



FLEET

ARC CENTRE OF EXCELLENCE IN
FUTURE LOW-ENERGY
ELECTRONICS TECHNOLOGIES



MONASH University
School of Physics and Astronomy

SPA & FLEET RESEARCH SEMINAR

Axisymmetric Topological Solitons

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Abstract: In certain low symmetry systems, magnetic interactions imposed by the underlying crystallographic structure can stabilize axisymmetric localized states - also known as magnetic vortices or skyrmions. These magnetic objects are nanometers-size whirling cylinders, embedded into a magnetically saturated state and magnetized antiparallel along their axis. They enjoy nontrivial topology, protecting them from unwinding into homogeneous states, although topology does not prevent them from collapsing. Further to intellectual curiosity, being highly mobile and the smallest magnetic configurations, these nanometer-scale localized objects are being proposed as candidates for high-density memory, logic circuits and neuro-inspired computing. Expectedly, their scientific and technological relevance is fuelling research in novel classes of bulk magnetic materials and synthetic architectures. The first part of the talk will address the physical principles and stabilization mechanism of these axisymmetric topological solitons. In the second part, I will discuss quantifiable insights towards understanding their stability and dynamics, and directions for exploiting their properties in nanoscale devices of thin film architectures.

About the Speaker: I received my PhD from the University of Cambridge (Trinity College) in 1997. I have since held positions as Trinity College Junior Research Fellow and Royal Society University Fellow at the University of Cambridge - United Kingdom, Professor of Physics at the University of Crete - Greece, and Professor of Physics and Applied Physics & inaugural Research Professor at the Nanyang Technological

University - Singapore. I am also the inaugural Investigator of the National Research Foundation, Prime Minister's Office - Singapore and Affiliate Professor at the Cavendish Laboratory, University of Cambridge. I received education and training from The Royal Society & Imperial College on The Business of Science, chaired many panels on research and education, and serve as reviewer on strategic initiatives for research Centers in North America, Asia and Europe. Honors include, European Young Investigators Award (European Union), Marie Curie Excellence Grants Award (European Union), Investigatorship Award (Singapore), Invited Professor at the Venture Business Laboratory (Japan) and the Chinese Academy of Sciences (China), and my election as Research Fellow at Trinity College, Cambridge (United Kingdom), the National Research Foundation (Singapore), and The Royal Society (United Kingdom). I have published more than 100 research articles in condensed matter physics, delivered numerous keynote speeches and courses in international graduate schools, and over 250 invited presentations at conferences and universities. In my free time, I participate in think-tanks and marathon races.

DATE: Wednesday 18 March 2020

TIME: 14:00 - 15:00

VENUE: G30, New Horizons
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