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Design of antennas and components in gap waveguide technology implemented with glide symmetric holey structures

Luis Fernando Herran(1), Astrid Algaba Brazalez(2), Oscar Quevedo-Teruel(3) and Eva Rajo-Iglesias(4)
(1) Department of Electrical Engineering, University of Oviedo, Spain
(2) Department of Ericsson Research, Ericsson AB, Gothenburg, Sweden
(3) Division of Electromagnetic Engineering, KTH Royal Institute of Technology, Stockholm, Sweden
(4) (Department of Communications and Signal Theory, Carlos III University, 28911 Madrid, Spain,
eva.rajo@uc3m.es

The glide symmetrical holey structure has been presented as a solution to create wide stopbands for the propagation of parallel plate modes [1]. The immediate application of this structure to groove gap waveguide technology designs was first proposed in [2]. The main advantage when this geometry is used in this technology is in terms of the manufacturing simplicity when compared to the versions made with pins.

Since the proposal of this use for gap waveguide technology, several designs of antennas and components have been presented. In this presentation, an overview of the examples already proposed in the literature will be given. The main difficulty when designing a component with this periodic unit cell comes from the lack of compactness which makes challenging the designs. Figure 1 shows the comparison of the holey glide structure and the typical periodic structure made with pins. In the figure, the difference in terms of size of the period of the unit cell can be clearly seen. Another important challenging comes from the implementation of the glide symmetry that requires the use of holes in two layers and a relative shifting of the holes in the two directions of the plane. Modifications on the unit cell, with shifting of the holes only in one of these two directions will be required for some of the designs.

Examples of antenna designs based on the use of slotted waveguide arrays, or combinations with horns and using different strategies for feeding will be shown [3]. Concerning the design of passive components, power dividers, phase shifters, hybrid couplers or mode converters among others will be presented [4].

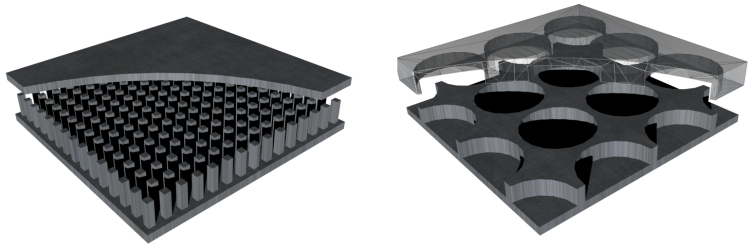

Figure 1. Periodic structure made of pins (left) and with glide-symmetric holes (right).

References

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