

## **Off-Axis Beam Patterns of Extended-Hemispherical Dielectric Lens Antennas: Theory and Experiment at 250 GHz**

**Gildas Gauthier, Daniel Filipovic, Sanjay Raman, and Gabriel M. Rebeiz**

**NASA Center for Space Terahertz Technology  
University of Michigan  
Ann Arbor, MI 48109-2122**

We report on extensive beam-pattern measurements at 250 GHz of an 11-element array of double-slot antennas placed on an extended hemispherical dielectric lens antenna. The measurements are made for linear arrays spaced in both the E-plane and H-plane directions. The measurements are also done for different extension lengths and for different lens diameters. The measurements are compared to a ray-optics based theory. Antenna gains and Gaussian-coupling efficiencies for different off-axis positions will be measured or extracted from measured patterns. We will finish by showing simple design rules applicable to imaging arrays in extended-hemispherical dielectric-lens antennas.