

Tunable conducting oxide epsilon-near-zero meta-devices

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Controlling the flow of light is fundamental to optical applications. With the recent advances in nanofabrication capabilities and new theoretical concepts, ground breaking platforms for the nanoscale manipulation of light have been demonstrated in recent years. These include metasurface and epsilon-near-zero (ENZ) materials and structures, which offer unique optical features such as sub-wavelength field confinement, unusual optical nonlinear/quantum properties and advanced wavefront shaping.

This talk will review our recent development on an electrically tunable conducting oxide metasurface that can tune the optical phase and amplitude and a broadband, tunable, and ultrathin conducting oxide epsilon-near-zero for meta-devices. I will present our recent development on the use of gate-tunable materials, transparent conducting oxides, to demonstrate an electrically tunable metasurfaces that can tune the optical phase and amplitude for ultrathin beam steering devices [1]. In addition, a broadband, field-effect tunable, and ultrathin ENZ perfect absorber enabled by the excitation of ENZ modes will be discussed [2,3].

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3. A. Anopchenko, S. Gurung, L. Tao, C. Arndt, H. W. Lee, "Atomic Layer Deposition of Ultra-thin and smooth Al-doped ZnO for Zero-Index Photonics", *Materials Research Express*, **5**, 014012 (2018).

Shorter Version

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