FLEET

ARC CENTRE OF EXCELLENCE IN FUTURE LOW-ENERGY ELECTRONICS TECHNOLOGIES

FLEET RESEARCH SEMINAR

Topological Defects in Ferroelectrics and Multiferroics

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Abstract: The use of a first-principles-based effective Hamiltonian in 2004 led to the prediction of a novel structure in zero-dimensional ferroelectrics, in which electric dipoles organize themselves to form a vortex. Such structure exhibits the spontaneous toroidal moment, as its order parameter. Subsequently, various original phenomena, all related to topological defects, were predicted in ferroelectric and multiferroic nanostructures. Examples include the existence of a new order parameter, the hypertoroidal moment associated with complex dipolar structures; the discovery of a new class of quantum materials for which zero-point vibrations wash out the vortex state and yield a complex local structure; and the existence of a spontaneous optical activity in systems possessing coupled topological defects.

This seminar will discuss some of these striking phenomena and other recent related developments from our work.

About the Speaker: ***Distinguished Professor Laurent Bellaiche*** received his PhD in 1994, from University of Paris VI. He joined the Department of Physics at the University of Arkansas, as an Assistant Professor in 1999 and promoted to Distinguished Professor in 2013. Professor Bellaiche's primary interests lie in developing and/or using direct first-principles methods, first-principles-based techniques and semi-empirical approaches to calculate properties of ferroelectrics, semiconductors, magnetic compounds and low dimensional systems. He has co-authored over 275 refereed journal articles, his publications have been cited more than 11,000 times and currently has a h-index of 57.

DATE: Monday 5 February 2018
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