Abstracts

Higher-Order Evaluation of Dipole Moments of a Small Circular Disk (Correspondence)

W.H. Eggimann. "Higher-Order Evaluation of Dipole Moments of a Small Circular Disk (Correspondence)." 1960 Transactions on Microwave Theory and Techniques 8.5 (Sep. 1960 [T-MTT]): 573-573.

Bethe was the first to calculate the induced electric and magnetic dipole moments if a plane wave falls upon a circular hole in an infinite plane screen. The corresponding complementary problem of a circular disk can then be solved using Babinet's principle. In some recent experimental work on circular disks in a rectangular waveguide large discrepancies between experimental and theoretical results were found when Bethe's theory was used particularly for disks, where ka>0.5 (a=radius of the disks, k =2μ/lambda). Bouwkamp has shown that Bethe's results can be obtained by using a first order approximation for the surface current distribution on the disk. Following the same procedures, a sixth order approximation in (ka) for normal incidence and a third order approxination for oblique incidence has been found. The detailed results will be presented in a future paper. Here only the expressions for the electric and magnetic dipole moments will be given.

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