

Simplifying Digital Array Architectures with Multifunctional Metasurface Apertures

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ABSTRACT

Holographic metasurfaces, tailored to exhibit a precise electromagnetic response from a low profile, are a powerful platform for wavefront control. In this work, we demonstrate a multifunctional metasurface aperture that can be reconfigured to generate multiple wavefronts simultaneously. This is achieved by using a metasurface with a spatially varying phase response that can be dynamically controlled. The resulting wavefronts are shown to be independent of the input wavefront, demonstrating the versatility of this platform for digital array architectures.

²L. Pardo-Mancera, P. T. Bowen, M. F. Imani, N. Kund, and D. Smith, Polarizability extraction of complementary metamaterial elements in a guided-wave aperture modeling, *IEEE Trans. Antennas Propag.*, vol. 96, no. 6, pp. 5000–5010, 2018.