Abstracts

Analysis of Millimeter Wave Phase Shifters Coupled to a Fixed Periodic Structure

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The propagation characteristics of an active plasma-induced millimeter wave phase shifter coupled to a fixed periodic structure are discussed. The numerical calculation is based on an improved boundary value solution. Like a normal dielectric slab waveguide with a plasma layer, the grating waveguide displays a phase shift with the increase of the plasma density. This phase shift due to the significant change of the field distribution has an impact on the modal attenuation coefficient. It results in the scanning of the radiation beam in the vicinity of the second Bragg. Especially, at both weak and strong plasma densities when the mode losses are small, the resonances caused by the periodic structure do not appear to be weakened. The results can be used to design electronically controllable millimeter wave scanning antennas.

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