

PROJECT ASSIGNMENT BPA34
in the Bachelor's Program EIT

Topic: Concept Development of a Sub-THz Oscillator with Patch Antennas

Task:

For the sub-THz and THz range of 0.1 – 1 THz, powerful oscillators and sensitive detectors are required. This frequency spectrum is particularly well-suited for the security sector for 3D imaging of dangerous objects under clothing, as THz waves are not strongly absorbed by clothing. Another possible application of this frequency spectrum is in communication technology, where high data rates for wireless point-to-point transmission are achievable at these high frequencies.

Measurements in the range of 1 MHz to 67 GHz represent an important basis for device characterization in the field. Additionally, evaluating entire wafers is important for gathering data about uniformity.

As part of this project work, an automated measurement setup for high-frequency measurements will be established. This involves integrating a fully automated wafer prober (MPI TS2000-IFE) with a network analyzer (R&S ZVA67) into a measurement concept.

A Python program will be used to enable automatic measurement of entire wafers. This will involve adapting or expanding an existing program (jS-Parameter).

In the first step, the existing program will be adapted to the modified measurement hardware, and its functionality will be tested. After that, a conceptual plan for the expansion to include automatic stepping will be developed and ultimately implemented. Particular attention must be paid to the needs of users and measurement scenarios.

Additionally, detailed documentation of the program code must be created.

The functionality will ultimately be demonstrated on a wafer with existing resonant tunneling diodes. The collected data will be analyzed with a focus on uniformity.

Furthermore, the measured diodes will be integrated into a circuit model as part of the work.