SEMINAR ANNOUNCEMENT

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING
COLLEGE OF DESIGN AND ENGINEERING
Website: https://cde.nus.edu.sg/ece

Area: Microwave & Radio Frequency

Host: Professor Chen Zhi Ning

Technical Seminar Jointly Organized by
IEEE Singapore RFID and ECE NUS

Merlion RFID Forum 2023 Paper Sharing Series

TOPIC	:	**Light Up the Way Toward a New Generation of Low-Cost Microwave Phased Array**
SPEAKER	:	**Professor Lin Feng Han** **ShanghaiTech University, China**
DATE	:	**Monday, 27 February 2023**
TIME	:	**4:00PM to 5:00PM**
VENUE	:	**Block E4, E4-05-39** **College of Design and Engineering, National University of Singapore** **Alternatively,** **Join Zoom Meeting** https://nus-sg.zoom.us/meeting/register/tZIpd-GprDIoE9bUgsA-iHILsh6yJVI4sHY1 **[Registration is required]** **Meeting ID: 864 0812 9292** **Passcode: 607047**

ABSTRACT

In this article, the concept and design of light-controlled large-scale wirelessly reconfigurable microstrip reflectarrays are proposed. Unlike conventional electrically reconfigurable microstrip reflectarray antennas (RAs) that control the aperture phase distribution by conducting wires for transmitting control signals, the proposed method utilizes light to control the ON-and OFF-state of the integrated positive-intrinsic-negative (p-i-n) diodes wirelessly and binaurally through light-sensitive resistance of photodiodes (PDs). The concept is validated by simulation first, where a 1 bit 32 × 32 wirelessly reconfigurable microstrip RA is designed at 10 GHz with a beam-steering range of ±60° for sidelobe levels <−10 dB, marking a record of 1024 elements with a tri-layer configuration. Experimentally, the light-control scheme is further validated by a smaller porotype of 256 elements, where a light-controlled beam steering from 30° to 45° is demonstrated. Compared with conventional wired reconfigurable microstrip RAs, the proposed method resolves the wire-routing complexity on the RA and offers a new possibility for further improving the maximum directivity, upper operating frequency, and the number of independently controllable polarizations of reconfigurable microstrip reflectarrays, paving the way for developing very-large reconfigurable intelligent surfaces (VRIS). Also, the proposed concept provides a new infrastructure for information exchange between light and microwaves.

BIOGRAPHY

Dr. Feng Han Lin received the Bachelor and Master degrees in Electrical Engineering from Xidian University, and the Ph.D degree from the ECE Department of National University of Singapore (NUS) in 2019. He was the awardee of many awards, including the NUS President's Graduate Fellowship for continuously 4 years, the 2018 Chinese Government Award for Outstanding Self-Funded Students Abroad, the Lin-Gang National Laboratory Qiu-Suo Outstanding Young Scholar, the Shanghai Leading Talent Program, and 11 student paper awards from international conferences and organizations. Since 2020, he has been an Assistant Professor with the School of Information Science and Technology, ShanghaiTech University, China. He has authored and co-authored more than 30 peer-reviewed papers, with five listed as IEEE-TAP popular papers, and two as ESI-highly cited papers. His current research interests stretch from fundamental electromagnetic theory to microwave technology including metamaterials, antennas, scatterings, circuits, artificial intelligence and neural-machine interface

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