Abstracts

Normal Modes in an Overmoded Circular Waveguide Coated with Lossy Material

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The normal modes in an overmoded waveguide coated with a lossy material are analyzed, particularly for their attenuation properties as a function of coating material, layer thickness, and frequency. When the coating material is not too lossy, the low-order modes are highly attenuated even with a thin layer of coating. This coated guide serves as a mode suppressor of the low-order modes, which can be particularly useful for reducing the radar cross section (RCS) of a cavity structure such as a jet engine inlet. When the coating material is very lossy, low-order modes fall into two distinct groups highly and lowly attenuated modes. However, as a/lambda (a = radius of the cylinder; lambda = the free-space wavelength) increases, the separation between these two groups becomes less distinctive. The attenuation constants of most of the low-order modes become small and decrease as a function of $lambda^2/a^3$.

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