复旦大学物理系 Colloquium

Time: 14:00, Tuesday, 2024.2.27

Location: C108, Jiangwan Physics Building

Exploring the nano-world with electrons

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Abstract: Transmission electron microscopy has been revolutionized in recent years, both by the introduction of new hardware such field-emission electron guns, aberration correctors and in situ stages and by the development of new techniques that take advantage of increased computational speed and the ability to control and automate modern electron microscopes. In this talk, I will describe how electron microscopy can be used to obtain quantitative information about not only local variations in microstructure and composition in materials, but also about switching processes in nanoscale devices, including individual electrically-biased phase change memory cells and three-dimensional magnetic solitons in geometrically-confined structures. I will conclude with a personal perspective on directions for the future development of transmission electron microscopy, followed by a summary of recent progress towards creating a sustainable distributed research infrastructure for electron microscopy in Europe.

Biography: Rafal Dunin-Borkowski is Director of the Institute for Microstructure Research and the Ernst Ruska-Centre for Microscopy and Spectroscopy with Electrons in Forschungszentrum J ü lich, Germany and Professor of Experimental Physics in RWTH Aachen University, Germany. His Ph.D. (1990-1994) was carried out in the Department of Materials Science and Metallurgy in the University of Cambridge. After working as a postdoctoral research scientist in the University of Cambridge, Arizona State University and Oxford University, between 2000 and 2006 he held a Royal Society University Research Fellowship in the University of Cambridge. Between 2007 and 2010, he led the establishment of the Center for Electron Nanoscopy in the Technical University of Denmark. He specializes in the characterization of magnetic and electronic materials at the highest spatial resolution using advanced transmission electron microscopy techniques, including aberration-corrected high-resolution transmission electron microscopy and off-axis electron holography. In 2009 he was awarded the Ernst Ruska Prize of the German Society for Electron Microscopy. In 2012, 2017 and 2019 he was awarded Advanced, Proof of Concept and Synergy Grants by the European Research Council.