Abstracts

Improved Single and Multiaperature Waveguide Coupling Theory, Including Explanation of Mutual Interactions

R. Levy. "Improved Single and Multiaperature Waveguide Coupling Theory, Including Explanation of Mutual Interactions." 1980 Transactions on Microwave Theory and Techniques 28.4 (Apr. 1980 [T-MTT]): 331-338.

Bethe's small aperture coupling theory, modified by Cohn for large coupling apertures, is improved by including correction terms obtained by averaging the fields over the large aperture. Additionally, inclusion of nonempirical thickness correction factors derived previously by McDonald give coupling formulas which result in theoretical predictions for multiaperture couplers substantially in exact agreement with experiment (correcting small discrepancies previously noted by the author in a 1968 paper). This agreement is now so close that it becomes possible both to identify and explain the mutual interaction effects between closely spaced apretures in multiaperture couplers. It is shown that the mutual interaction is due to contradirectional (or backward) waves in the secondary arm, so that multiaperture interactions are manifested as elimination of the self-interactions of the individual apertures (since the high directivity of typical multiaperture couplers implies negligible backward wave amplitude).

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