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 2022 Paper Sharing Series

TOPIC	:	**Single-Beam 1-Bit Reflective Metasurface Using Prephased Unit Cells for Normally Incident Plane Waves**
SPEAKER	:	**Dr. Jiexi Yin** **Karlsruhe Institute of Technology, German**
DATE	:	**27 December 2022 (Tuesday)**
TIME	:	**4:00PM to 5:00PM**
VENUE	:	**E4-04-05, E-Cube 1** **College of Design and Engineering, National University of Singapore** **Alternatively,** **Join Zoom Meeting** **https://nus-sg.zoom.us/meeting/register/tZMoc-2vqTMiE9wjJw3F_C7hgPscBLeLma9a** **[Registration is required]** **Meeting ID: 875 4477 8898** **Passcode: 834845**

ABSTRACT

A single-beam prephased 1-bit reflective metasurface is proposed to achieve single-beam patterns under normally incident plane waves. Theoretical analysis and numerical simulations are presented to show that, under normally incident waves, single-beam patterns can be achieved by introducing a fixed prephase distribution with two values in the 1-bit metasurface. Compared with conventional 1-bit reflective metasurfaces, the proposed scheme alleviates the inherent limitation of single-beam patterns on 1-bit reflective metasurfaces under normally incident plane waves. To verify the proposed scheme, a 1-bit unit cell is designed with a 180°±25° phase difference between the two states for frequencies ranging from 34.3 to 49.9 GHz, and a layer-stacking method is proposed to achieve two prephases with a 90° phase difference. As an example, three 1-bit reflective metasurfaces comprising 20 × 20 unit cells with single beams pointing separately at 0°, 15°, and 30° are designed and measured over frequencies of 37.0 to 41.0 GHz; the measured sidelobe levels are less than −7.8 dB. Simulated and measured results show that the proposed prephased 1-bit metasurface can achieve single-beam patterns under normally incident plane waves.

BIOGRAPHY

Jiexi Yin is a Research Fellow at Karlsruhe Institute of Technology, German. She received the B.S. degree in applied physics from Ningbo University, Ningbo, China, in 2014 and the Ph.D. degree in electrical engineering from Southeast University, Nanjing, China, in 2020. From October 2018 to September 2019, she was a visiting Ph.D. student with the Department of Electrical and Computer Engineering, National University of Singapore, Singapore, where she was a research fellow from April 2021 to November 2022. She received the Student Paper Award of Marina Forum on Metantennas 2022. Her current research interests include metasurfaces and millimeter-wave antennas.

E-mail: jiexi.yin@kit.edu

CONTACT PERSON

Dr. Xinyi Tang Tang_Xinyi@i2r.a-star.edu.sg
Dr. Peiqin Liu eleliup@nus.edu.sg