Master Thesis

Höchstfrequenz elektronik

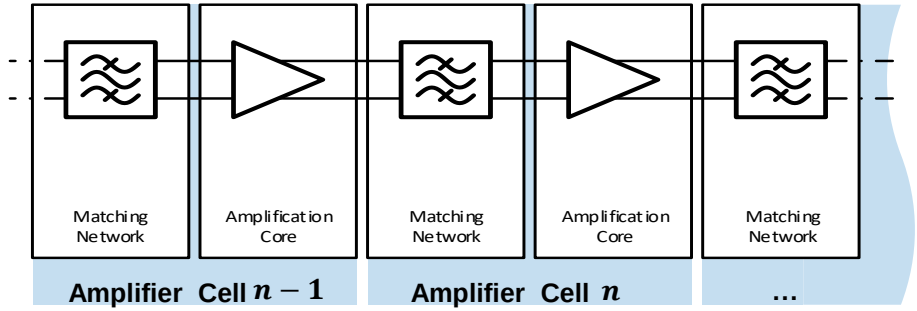
RWTH AACHEN UNIVERSITY

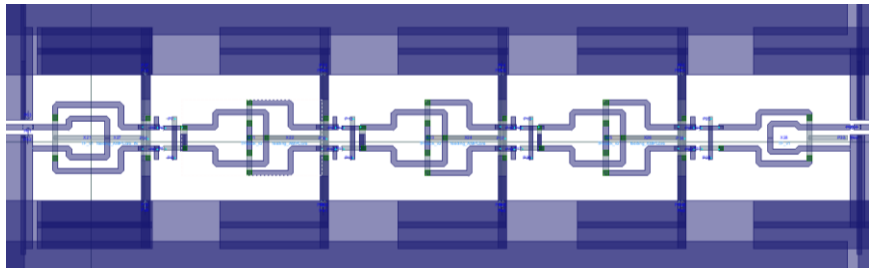
Amplifier Design and Optimization beyond 200 GHz

Background

Due to the increasing need of faster and more broadband communication, the operation in the mm-Wave and sub mm-Wave band is a good solution to provide high data rates in the range of tens of Gbits/s. Furthermore, it enables compact frontend designs, which can be integrated on a single chip. This in turn enables new technologies like wireless chip-to-chip communication which makes the application of high-speed multicore computing devices possible.

Regarding the frontend design, the amplifier design is critical, since it mainly determines the RF performance of the system. Due to the inherent low gain at high frequencies close to the f_{max} of a certain technology, cascaded amplifier structures must be used to provide sufficiently high gain. Therefore, the matching between each stage is crucial, since it mainly dictates the power loss and the achievable bandwidth of the amplifier.





Tasks

The students‘ task is the design of a broadband sub mm-Wave amplifier in the frequency range beyond 200 GHz. A special focus is laid on the optimization of the matching passives. Therefore, the work can be structured as follows:

- Comprehensive literature research on broadband sub mm-Wave amplifier topologies beyond 200 GHz
- Investigation on bandwidth limitations and insertion loss optimization of (interstage) matching networks
- Amplifier design including layout and verification by EM-simulation in a State-of-the-art IC technology

Contact

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