Cutting-edge electronics research receives £1.75m boost from EPSRC

Wednesday 12 April, 2017

Cutting-edge electronics research in the UK has received a huge boost, thanks to grants for the University of Warwick – totalling almost £1.75 million – from the Engineering and Physical Sciences Research Council (EPSRC).

Professor Marin Alexe in the Department of Physics has been awarded grants for two research projects in the field of *ferroelectricity* – which may lead to breakthroughs in nanotechnology, and memory storage in everyday devices.

One project, 'Ferrotoroidic structures: polar flux-closure, vortices and skyrmions', will develop a fundamental, new understanding of ferroelectrics systems – materials which are used in smart phones and TVs, watches, games consoles, and computers.

The aim is to obtain and analyse the fundamental structural and functional properties of polar ferrotoroidic oxides based on the perovskite structure.

The knowledge acquired from this project could be used to develop the next generation of memory devices and cognitive computing – revolutionising the fields of data processing and secure communications.

Professor Alexe is the Principal Investigator on this project, with Dr Ana Sanchez as Co-Investigator. The EPSRC award for this project is is £998k.

Another programme, 'Ferroelectric, ferroelastic, and multiferroic domain walls: a new horizon in functional materials', will focus on exploring the novel functionally of active ferroelectric, ferroelastic and multiferroic domain walls (DW).

The project is highly important for the electronics industry – the research could unlock the potential of DW technology as a viable technology for microelectronics and progress the development of functional nanodevices.

Working alongside Queen's University Belfast, and the universities of Cambridge and St Andrews, Warwick receives £730k for this project.

Prof Marin Alexe recently joined Warwick's Department of Physics as Chair of Functional Materials, after spending 18 years at the Max Planck Institute of Microstructure Physics-Halle.

His research interests include the physics and engineering of complex oxide thins films for information technology, and the integration of functional materials for oxide electronics.

He is one of the pioneers of nano-ferroelectrics, with several contributions in high impact journals such as Science, Nature Materials and Communications.

Prof Alexe was recently awarded the Wolfson Research Merit Award and the Theo Murphy Blue Sky Award of The Royal Society. He comments:

"This represents an excellent opportunity to bring UK at the forefront of research in this exiting field of oxide functional materials and electronics."

Professor Pam Thomas is Warwick's Pro Vice-Chancellor for Research, and Professor of Physics. She comments:

"I'm very pleased to see this important area of materials research being funded in this way.

"Through Professor Alexe's research together with Dr Sanchez and his other coinvestigators, Warwick's combination of expertise and excellent research infrastructure together with EPSRCs support, is poised to make a real difference in the world of electronic materials."

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The University of Warwick is one of the top 10 research environments in the UK for Physics, as assessed by REF 2014, with all aspects considered to be either world-leading or internationally excellent.

96% of the research papers submitted to REF 2014 were judged to be at least "internationally excellent" and a quarter "world leading" (4*).

'Energy' is one of the University of Warwick's Global Research Priorities. The University is addressing global challenges through its world-class multi-disciplinary research.

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