

HiWi - Student Assistant

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Resilient Communication Systems



TECHNISCHE
UNIVERSITÄT
DARMSTADT

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Design of Liquid-Crystal-based Metasurfaces under Realistic Conditions



Job Description

Metasurfaces, also known as intelligent reflecting surfaces (IRSs), have recently received significant interest as a cost and power-efficient solution to enable programmable wireless signal propagation environments. One of the methods to implement an IRS is using liquid crystals (LC) due to their low cost and energy consumption.

Despite the many advantages of LC-IRSs, there are some challenges associated with this technology. For instance, the time response of liquid crystals is significantly higher compared to other materials, resulting in interference (as shown in Fig 1) when changing the set of phases in the elements. Moreover, they are affected by changes in temperature, particularly relevant for outdoor applications. The design and performance characterization of LC-IRSs under the aforementioned realistic conditions have not been conducted so far in the literature and constitutes the main objectives of this project.

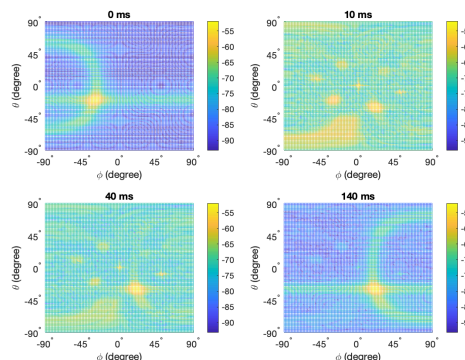


Figure 1: Transition of the LC-IRS reflection pattern from one phase-shift configuration to another.

Prerequisites

Scientific skills	Basic knowledge of digital communication systems
Programming skills	Experience in MATLAB programming
Language skills	Fluent in English
Supervisor	Mohamadreza Delbari

Interested applicants are encouraged to submit their academic transcripts, and a brief statement outlining their interest in the position to mohamadreza.delbari@rcs.tu-darmstadt.de.