Bias Field/Frequency Characteristic Of Millimeter Wavesemiconductor Resonators At 77K

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Summary

Axially magnetized planar gyroelectric resonators are characterized for both InSb and GaAs semiconductors at 77K. The calculations assume that these materials are represented by the tensor permittivity derived from the Drude model of cyclotron motion in a plasma. Modal information is presented in terms of bias field and signal frequency. Resonance and loss regions are identified. The dependency of the modal characteristics on changing material and geometrical properties of the resonator are illustrated. In order to measure the millimeter-wave properties of the magnetized semiconductor disk, a two port network is analyzed using the Green's function approach. This method is vital in calibrating the semiconductor material before designing magnetized semiconductor junction circulators for high-Tc superconductive circuits