Funded under:
H2020-EU.2.1.1.1. - A new generation of components and systems: Engineering of advanced embedded and energy and resource efficient components and systems

Thermally Integrated Smart Photonics Systems

From 2015-02-01 to 2018-07-31, closed project | TIPS Website

Project details

**Total cost:**
EUR 5 230 041,25

**EU contribution:**
EUR 5 230 041

**Coordinated in:**
Ireland

**Topic(s):**
ICT-02-2014 - Smart System Integration

**Funding scheme:**
RIA - Research and Innovation action

Objective

The objective of this proposal is to develop and demonstrate a scalable, thermally-enabled 3D integrated optoelectronic platform that can meet the explosion in data traffic growth within ICT. The Thermally Integrated Smart Photonics Systems (TIPS) program will heterogeneously integrate micro-thermoelectric coolers (μTEC) and micro-fluidics (μFluidics) with optoelectronic devices (lasers, modulators, etc.) in order to precisely control device temperature and thus device wavelength compared to commercially available discrete technology.

Data traffic is projected to increase sharply (40-80× by 2020) and this is driving an increase in network complexity and the requirement for scalable optoelectronic integration. A major bottleneck to this large scale integration is thermal management. Active photonic devices generate extremely high heat flux levels (~1 kW/cm2) that must be efficiently removed to maintain performance and reliability; furthermore, active photonic devices must be controlled at temperature precision better than ±0.1°C. Today’s thermal technology is at the limit and cannot scale with growth in the network. As a comparison, electronics produce lower heat flux levels (~100 W/cm2) and have a less restrictive temperature requirement of ≤ 85±2°C. Integration of thermal management onto optoelectronic devices has not been addressed to date in academic or industrial investigations and therefore presents a significant knowledge gap that must be filled to enable impact and ensure the EU is at the forefront of optoelectronic technology. While the end goal is driven by telecom or datacom industrial requirements there are many scientific knowledge gaps that will be filled by the TIPS consortium. The application space for a thermally-integrated smart optoelectronic solution is large and spans multiple communication length scales from long reach to inter/ intrachip communications as well as other applications like sensors that seek to leverage silicon photonics platforms.

Related information

**Report Summaries**
Periodic Reporting for period 1 - TIPS (Thermally Integrated Smart Photonics Systems)
Coordinator

UNIVERSITY COLLEGE CORK - NATIONAL UNIVERSITY OF IRELAND, CORK
WESTERN ROAD
T12 YN60 CORK
Ireland
EU contribution: EUR 1 198 696

Activity type: Higher or Secondary Education Establishments
Contact the organisation

Participants

III-V LAB
1 AVENUE AUGUSTIN FRESNEL CAMPUS POLYTECHNIQUE
91767 PALAISEAU CEDEX
France
EU contribution: EUR 794 850

Activity type: Private for-profit entities (excluding Higher or Secondary Education Establishments)
Contact the organisation

NOKIA IRELAND LIMITED
SUITE 3 ONE EARLSFORT CENTRE LOWER HATCH STREET
2 DUBLIN
Ireland
EU contribution: EUR 550 500

Activity type: Private for-profit entities (excluding Higher or Secondary Education Establishments)
Contact the organisation

UNIVERSITAET HAMBURG
MITTELWEG 177
20148 HAMBURG
Germany
EU contribution: EUR 0

Activity type: Higher or Secondary Education Establishments
Contact the organisation

CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE CNRS
RUE MICHEL ANGE 3
75794 PARIS
France
EU contribution: EUR 741 500

Activity type: Research Organisations
Contact the organisation
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<td>Ireland</td>
<td>Lombard Street West 46 8 DUBLIN</td>
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