Zinc Oxide For TeraHertz Cascade Devices

Fact Sheet

Project Information

Zoterac
Grant agreement ID: 665107
Status
Closed project
Start date
1 September 2015
End date
29 February 2020

Funded under
H2020-EU.1.2.1.

Overall budget
€ 3 795 877,44

EU contribution
€ 3 795 876,94

Coordinated by
CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE CNRS
France

Objective

The terahertz (THz) spectral region, located between the infrared and the microwave regions, is known as “the THz gap” because of the lack of compact semiconductor devices. This spectral domain is currently intensively explored in view of its potential for medical diagnostics, security screening, trace molecule sensing, astronomical detection, space-borne imaging, non-invasive quality control or wireless communications. A prerequisite for public-domain applications to emerge in the strategic THz frequency range is the availability of compact size semiconductor sources operating at room temperature, which is out of range of the current technology based on GaAs quantum cascade lasers.

ZOTERAC proposes a disruptive approach based on ZnO-based nano-engineered semiconductors in order to realize THz emitters operating at room-temperature with milliWatt output power capability as well as THz quantum detectors with unprecedented large operating temperatures. These devices are based on the
quantum cascade concept and take benefit of the large optical phonon energy of ZnO (twice that of GaAs) for achieving high temperature operation. Establishing a new state-of-the-art for the design, growth and processing of ZnO/ZnMgO heterostructures, and developing an advanced know-how on oxide-based devices are major challenges of the project. The consortium regroups world-class academic experts on ZnO technologies, quantum cascade lasers and detectors as well as THz optoelectronics. The strategies have been chosen based on a careful assessment of the risk attached to all tasks and achievement of targeted objectives at each stage of the project. This project which implies a strong expertise in basic physics, chemistry and engineering, is expected to generate high impacts in terms of scientific and technological achievements.

Field of science

/natural sciences/chemical sciences/inorganic chemistry/inorganic compounds
/natural sciences/physical sciences/electromagnetism and electronics/semiconductor device
/natural sciences/physical sciences/electromagnetism and electronics/electrical conductivity/semiconductor
/natural sciences/physical sciences/electromagnetism and electronics/optoelectronics
/natural sciences/physical sciences/optics/laser physics

Programme(s)

Call for proposal

H2020-FETOPEN-2014-2015-RIA

Funding Scheme

RIA - Research and Innovation action

Coordinator

CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE CNRS

Address
Rue Michel Ange 3
75794 Paris

Activity type
Research Organisations

EU contribution
€ 1 532 742,44
# Participants (4)

<table>
<thead>
<tr>
<th>Institution</th>
<th>Country</th>
<th>EU contribution</th>
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<tr>
<td>UNIVERSITE PARIS-SACLAY</td>
<td>France</td>
<td>€ 306 251</td>
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<td>EIDGENOESSISCHE TECHNISCHE HOCHSCHULE ZUERICH</td>
<td>Switzerland</td>
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