

## Project 6.2 Design, fabrication and characterization of arrays of micro light emitting diodes

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**www:** <https://www.unipress.waw.pl/mbe/en>

### Background:

The project is devoted to the development of technology for the fabrication of monolithically integrated, addressable micro- and nano-LED arrays that emit visible light. Micro-LED arrays will find wide applications in bright high-resolution displays, wireless Li-Fi communications or augmented and virtual reality glasses. Applications for nano-LED arrays are seen in optogenetics, super-resolution microscopy, maskless photolithography, and chemical and biomedical sensors. The developed technology will allow LED arrays to be placed sequentially, one on top of the other, emitting light at different wavelengths.

The technology, under development, is based on the growth of thin crystalline layers of (Al,In)GaN by molecular beam epitaxy and advanced processing methods. At the heart of the proposed solution are tunnel junctions that, when grown directly on a light-emitting layer, change the type of conductivity and allow the growth of another light-emitting layer with a different wavelength.

### Aim:

The project will be carried out within the framework of the First Team project entitled "Monolithic integration of multicolor micro- and nano-LED arrays". The PhD student will conduct growth by means of molecular beams epitaxy of nitride structures and their characterization. In addition, she will perform computer simulations to analyze and understand experimental results.

### Requirements:

- Master's degree in physics or materials engineering or electrical engineering (or equivalent to enter a PhD program in physics in the country of issue),
- very good knowledge of English,
- programming skills in one of the following languages: Python, C++ or similar,
- knowledge of semiconductor physics.