

Master Thesis Project

Design, fabrication and measurements of passive elements based on planar Goubau line at terahertz frequencies

- Master Thesis / Diploma Thesis
- Credits: 30 hp
- Requirements: Successfully completed undergraduate studies in engineering physics, electrical engineering or a related area, and at least earned 45 credits in the master's program. Previous experience in microwave measurements is of great advantage.

Background:

At Terahertz (THz) frequencies, conductor losses increase with frequency, making crucial to reduce the losses, especially for the case of metallic planar circuits. A metallic planar waveguide which has shown to minimise losses at THz frequencies is the planar Goubau line (PGL). This waveguide, consisting on a single conductor, has already some proposed passive elements, (like filters, resonators and couplers), but they have seldom been designed for frequencies around 1 THz, where research gets both interesting and challenging.

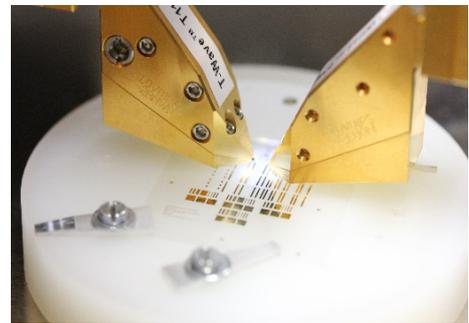


Figure 1: THz probes measuring planar Goubau lines at our labs.

One of the reasons why there isn't much developed at 1 THz, is that measurements require extremely high-performance equipment, which only a handful of research institutions around the world have. Fortunately, at Chalmers University, we have such equipment at the Kollberg laboratory, in the MC2 department, enabling to explore the possibilities of THz planar circuits.

The master thesis consists of:

- Theoretical study and literature review
- Passive element design for the planar Goubau line.
- Clean room fabrication of the designed passive elements.
- S-parameters measurements of the fabricated structures up to 1.1 THz.

This master thesis is an excellent learning opportunity for a master student who wants to work at the edge of RF design—at THz frequencies—and provides enough flexibility to allow creative solutions for tomorrow's technological needs.

Supervision:

Juan Cabello-Sánchez (juancab@chalmers.se) and Helena Rodilla (rodilla@chalmers.se)
Terahertz and Millimetre Wave Laboratory, MC2, Chalmers

Feel free to contact us for more information!