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.]

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