Abstract Submitted
for the MAS20 Meeting of
The American Physical Society

Dynamically Tunable Single-layer VO2/metasurface-based broadband THz Cross-Polarization Converter[1]

ZIZWE CHASE, RIAD YAHIAOUI, CHAN KYAW, THOMAS SEARLES, Howard University, ERIC SEABRON, Morgan State University, JAY MATHEWS, University of Dayton — Numerically, we demonstrate a single-layer THz metadevice, comprised of a 2D array of split ring resonators each with a vanadium oxide (VO2) pad integrated into one of the two capacitive gaps of a unit cell, which exhibits cross-polarization transmission. As the conductivity of VO2 increases, the amplitude of the cross-polarization intensity decreases but maintains a wider broadband range than previously reported for single layered hybrid metamaterial (MM) devices as the VO2 transforms from the insulator to metallic phase. The asymmetric transmission, optically modulated by the device, is higher than that of multi-layered MM devices. Due to the materials properties of VO2, our results introduce a promising method that allows for an active sub-cycle dynamic tenability for THz polarization conversion with multiple modalities using optical, electrical or thermal switching.

[1]Keck Foundation, ONR HBCU/MI Program

Zizwe Chase
Howard University

Date submitted: 28 Oct 2020 Electronic form version 1.4