PhD Oral Defense

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Thesis Title
Research on High-Gain Millimeter-Wave and Terahertz Antennas for 5G and Beyond

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Abstract

At the dawn of the fifth generation (5G) wireless communications era, the ever increasing demand for higher data transmission rate continues to drive carrier frequencies into the millimeter-wave (MMW) and terahertz (THz) bands for improved channel capacities. However, the increase of the operating frequency imposes significant challenges in MMW and THz antenna design; it incurs high atmospheric absorption loss, significant metal and dielectric material losses, and limited fabrication tolerance. In this thesis, we present several high-gain antenna solutions to address these challenges by developing a unique inexpensive three-dimensional (3-D) printing fabrication process, exploring the new concept of amplitude-modulated (AM) leaky-wave antennas and adopting orbital angular momentum (OAM)-based multiplexing.