



Summer internship on understanding oxidation in nuclear fusion materials

General Description: Applications are invited for an Undergraduate Research Opportunities Programme (UROP) scholarship in nuclear fusion materials. All undergraduate students enrolled in UK universities are eligible. The placement will have a duration of 8 weeks (between June 1 and August 31) and the stipend is £3,000. The project is conducted in close collaboration with the UK Atomic Energy Authority (UKAEA) and is funded by the FIP Summer Placement programme.

The aim of the project is to conduct critical experiments to understand oxidation in tungsten. Recent years have seen remarkable progress in nuclear fusion research, invigorating the field. However, achieving the ambitious objectives of nuclear fusion requires addressing important material challenges, including the understanding of oxidation behaviour. In a spherical tokamak, plasma-facing materials are exposed to an extremely harsh environment, such as high heat flux and high energy neutron irradiation. Previous research has identified risk of oxidation of plasma-facing materials, which could cause two issues: (1) dispersion of volatile (radioactive) oxides in case of loss-of-coolant Accident (LOCA) and (2) loss-of-vacuum accident (LOVA), which can strongly reduce tritium recovery capability from waste.

To address these two issues, tungsten oxidation experiments will be conducted using the recently purchased Simultaneous Thermal Analyzer (STA) facility installed at the Centre for Infrastructure Materials (CIM) in the Civil & Environmental Engineering Department at Imperial College London. The STA experimental work will be followed by post-oxidation analyses using multiple characterisation techniques, such as XRD and SEM. Through these experiments, we expect to identify: (i) the kinetics and nature of the oxide formed, (ii) the thermodynamic conditions (temperature and environment) and the kinetics of the oxide sublimation.

How to apply: Applicants wishing to be considered for these opportunities should send the following application documents to Dr Emilio Martínez-Pañeda (e.martinez-paneda@imperial.ac.uk) and Dr Guillermo Alvarez (g.alvarez20@imperial.ac.uk).

- CV
- Cover letter, explaining their motivation and suitability
- Contact details of one academic referee

Review of applications will start on May 5 and applications must be submitted by **May 10** to be considered.

For further details, informal discussions and information about the project please contact Dr Emilio Martínez-Pañeda at e.martinez-paneda@imperial.ac.uk