



PhD position at IEMN Laboratory

High-speed, antenna-enhanced mid-IR detectors

In recent years, the Mid-Infrared (MIR, ~3-12 μ m) region of the electromagnetic spectrum has attracted a lot of interest for several applications, including molecular gas sensing, free-space communications and military countermeasures. To help these applications a fundamental building block is missing: there is a lack of high-speed detectors in the MIR spectral window, with RF bandwidths in the tens of GHz range or more. The main objective of this project is to try filling this gap through the realization of ultra-broad bandwidth (>50GHz) multi-quantum well detectors based on intersubband transitions in III-V semiconductor materials. The detectors will target mainly the long-wave infrared spectral range (LWIR – 8-12 μ m) and will operate as heterodyne receivers coupled to MIR plasmonic nano-antennas that will allow increasing the device collection area beyond its physical size. In this way it should be possible to minimize the RC time constant without compromising the external quantum efficiency.

For this position we seek a motivated student with have a solid background in classical electrodynamics, semiconductor physics and optoelectronics. Experience in cleanroom fabrication is a plus. The work will be mainly experimental, and will include the fabrication of the devices in cleanroom environment and their electrical and optical characterisation. A significant part of the activity will be dedicated to electromagnetic modelling using FEM and FDTD simulation codes.

The candidate will work within a team of researchers in the THz-Photonics group at IEMN Laboratory (<https://photoniquethz.iemn.univ-lille1.fr/en/>). The group has a strong experience in the conception and realization of THz optoelectronic devices, and is fully equipped to carry out this project, including microwave and mm/sub-mm-wave probe-stations, MIR and THz laser sources and detectors. The Laboratory hosts a 1500m² clean-room with state of the art growth and fabrication facilities. IEMN is located in Lille, the capital of French Flanders, a nice city close to the Belgian border at 50min by train from Paris-CDG airport.

Starting date: January 2017

Applications, including a CV and a recommendation letter should be sent to:
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