



Biomedicine and Molecular Biosciences (BMBS)

Participating countries

AT, BE, BG, CH, DE, DK, EE, ES, FI, FR, HR, IE, IT, LT, LV, MT, NO, PL, PT, RO, RS, SE, TR, UK, AU

COST Action BM1205.

European Network for Skin Cancer Detection using Laser Imaging

2013 | 2017

Objectives

- Provide an interdisciplinary framework to enhance interaction activities within the field of optical biosensing, between world-class academic groups, labs and system integrators from industry
- Develop and exploit novel laser sources and innovative imaging platforms such as optical feedback interferometry in specific biomedical applications.
- Exchange knowledge, explore and compare technology platforms and perform clinical validation and evaluation of new devices which will permit detection of both the changes in skin lesions and disordered blood flow patterns and tissue perfusion typical of malignancy

Main Achievements in the first year

- 7 high profile journal publications between Action's partners from different countries with several more in prospect, all acknowledging BM1205 COST Action.
- 8 STSMs between European partners and one special STSM to international partner in Australia.
- Demonstration of THz quantum cascade laser and Interband cascade laser high resolution infrared imaging based on optical feedback interferometry.
- Training School for more than 30 young researchers, with 4 Action's MC members delivering lectures as trainers. Proceedings to be published by Institute of Physics Publishing as a special issue of Physics Scripta journal.
- 2 major workshops: 1) THz and Mid Infrared Radiation and Applications to Cancer Detection Using Laser Imaging, with published Proceeding, and 2) Hyperspectral Imaging in Medicine
- 2 successful joint project grant applications between Action's parties from different countries.

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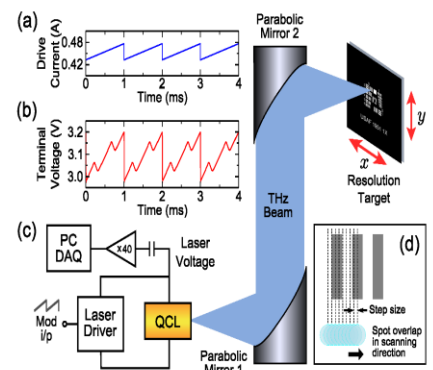
Biomedicine and Molecular Biosciences

COST Office

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Website

<http://www.skin-laser-imaging.org/>



High-resolution imaging system based on self-mixing effect in THz Quantum cascade laser (QCL); adapted from Action's publication in Optics Letters vol 39, issue 9, pp. 2629-2632 (2014).



COST is supported by the EU RTD Framework Programme



ESF provides the COST Office through a European Commission contract



Working Group activities

Working Group 1

- Successful grant application CIP-PSP FP7 Grant CIP-PSP-GA621066 “DIAGNOPTICS: Diagnosis of skin cancer using optics” (Dec 2013-Dec 2016). Budget 4744 K€. Coordinated by UPC (ES), with participation of INPT (FR) and Hospital Clínic (ES), among others.
- STSM U Latvia (LT) - UPC (ES) overview multispectral techniques and devices for skin cancer monitoring.
- STSM UPC(ES) –INPT(FR) within a direct collaboration for combining optical and electronic engineering aspects of laser SMI sensors for skin cancer detection.

Working Group 2

- Successful project application „Ultrafast Infrared Emitter on a Quantum Cascade – FastIQ“, Swiss National Science Foundation“ (April 2014. – March 2016) SCOPES program, Joint Research Projects, ref. no. IZ73Z0_152761. Budget CHF 177 759. Coordinated by CSEM (CH), with participation of ETF (RS) and IMP-RAS (Russia, MC Observers in MP1204).
- First ever demonstration of self-mixing imaging with room-temperature continuous wave mid-infrared interband cascade laser (AU-DE-UK).
- STSM ETF(RS)– UL(UK), development of photon density model in the full transport model of mid-infrared quantum cascade laser – optimisation of higher order effects

Working Group 3

- Methods for swept-frequency characterisation of materials, coherent high-resolution 3D profile imaging and inverse synthetic aperture radar imaging based on self-mixing effect in THz quantum cascade-laser.
- STSMs (PT-LT)– THz time domain spectroscopy and imaging of paraffin-embedded cancer sample tissue. (LA-LI) Study of THz sensor technology for biomedical imaging

Working Group 4

- STSMs- Elaboration of human tissue measurement method based on Near-Infrared Spectroscopy. Tissue screening, especially skin lesions, validation of the method.
- STSM - Use of Dermoscopy and Confocal Scanning Laser Microscopy in Skin Cancer Detection. The use of confocal microscopy in specific clinical cases where additional evaluation of skin tumor is indicated: analysis of recurrent pigmented melanocytic tumors.

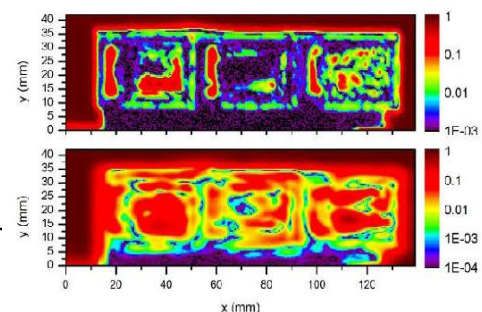
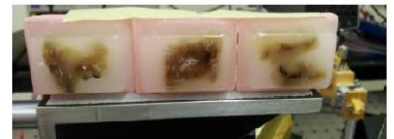
Industry participation

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Gastric tissue, adenocarcinoma pT3. Visible microphotographs of the histo-pathologic sections, THz Imaging at 590 GHz and at 201 GHz. Adapted from Action's publication submitted to the Journal of Molecular Structure.



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