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City University Distinguished Lecture Series

Speaker

Professor Qi-Kun Xue

Professor of Department of Physics, Tsinghua University
Member of Chinese Academy of Sciences

Physics beyond Ohm's Law

on

Monday, 25 September 2017 at 4:30 pm

at

Connie Fan Multi-media Conference Room
4/F Cheng Yick-chi Building
City University of Hong Kong
Tat Chee Avenue, Kowloon

Abstract

Ohm's law, discovered in 1827, is one of the most important laws for quantitative descriptions of the physics of electricity. It determines the performance and energy usage efficiency of all electrical/electronic devices, from a tiny transistor in integrated circuits to anywhere power lines for electric transmission and distribution in a grid. Superconductivity and quantum Hall effect as well as quantum anomalous Hall effect (the quantum Hall effect without external magnetic field), which do not obey the Ohm's Law, provide a way to solve the problem with electrical resistance for better use of electricity. In this talk, Professor Xue will talk about how to increase the transition temperature of superconductivity and quantum anomalous Hall effect. Professor Xue will argue that realization of superconductivity and quantum anomalous Hall effect at temperatures above liquid nitrogen boiling temperature (77 K), and particularly around room temperature, may trigger the next industrial revolution, which can be as significant as the second industrial revolution with electricity more than 100 years ago.

Biography

Professor Qi-Kun Xue, received his BSc in Shandong University in 1984, and PhD degree in condensed matter physics from Institute of Physics, the Chinese Academy of Sciences (CAS) in 1994. From 1994 to 2000, he worked as a Research Associate at IMR, Tohoku University, Japan and visiting Assistant Professor at Department of Physics, North Carolina State University, USA. He became a professor at Institute of Physics, CAS in 1999. He was elected into the Chinese Academy of Sciences in 2005. Since 2005, he has been a professor in Department of Physics, Tsinghua University. From 2010 to 2013, he was the Chair of Department of Physics and the Dean of School of Sciences. He became the Vice President for Research in May 2013, Tsinghua University. He won the TWAS Prize in Physics in 2010.

His research interests include scanning tunneling microcopy/spectroscopy, molecular beam epitaxy, low-dimensional and interface-related superconductivity, topological insulators, and quantum size effects in various low-dimensional structures. He has authored/coauthored ~400 papers with a citation of ~13000 times. He has presented more than 150 invited/keynote/plenary talks at international meetings/conferences, such as American Physical Society March Meeting (1996, 2005, 2010, 2012, 2014, 2017). Currently, he is the Fellow of American Physical Society, the Associate Editor of National Science Review, the Editors-in-Chief of Surface Review & Letters, and on the Editorial Board of Physical Review B, Applied Physics Letters, Journal of Applied Physics, Surface Science Reports and AIP Advance.

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