Institute for High-Frequency & Communication Technology

IHCT

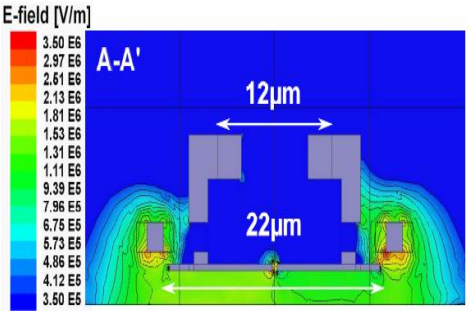
Master-Thesis

Investigation of the Effects of Complex Permittivity on a Split-Ring Resonator at 350 GHz

In the master's thesis, the impact of complex permittivity on a Split-Ring Resonator (SRR) in the frequency range around 350 GHz is investigated. Both the real and imaginary parts of the permittivity are considered, as they each have distinct effects on wave propagation characteristics and the resonator may respond differently to them. The aim of the thesis is to separately analyze the changes caused by the real and imaginary parts and to explore various measurement concepts.

Another important aspect of the work is the potential 2D integration, with particular attention to the size of the circuit. This requires intensive simulation using the electromagnetic solver HFSS and Cadence for the 130nm technology from IHP. The goal is to develop a completed circuit that is ready for manufacturing.

The work has the potential to make significant contributions to the use of THz radiation in biomedical applications, such as bio-sensing and label-free cell monitoring.



Requirements:

- Fundamentals of high-frequency technology.
- Strong knowledge of basic electrical engineering (ET1, ET2).
- Experience with Python for result visualization.
- Good command of English.

Upon completion of the work, there are excellent career prospects in the following areas:

- RFIC-Design
- Sensor design

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