRIS, asteroids Steins showed signs that it had undergone YORP-induced shape modifications. This project is aimed at understanding the likely evolutionary history of Steins through simulations of asteroid impacts and YORP-strength modelling.

The student will also be involved in a new observational programme at the European Southern Observatory (ESO), led by Dr. Lowry and colleagues. This programme will make use of the 8.2m VLT and the 3.5 NTT observing facilities over the next 4 years. This ESO Large Programme is designed to survey a large sample of small near-Earth asteroids at optical and thermal-IR wavelengths to detect the YORP effect acting on these bodies, and to determine their likely surface compositions. This study will also inform the Steins Rosetta work. The ESO programme is a collaboration between the University of Kent, Max Planck Institute for Solar System Research (Germany), Open University (UK), Queen's University Belfast (UK), and NASA's Jet Propulsion Laboratory (California, USA).

*Additional Details:*

The supervisors will be Dr. Stephen Lowry (CAPS) and Dr Colin Snodgrass (MPS) and Dr. Holger Sierks (MPS and OSIRIS Principal Investigator). As this is a joint PhD project between CAPS and MPS, the successful student will spend half of their tenure in Canterbury and the other half in Katlenburg-Lindau.

Funding is available for 3 years for suitably qualified candidates, which includes registration fees and an annual stipend. The stipend will be roughly in line with UK STFC studentships (~£14k per year while in the UK and ~15k Euros per year while at MPS), but given the nature of the joint funding the stipend amount may vary slightly from year to year. Limited funds for travel to international conferences and telescope facilities may be made available. This studentship is available to EU residents, and the application window will remain open until August 20<sup>th</sup> 2011, or until the position has been filled, whichever comes first.

For more detailed information on the project please contact the respective lead supervisor Dr Stephen Lowry directly ([s.c.lowry@kent.ac.uk](mailto:s.c.lowry@kent.ac.uk)), and for further information on how to apply via the University of Kent online system, please contact Sarah Saunders ([spsrecruit@kent.ac.uk](mailto:spsrecruit@kent.ac.uk)). Further details on the University of Kent School of Physical Sciences and the International Max Planck Research School are available here:

<http://astro.kent.ac.uk/>

<http://www.kent.ac.uk/physical-sciences/>

<http://www.mps.mpg.de/en/imprs/>