Abstracts

Characterization of diffraction anomalies in 2-D photonic bandgap structures

M. Sarnowski, T. Vaupel, V. Hansen, E. Kreysa and H.P. Gemuend. "Characterization of diffraction anomalies in 2-D photonic bandgap structures." 2001 Transactions on Microwave Theory and Techniques 49.10 (Oct. 2001, Part II [T-MTT] (Special Issue on Microwave and Millimeter-Wave Photonics)): 1868-1872.

This paper deals with transmission anomalies of freestanding two-dimensional bandgap structures, which have found a large application range as filter and guiding structures in communication systems and radioastronomical applications in the far infrared region. The effect appears as a sharp breakdown of the transmission factor in the passband of quadratic patch and slot structures, first revealed by measurements. This paper outlines the numerical confirmation of these effects by computer simulations based on the method of moments combined with the Floquet theorem. The transmission and reflection behavior is examined for different structure geometries, frequency ranges, angle, and polarization of the incident wave also revealing alternative structures suppressing these effects. The modeling with electric and magnetic currents allows the characterization of both patch and slot arrays. Finally, cross shaped structures are examined allowing the complete suppression of this kind of anomalies.

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