University of Stuttgart
Institute of Robust Power Semiconductor Systems

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Bachelor Thesis, Research Thesis, Master Thesis

ILH RF Group

Design of Passive and Active Components for THz Communication Transceivers

Our research group develops analog frontends for THz wireless communication systems operating in H-band (220-325 GHz).

In scope of the SOLITONIC project, several active and passive components need to be designed to provide the pre-distortion functionalities of the monolithic integrated power amplifier circuit.

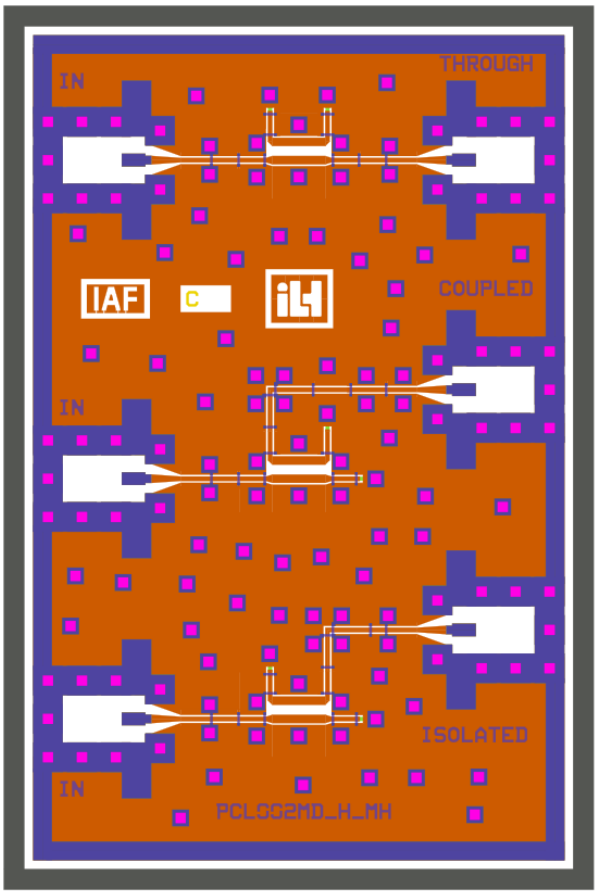
Active:
- Controllable phase shifter and attenuator
- Active power divider
- Buffer amplifier

Passive:
- 2- and 3-way power divider
- 2- and 3-way power combiner
- Coupler

The goal of this thesis is to design and optionally layout some of these components operating at a center frequency of 300 GHz. For that, circuit simulations and electro-magnetic simulations need to be conducted.

You will use the state-of-the-art 35 nm InGaAs HEMT technology from the Fraunhofer Institute of Applied Solid-State Physics, which has cutting-edge high frequency and low noise performance and achieves cutoff frequencies (f_max) of well beyond 1 THz.

The workload will be adjusted according to which kind of thesis you execute.



Previous work at the ILH. The picture shows the layout of quarter-wavelength-couplers in the 35 nm InGaAs HEMT technology from the Fraunhofer Institute of Applied Solid-State Physics. The chip size is 1000 µm x 1500 µm.
[Mario Hüttel, "Design of a Power and Envelope Detector for Ultra Fast Communication Systems in the Low Terahertz Region" Master's Thesis, 2018, p. V.]

SOLITONIC

Fraunhofer IAF

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