Abstracts

Excitation and Scattering of Guided Modes on a Helically Corrugated Dielectric Cylinder

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The excitation and scattering of guided modes on a dielectric cylinder with a helical corrugation are investigated. A finite number of radiation modes and an infinite number of surface modes are considered, with the consequence that both the amplitude and phase of the interacting modes can be evaluated. The effect of the pitch angle on the coupling and conversion between the guided modes and the radiation modes of various polarizations is investigated. It is found that TE/sub 0/ guided modes undergo a Brewster phenomenon in the low permittivity dielectrics. The power conservation relation is developed and the reciprocity relations are treated. The aperture fields are used to study the radiation characteristics of a novel dielectric-helix antenna capable of yielding a circularly, elliptically, or linearly polarized radiation.

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