368. Title:Novel terahertz antenna based on a silicon lens fed by a leaky wave enhanced waveguide

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Abstract:We introduce a novel antenna concept suitable for future integrated arrays at terahertz frequencies. The antenna consists of an extended hemispherical lens antenna fed by a leaky wave waveguide feed that can be integrated with sensors and detectors such as Schottky diodes. In this antenna architecture, a couple of TE/TM leaky wave modes are excited in a resonant cavity formed by a waveguide opening ground plane and a silicon lens. Due to these modes, the field radiated by the waveguide inside the lens is a very directive pattern that illuminates the upper part of the lens. Having a directive primary field helps to increase the f-number of the lens improving several factors as spill over, off axis distortions and coating layer fabrication. The antenna structure is compatible with modern semiconductor fabrication technology and lends itself nicely for large format imaging arrays. In this contribution, we investigate the important parameters of a single antenna such as reflection coefficient, directivity, Gaussicity, phase center and off-axis displacement tolerances, and we validate our simulations by measuring the far field radiation patterns of a 545 GHz prototype.