Seminar on

Line wave: robust topological states of light and applications thereof

By

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Time : **02:30 pm – 03:30 pm**
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

In this talk, I report on my recent research activities at the Applied Electromagnetic Group of the University of California, San Diego.

Following a brief background on artificial impedance surfaces (metasurfaces), I present a new electromagnetic mode at the interface of such surfaces, demonstrating wave guidance along an infinitesimal one-dimensional line. Then, I introduce photonic topological insulators and discuss how the proposed mode structure is related yet advantageous compared to existing implementations. In addition, the use of graphene is studied as a reconfigurable terahertz platform for line wave operations. Furthermore, the prospect of the field singularity featured by the line wave is shown for enabling new vacuum-based nonlinear-photonic devices. Lastly, I advocate the use of line wave to integrate with electronic topological insulators, hence modulating spin-current using optical signals.

The presented approach opens a new door to manipulating electromagnetic waves, which is fundamental to modern sensing, communication, and information technologies. Evidently, the line wave is attractive for none-reciprocal devices, high-density integration of optical circuitry, high speed and high power semiconductor-free devices, and possibly quantum computing applications. Importantly, this work is a step towards enabling the emerging field of metadevices and metasystems with unique functionalities.

Biography

Dia'aaldin Bisharat received his BS degree in physics-engineering from Washington and Lee University, Virginia, US, in 2013. In 2012, he was an affiliate and research student at University College London, UK. He is currently pursuing a PhD degree in electronic engineering at City University of Hong Kong, Hong Kong. Since 2016, he has been working at the Applied Electromagnetics Group, UC San Diego, US, as a visiting graduate student. His research interests include antennas, metamaterials, plasmonics, and terahertz applications.

***** ALL ARE WELCOME *****

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