



Applications are invited for the following a PhD studentship for the following project:

Ultra-thin film oxide semiconductors for ICT applications

The position will be based with *the Applied Physics Research Group* at School of School of Physics Trinity College Dublin under the supervision of Prof. Igor Shvets and be part of the Materials for ICT platform within the Advanced Materials and Bioengineering Research Centre (AMBER) centre.

Project Background

Confining a material in one direction strongly influence its properties, the study of this phenomena in the field of nanoscience continues to drive industry via the synthesis of emerging materials with new and desired properties. Thin-film oxide semiconductors have received considerable attention in recent years and offer an alternative to silicon based electronic devices. This endeavour has seen emerging oxide semiconductors utilized in new ICT devices such as thin-film transistors and flexible and transparent electronics, to name but a few. In this project crystalline ultra-thin film (several nanometers) semiconducting oxides will be synthesized, focusing on group 4 and 5 transition metal oxides. The ultra-thin films will be synthesized on highly-ordered and ultra-pure metal single crystals. The interaction between metal substrate and ultra-thin film strongly influences the properties of the ultra-thin film. This interaction and confining the oxide semiconductor in one direction can result in oxide phases and correlated properties which would otherwise not exist in bulk form. The project aims to tailor the synthesis - in terms of the substrate, material thickness and transition metal of the oxide semiconductor - to synthesize novel materials for ICT applications. The synthesis will be performed in ultra-high vacuum conditions. Characterization will be performed in-situ by the combination of variety of contrasting yet complimentary surface sensitive techniques: scanning tunneling microscopy and spectroscopy, which will be the primary technique employed, will provide unrivaled atomic-scale structural and electronic. Low-energy electron diffraction and X-ray photoelectron spectroscopy will provide area-averaging structural and elemental characterization.

The ideal applicants will have a 1st Class Honours Bachelor's degree in *Chemistry, Physics or Material Science with a strong background/interest in physical measurement.*

The researcher will work closely with other members of a multidisciplinary project team. Excellent written and oral communication skills are essential.

How to apply:

CVs with the names and addresses of three referees should be submitted to:

Professor Igor Shvets, School of Physics, Trinity College Dublin. ivchvets@tcd.ie

Positions will remain opened until filled but preferred start date is *September 2 2019*. Only short-listed applications will be acknowledged.

This position is funded by the SFI-research centre AMBER.

The AMBER research centre, as a community of researchers, welcomes its responsibility to provide equal opportunities for all. We are actively seeking diversity in our research teams and particularly encourage applications from underrepresented groups.

