

Seminar On

On Super-Resolution Imaging and Electromagnetic Metasurfaces

by

Dr Alex M. H. Wong

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Date : 06 September 2016 (Tuesday)
Time : 11:00 am – 12:00 noon
Venue : Room 15-202, meeting room of State Key Laboratory of Millimeter Waves, 15/F,
Lau Ming Wai Academic Building, City University of Hong Kong

Abstract

This seminar will revolve around two central themes – super-resolution imaging and metasurfaces – which are intimately related.

The rise super-resolution imaging has been integral to the advancement of many frontiers in science and technology. Conventional imaging systems based on electromagnetic (EM) waves suffer a resolution limit due to wave diffraction characteristics: the resolution limited to roughly half the wavelength of the illumination wave. This is, for example, the reason why a Blu-ray Disc (written by a blue laser) contains higher information density than a DVD (written by a red laser, which has a longer wavelength than blue). The first part of this seminar will examine the curious phenomenon of superoscillation, which, for example, allows red light to oscillate as sharply as blue light for a designated stretch of space, and hence increases its resolution. We shall show that superoscillation makes a viable and attractive avenue to achieving super-resolution: we shall demonstrate that one can achieve super-resolution imaging in time and space, in a manner which bypasses common drawbacks suffered by other super-resolution systems.

The metasurface serves as a versatile tool which enables the generation of high-quality superoscillations and other intricate waveforms. The second part of this seminar will demonstrate the metasurface as powerful tool for engineering electromagnetic waveform, through examples of metasurface enabled devices which include near- and far- field imaging devices, invisibility shields and wide-angle retroreflectors.

Biography

Alex M. H. Wong was born in Hong Kong and immigrated to Canada at a young age. He obtained his bachelor's degree in Engineering Science (B.A.Sc. 2006), and his master (M.A.Sc. 2009) and doctoral (Ph.D. 2014) degrees in Electrical Engineering, all at the University of Toronto in Toronto, Canada. He is currently a post-doctoral fellow within the Eleftheriades group in electromagnetics, at the University of Toronto, advancing multiple projects on superoscillation-based imaging, “smart train” radar, and next-generation RF, infrared and optical metasurfaces. His wide ranging research interest spans the fields of electromagnetics and optics and specifically includes superoscillations, super-resolution imaging, metasurfaces and near-field antennas. He is a member of the IEEE Antennas and Propagation Society and the IEEE Microwave Theory and Techniques Society.

*** ALL ARE WELCOME ***

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