

Bachelors/Master thesis

Ferrite Material Characterization

Motivation

In high-power and high-frequency applications, complex permittivity and permeability are critical parameters for studying the performance of ferrite magnetic structures and for the optimized design of ferrite-core magnetic devices. The combination of high permittivity and high permeability of Mn-Zn ferrite cores leads to some strange effects, including dimensional resonance and skin effect. The measured apparent complex permittivity and permeability could differ significantly from the intrinsic values due to surprising field distributions.

Research topic

To obtain the intrinsic complex permittivity and permeability, the measured data of a ferrite inductor and a ferrite capacitor are usually required. Theoretically, the apparent complex permittivity and permeability can be taken as the intrinsic values when the size of the ferrite inductor and capacitor is very small, because the dimensional effects are less significant for ferrite structures of smaller sizes. However, the measured apparent complex permittivity and permeability are very sensitive to both the size error and the impedance measurement error. This makes the method not very practical when the sizes of the inductor and capacitor are too small.

Your Profile

You are eager to learn. Prior knowledge and experience in the field of Electromagnetics or Electronics is highly appreciated. You will learn about intrinsic characteristic of ferrite materials and different method to characterize complex materials.

Organizational matters

- Start: as soon as possible
- Workplace: at the institute

Contact/Supervision

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