

RADIATION CHARACTERISTICS OF MICROSTRIP ANNULAR CORRUGATED SLOT ANTENNA IN WEAKLY IONIZED PLASMA MEDIUM

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Abstract:

With the advent of communication engineering techniques of microwave antenna have developed to a great extent. Consequently the microstrip antennas are utilized in various diverse applications these days. It may be mentioned that the strong revival of research and development in the region of microstrip antenna attributed to the argent need for the new technology.

Now a day due to keen interest in research and development in the area of communication engineering, considerable effort has been confined to investigate the problem related to the annular corrugated slot antenna. The corrugated surface antennas utilize a surface wave guide by a corrugated surface. Such antenna can be analyzed by considering first, the corrugated rectangular waveguide. If the width of the teeth and grooves are uniform along the wave-guide, the corrugated surface is periodic. Thus in this case the fields within the wave-guide have a periodicity. These corrugated surfaces may have different shapes; the annular corrugated surface is one of them. This surface has several advantages over other corrugated surfaces. It may be noted that the presence of plasma medium during the voyage of this antenna may modify the essential characteristics of the antenna.

In the present paper the theoretical investigation has been carried out to evaluate the influence of weakly ionized plasma medium on the radiation characteristics of microstrip annular corrugated slot antenna. Since such structure is analyzed by using the surface wave-guide by a corrugated surface, thus for our purpose the concept of corrugated rectangular wave-guide has been utilized. It has been found that the radiation characteristics of microstrip annular corrugated slot antenna is modified significantly due to presence of weakly ionized plasma medium. The directivity of such antenna is also found to increases with increasing the value of ω_p/ω . Further, it is also observe that the directivity and radiation characteristics both depend heavily on collision frequency of weakly ionized plasma medium. The permittivity of plasma medium decreases with increasing collision frequency for particular value of electromagnetic and electronic temperatures.

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