Abstracts

Gaussian Beam Imaging with Cylindrical Optics

P.F. Goldsmith. "Gaussian Beam Imaging with Cylindrical Optics." 1985 MTT-S International Microwave Symposium Digest 85.1 (1985 [MWSYM]): 173-174.

We review the propagation of Gaussian beams of radiation through asymmetric elements which focus in only one direction perpendicular to the axis of propagation: these are most commonly cylindrical lenses or mirrors. We develop formulas for Gaussian beam imaging with fixed total distance between input and output waists, and use them to derive simple expressions for the case where the input and output waists are located in the same plane. This situation is required for correcting the beam patterns of certain types of feedhorns to improve the symmetry of their radiation patterns, as well as for the illumination of asymmetric antennas. A cylindrical lens has been used to transform the symmetric beam of a 100 GHz scalar feedhorn into an elliptical pattern; the results are in good agreement with the imaging formulas and demonstrate the utility of this technique.

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