

Plasmonics and Metasurfaces for Solid State Lighting LEDs

Internship job offer for bachelor and master students in the field of photonics, electronics, electrical and telecommunication engineering

Lumileds R&D is searching for graduate and undergraduate students willing to contribute to the solid state lighting industry. The student/s will work in a high tech industry facility together with a professional research team of electrical engineers and physicists. The specific research project they are asked to participate in relates to plasmonics for Solid State Lighting applications with particular focus on the coupling of plasmonics to luminescent Quantum Dots (QDs) and Quantum Wells (QWs). Investigations on light-matter interactions have revealed a number of strong resonant coupling regimes in schemes involving quasi-particles such as surface plasmons, excitons, polaritons and combinations thereof. Most notably, some of these regimes are achieved by means of surface lattice arrangements of metallic nanostructure arrays (or nanoantenna arrays) wherein the hybridization between molecular excitons and surface lattice resonances has been observed. The properties of these resonant coupling regimes fall at the heart of quantum condensed state of light and matter. Of particular interest are those properties that enable the development of more efficient and highly tunable nanoscale light sources by introducing the ability to control key features such as photon energy, spectral width, directionality and polarization. The fundamental platform to establish this conveniently comprises the coupling interaction between pump light, QDs and metallic nanostructure arrays. Demonstrations have shown that emitted light from the QDs can be enhanced and controlled by structuring the metal to sustain surface plasmons that resonate with the emission. Spatial positioning is critical due to the deep sub-wavelength scale confinement of the surface plasmon resonant fields. This challenge has been tackled by the use of thin film luminescent layers of QDs deposited on substrates with metal nanoantennas supporting surface lattice resonances.

Responsibilities:

- Support research team on the theoretical analysis of photoluminescence materials
- Develop and test photoluminescence InGaN based LED models
- Model calibration
- Data processing

Skills: Skills: English, computational engineering, optics, photonics, device physics.

Administrative requirement: **Eligible or have a legal permit or able to obtain a legal permit to work in Germany** without the help of Lumileds.

Starts as soon as possible. Assignment duration: 6 months to 1 year depending on interest and 2availability. Interested candidate, please contact Toni López (toni.lopez@lumileds.com).

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