Silicon-photonics-based laser spectroscopy platform: towards a paradigm shift in environmental monitoring and health care

Scheda informativa

Informazioni relative al progetto

INSPECTRA

ID dell’accordo di sovvenzione: 267853

Statuto
Progetto concluso

Data di avvio: 1 Aprile 2011
Data di completamento: 31 Marzo 2017

Finanziato da
FP7-IDEAS-ERC

Bilancio complessivo
€ 2 183 000

Contributo UE
€ 2 183 000

Ospitato da
UNIVERSITEIT GENT
Belgio

Obiettivo

The Principal Investigator and his team will open up new horizons in the field of laser spectroscopy through basic research on silicon-photonics-based Spectroscopic Systems-On-Chip (SpecSOC’s). The key question being addressed is: how can the powerful concepts of high-index-contrast nanophotonics be combined with the extreme accuracy of silicon technology and with the performance of hybrid silicon/III-V integration in order to create system-on-chip functionalities for advanced (bio-)spectroscopy.

We will first focus research on integrated lasers or Laser Systems-on-Chip (LaSOC’s) capable of providing very wide wavelength tuning in the infrared, mid-infrared or visible. These lasers will have an unprecedented combination of properties. They will differ from existing semiconductor lasers in the sense that they combine the best of III-V semiconductor technology and silicon technology in unique
cavity structures exploiting high index contrast in three dimensions. In the second phase of the project we will shift the focus from laser-oriented novelty to spectroscopy-oriented novelty and investigate SpecSOC’s with an unprecedented system performance that matches the requirements of mainstream real-life spectroscopy. We will explore coherent optical detection techniques for sensitivity enhancement, microporous coatings for on-chip gas sensing and implant-oriented tissue spectroscopy.

Our research will lead to a paradigm shift in laser spectroscopy, in the sense that it will turn an advanced spectroscopy system into a small form-factor commodity system. This will have an enormous impact on applications such as point-of-care medical diagnosis and medical implants, monitoring of air, water and food quality. Furthermore the on-chip spectroscopy systems will be highly valuable for fundamental research.

**Campo scientifico**

/ingegneria e tecnologia/ingegneria dei materiali/rivestimenti e pellicole
/scienze naturali/scienze chimiche/chimica analitica/spettroscopia
/ingegneria e tecnologia/nanotecnologia/nanofotonica
/scienze naturali/scienze chimiche/chimica inorganica/composti inorganici
/scienze naturali/scienze fisiche/elettromagnetismo ed elettronica/conduttività elettrica/semiconduttore
/scienze mediche e della salute/biotecnologia medica/bioprodotti medici/impianti
/scienze naturali/scienze fisiche/ottica/fisica dei laser

**Programma(i)**

**Argomento(i)**

**Invito a presentare proposte**

ERC-2010-AdG_20100224

**Meccanismo di finanziamento**

ERC-AG - ERC Advanced Grant

**Istituzione ospitante**

UNIVERSITEIT GENT
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<td>Sint Pietersnieuwstraat 25, 9000 Gent</td>
<td>€ 1 981 400</td>
<td>Higher or Secondary Education Establishments</td>
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<tr>
<td>INTERUNIVERSITAIR MICRO-ELECTRONICA CENTRUM</td>
<td>Kapeldreef 75, 3001 Leuven</td>
<td>€ 201 600</td>
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