Master's Thesis Proposal

Laboratory for Biomedical Microtechnology – Prof. Dr.-Ing. Thomas Stieglitz

Topic: Simulation of polyimide-based thin-film twisted pair structures for mitigation of electromagnetic interference in neural implants

Introduction

The functionality of integrated chips in foils is dependent on permanently stable electrical contacts and conductor lines on which crosstalk remains low. In the context of neural implants, this is of paramount importance in order to guarantee intended functionality and ultimately to protect patients from unwanted and uncontrolled neural stimulation. Strong electromagnetic interference from outside the human body might result in such uncontrolled behaviour.

Improving the systems' ability to mitigate such external interference can be achieved by employing twisted pair structures, as they are used for high-speed data transmission lines. This work aims to find optimal feature sizes of such twisted pair structures based on thin-film technology by simulation.

Objective

Simulation of thin-film twisted pairs in COMSOL and finding optimal feature sizes

Your tasks

- Learning to work with COMSOL.
- Simulation of simplified model of two conductor lines in COMSOL.
- Simulation of thin-film twisted pairs in COMSOL with focus on inductive and capacitive coupling.
- Finding optimal feature sizes.
- Presenting and writing a thesis.

Your profile

- You are interested in the field of electrical design and simulation.
- You have knowledge about electrical engineering and electronics.
- You ideally have experience with simulations (with COMSOL).
- You can work in a concentrated, focused and structured way.

Logistics

- Location: Campus for Intelligent Machine-Brain Interfacing Technology (IMBIT)
- Earliest starting date: now
- Maximum length of the thesis: 6 months
- Language: German or English

Contact

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