Abstracts

Millimeter-Wave Mode Conversion by a Solid-State Magnetoplasma

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Solid-state magnetoplasma devices have been recently proposed as phase-shifters, isolators, filters, and circulators for use at millimeter and sub-millimeter wavelengths. We herewith report observations of phenomena indicating that magnetoplasmas can also be utilized to efficiently transduce millimeter and submillimeter energy from one waveguide mode to another present microwave devices which accomplish this function are mechanical in nature and are thus subject to wavelength limitations imposed by dimensional tolerances. Besides circumventing such limitations, magnetoplasma mode-conversion devices have the additional advantage of being magnetically controllable. In the present paper, we consider one-port conversion from the circular TE/spl circle/ /sub 01/ mode to the circular TM/spl circle//sub 01/ mode. The basic principle is, however, also applicable to two-port conversion and to several other choices of waveguide geometry and mode-pair.

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