

Subwavelength waveguide arrays for spatial phase manipulation of microwaves

Dominic Palm¹, Marco Rahm¹

¹Department of Electrical and Computer Engineering, Research Center OPTIMAS,
Technische Universität Kaiserslautern, Kaiserslautern, Germany

Abstract

We design, fabricate and experimentally test waveguide arrays with subwavelength width and periodicity to manipulate the spatial phase of microwaves. The electromagnetic performance of the waveguide arrays is optimized by use of a particle swarm algorithm. For example, we implement a waveguide array wall that transmits microwaves with incidence angles between -80 and +80 deg with a transmittance of more than 88%, a spatial filter that refracts incident waves with incidence angles smaller than +/-20 deg at a refraction angle of 0 deg in the forward direction and a device that deflects normally incident waves at very large deflection angles in the backward direction.