Abstracts

Twist Modes in Magnetoplasma-Filled Circular Waveguides

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The properties of the axially symmetric normal modes of a circular waveguide containing an axially magnetized gas or solid-state plasma (i.e., the so-called Faraday configuration) are examined. Of particular interest is the fact that transverse electric fields demonstrate a characteristic twisting wave motion rather than the more familiar rotating motion of the circularly polarized TE°/sub 11/ limit modes or the undulating motion of the normal modes of an empty waveguide. Modes demonstrating this unique wave motion are termed "twist" modes. Within a restricted range of magnetic field, twist modes divide into evanescent (TE-limit) modes and low-loss propagating (TM-limit) modes. Since wavelengths of propagating modes depend on the axial B field, twist modes in solid-state magnetoplasmas such as InSb may find applications in magnetically tunable millimeter and submillimeter devices.

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