



DLR – DAAD Fellowships

Fellowship No. 566

Research Area : Space

Research Topic: **Fully reconfigurable transmit arrays for air- and spaceborne SAR systems**

DLR Institute: Microwaves and Radar Institute, DLR Oberpfaffenhofen

Position: Doctoral Fellow

Openings: 1

Job Specification: Transmit arrays are surfaces used in antenna systems which are capable of manipulating the phase of the incident electromagnetic wave. This allows, for example, beam shaping to produce a high gain antenna. Transmit arrays consist of an array of unit cells, which can be passive or reconfigurable. Unlike phased arrays transmit arrays do not require a feeding network, which reduces the overall losses in the system.

The aim of this PhD topic is to investigate the suitability of transmit array antennas for future synthetic aperture radar (SAR) systems, particularly concerning space-borne systems using modern beam scanning techniques. This includes an extensive analysis of the current state of the art and an in-depth theoretical modeling of such antenna systems. In order to have full pattern synthesis control, the development of new unit cells, capable of manipulating both phase and amplitude is necessary. Based on that, a fully reconfigurable transmit array should be developed and integrated into an experimental radar demonstrator.

The candidate is expected to develop electromagnetic models of such antenna systems as well as analyze and optimize the configuration for certain use cases. Moreover, the candidate has to develop an experimental transmit array in hardware and demonstrate its potential and limits using a ground based SAR system.

Required Qualification:

- Master Degree in Electrical Engineering and Information Technology, with focus on antenna design
- Background knowledge in electromagnetic modelling (theory and simulations)
- Experience in antenna engineering, theory and especially in simulation programs Ansys HFSS and CST Microwave Studio
- Deep understanding in microwave circuit theory and design
- Experience in basic SAR processing techniques

Advantageous Skills:

- Applicants should have good interpersonal and communication skills and should be able to work in an international and interdisciplinary environment, both independently and as part of a team
- Experience in antenna measurements preferably in Compact Test Ranges

English competence: See requirements on www.daad.de/dlr

Earliest Start Date: January 1st, 2023

Application Deadline: December 1th, 2022

Further Information: <http://www.dlr.de>
<http://www.daad.de/dlr>

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