



## PhD Position

### Study of 300-GHz electronically reconfigurable transmitarray antennas in monolithic technology

Due to the scarcity of electromagnetic spectrum resources and the need of broad bandwidth for high data-rate communications, the millimetre wave (mm-wave) and sub-THz bands from 30 to 350 GHz are very attractive for 5G and beyond 5G applications. In this context, high gain electronically reconfigurable antennas with self-alignment, beam-steering, multi-beam, or beam-forming capability are required.

Typically composed of one or more radiating surfaces illuminated by one or more focal sources, transmitarrays (also called discrete lenses) are a recent cutting-edge antenna concept. They are realized typically using multilayer printed circuit technologies compatible with the integration of the active devices (diodes, MEMS, NEMS, semi-conductors, etc.). These devices can be used to control the electromagnetic field on the array aperture with excellent performance (bandwidth, cross-polarization level).

The main scientific & technical objectives of this PhD thesis are the following: first experimental demonstrations (1) of highly efficient (70%) and highly directive (gain > 43 dBi) flat antennas at 300 GHz, (2) of ultra-flat transmitarray antennas, and (3) of self-alignment techniques for highly-directive antenna beams.

The PhD candidate will be hosted in the Antennas and Propagation group of CEA-LETI and will benefit from state-of-the-art CAD softwares, computing stations, RF equipments and anechoic chambers. CEA-LETI is a world-leading research institute in silicon technologies with state-of-the-art clean room facilities and close links to industrial partners in the field. The thesis will be carried out in collaboration with the University of Rennes I (Prof. Ronan Sauleau). CEA and IETR (university of Rennes I) have a very strong and unique expertise on transmitarray antennas. The previous realized studies from 2006 demonstrated the potentiality of transmitarrays in X-band (8-12 GHz), in Ka-band (28-40 GHz), V-band (50-70 GHz), E and D bands (110-170 GHz). The position is open to outstanding students with Master of Science, "école d'ingénieur" or equivalent degree. The student must have a specialization in the field of telecommunications, microwave and/or electromagnetic waves.

#### Host Laboratory

CEA-LETI, Antennas and Propagation Laboratory, <http://www.cea.fr/>  
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