

# PROGRAMME



*This workshop  
is supported by:*

The NATO Science for Peace  
and Security Programme

## Monday 2 November 2015

all day Arrivals and accommodation in Altin Yunus Hotel

## Tuesday 3 November 2015

09:30 Opening Ceremony

10:00 State-of-the-Art in Detection of Explosives, CBRNs and Dual Use Diagnostics (part I)

11:00 Coffee break

11:30 State-of-the-Art in Detection of Explosives, CBRNs and Dual Use Diagnostics (part II)

13:00 Lunch

15:00 State-of-the-Art in Detection of Explosives, CBRNs and Dual Use Diagnostics (part III)

16:30 Coffee break

17:00 Poster session

19:00 Dinner

## Wednesday 4 November 2015

09:30 Quantum Cascade Lasers and Their Applications to Sensing (part I)

11:30 Coffee break

11:30 Quantum Cascade Lasers and Their Applications to Sensing (part II)

13:00 Lunch

15:00 Quantum Cascade Lasers and Their Applications to Sensing (part III)

16:00 Coffee break

17:00 Beyond Quantum Cascade Lasers: Competing Materials and Technologies for THz and MIR Radiation Detection and Applications (part I)

18:30 Dinner

## Thursday 5 November 2015

09:30 Beyond Quantum Cascade Lasers: Competing Materials and Technologies for THz and MIR Radiation Detection and Applications (part II)

11:30 Coffee break

14:00 Lunch

15:30 Workshop conclusions and recommendations

19:30 Dinner

## Friday 6 November 2015

all day Departures

## Tuesday 3 November 2015

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### 09:30 Opening Ceremony

organization details / refund procedure / proceedings publication

## State-of-the-Art in Detection of Explosives, CBRNs and Dual Use Diagnostics

### 10:00 Babak Akhgar

Situational Awareness Frameworks for National Security and Protection of National Critical Security - How Can Early Detection of Threats by THz Devices Help Our Efforts?

### 10:30 Vincenzo Spagnolo

Innovative Quartz Enhanced Photoacoustic Sensors for CBRNs Detection Operating in THz and Mid-Infrared Spectral Ranges



### 11:30 Wojciech Knap

Terahertz Plasma Fets from Basic Physics to First Fast Terahertz Scanners for Detection of Explosives and CBRN

### 12:00 Jeffrey Hesler

THz Transceivers and Their Application to Detection of CBRN and Explosives

### 12:30 Lilian Sirbu

Integrating THz Sensors/Structures through Electro-wetting in Dielectrics (EWOD) for Security Applications



### 15:00 Norbert Pałka

THz Detection and Identification of Dangerous Objects and Substances

### 15:30 Hakan Altan

Compressive Sensing for Detection of Concealed Objects

### 16:00 Kang Liu

Recent Research on Standoff Sensing of CBRN with THz Waves



### 17:00 Poster Session

see the list of posters on the next pages



**Wednesday 4 November 2015**

## **Quantum Cascade Lasers and Their Applications to Sensing**

- 09:30 Manijeh Razeghi**  
World's First mW Power, Room Temperature, Continuous Wave 3.5 THz Diode Laser, Based on QCL Difference Frequency Generation
- 10:00 Christopher Bonzon**  
Recent Progress on Terahertz Quantum Cascade Lasers
- 10:30 Richard Maulini**  
Advances in QCLs Optimized for Chemical Sensing
- 11:00 Juraj Darmo**  
Phase-locked Spectroscopy of THz QCLs



- 12:00 Y. J. Han**  
Development and Applications of THz frequency QCLs
- 12:30 Tomasz Starecki**  
Recent developments in QEPAS: a spectroscopic technique for trace gas sensing
- 13:00 Mauro Fernandes Pereira**  
Microscopic Theory for Interaction of THz Radiation with Semiconductor Materials – from Bulk to Nanostructures



## **Beyond Quantum Cascade Lasers: Competing Materials and Technologies for THz and MIR Radiation Detection and Applications**

- 15:30 Roberto Morandotti**  
THz Field Induced Second Harmonic Coherent Detection Scheme based on a Biased Nonlinear Micro-slit
- 16:00 Elliott Brown**  
Sensitivity and Selectivity in THz Spectroscopy of Bioparticles and Biomolecules
- 17:00 Ramunas Adomavicius**  
THz Emission from Bulk and Nanowire Semiconductor Surfaces
- 17:30 Feo Kusmartzev**  
THz Flux-Flow Oscillators for Detection of Explosive and CBRN Agents
- 18:00 Kouji Nawata**  
Sensitive Terahertz-wave Detection Using Optical Nonlinear Wavelength-conversion for Stand-off Sensing



- 09:30 Lutfi Ozyuzer**  
Terahertz Wave Emission and Detection from Single Crystals of High Temperature Superconducting  $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_{8+\delta}$
- 10:00 Vladimir Matvejev**  
THz Wave Sensing @ ETRO-VUB: Beyond Conventional Limits
- 10:30 Esa Saarinen**  
CBRN Defense Using THz Pulse Trains from Semiconductor Disk Lasers
- 11:00 Guido Giuliani**  
Compact photomixing solutions for generation/detection of mm/THz-waves: monolithic photonic circuits and self-coherent detection



- 12:00 Traian Dascalu**  
Method for Generation Multiple High-Intensity THz Pulses within 1-100 ps Time Range
- 12:30 Ofer Markish**  
Design Aspects of Antennas for THz Bolometers
- 13:00 Anatoli Sidorenko**  
Far Infrared System for Detection of Explosives and CBRN Agents for Post Office
- 13:30 Bernd Fisher**  
THz Spectroscopy for Detection of Explosives and Illicit Substances



- 15:30 Half-day devoted to formulating workshop conclusions and recommendations,** starting with a roundtable in MIR and THz applications in security area problems/possible science for peace proposals. This discussion will go hand in hand with the forum „From Academia to Industry" in which research intensive industrial partners can propose pathways for turning fundamental science presented in the Workshop into concrete development projects for commercialization. They can further express their "industrial wish list" of problems that they feel that academic partners can solve to support their current projects and future commercial endeavours. We already have the following confirmed industrial representatives: New Tera Tech (NTT) (Italy), Alpes Lasers (Switzerland), Virginia Diodes (USA), Julight (Italy) and TeraVil (Lithuania). They will deliver important talks in the program and take part in the forum.

## List of Posters

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### 1. Hakan Altan

Development of a 100m Stand-Off  $\mu\text{m}$ -Wave 3D Imaging System Based on a GDD Array

### 2. Speranta Avram

Fast Computational Chemistry Methods Applied to New Anti-Ebola Virus Entry Drugs Application for New Therapeutic Targets

### 3. Samet Aytakin

Analysis of Active Pharmaceutical Ingredients by Terahertz Spectroscopy

### 4. Juan Antonio Delgado Notario

Plasma Waves Based Transistors for Room Temperature Detection of Explosives and CBRN

### 5. Yigit Demirag

Fast and Accurate Identification of Common Explosives by Principle Component Analysis Using a THz-Tds System

### 6. Yasemin Demirhan

Fabrication of Bi2212 High Temperature Thin Films for Tunable Terahertz Wave Metamaterial Filters

### 7. Antonina Geras

Simplified Lock-in Detection for Qepas Trace Gas Sensing Applications

### 8. Alex Gubin

Submm-Wave Reflection and Transmission Technique for Testing and Monitoring of Biochemical Solutions

### 9. Eduard Hulicius

Microwave Radiation Absorption and Shubnikov-De Haas Oscillations of InAs/Gasb/Alsb Deep Quantum Wells

### 10. Irmantas Kasalynas

Compact Spectroscopic THz Imaging Systems for Detection of Explosives and CBRN

### 11. Irina Khromova

Near-Field Characterization of Micro-Resonators for Terahertz Sensing and Detection Applications

### 12. Kamil Kosiel

Terahertz Quantum-Cascade Lasers for THz Detection of Explosives and CBRN

### 13. Vladimir Matvejev

Bio-chemical Process Monitoring with Terahertz Sensor

### 14. Yildiz Mentese

Compressive Sensing Imaging and Image Fusion At Sub-THz Frequency in Transmission Mode

### Laura Mihai

15. Single-Mode QCL's Beam Delivery Using Hollow Core Waveguide in 3.7 – 7.3  $\mu\text{m}$  Spectral Range;

16. Optical and THz evaluation of components for gas sensing spectroscopy in hazardous environm.;

### 17. Dan Florin Mihailescu

Theoretical Study On Molecular Damage Produced by Radiation Probed by Terahertz Spectroscopy

### 18. Mehmet Ali Nebioglu

Superconducting Metamaterial Based Devices for THz Sening and Detection

**19. Faouzi Ouerghi**

Metamaterial Chemical Sensor for THz Detection of Explosives and CBRN

**20. Irina Protsenko**

Test of Sub-THz Properties of Bioliquids Using Wgm Resonator with Microfluidic Channel

**21. Angelo Sampaolo**

H<sub>2</sub>s Detection From Near-IR To THz Spectral Regions via Quartz -Enhanced Photoacoustic Spectroscopy

**22. Tuğçe Semerci**

Terahertz Wave Sensitive Superconducting Bolometric Detector

**23. Olga Shapoval**

Micro-Size Graphene Strip as a Plasmon-Resonance Sensor of the Bulk Refractive Index

**24. Anna Shevchyk-Shekera**

IR and Sub/THz Spectral Region Mct Detectors for Detecting of Concealed Objects: Chip and Optical Elements Design

**25. Maciej Sypek**

Fast THz Mail Scanner

**26. Anna Szerling**

Ion Implantation for Isolation of Quantum Cascade Lasers for Detection of Explosives and CBRN

**27. Vladimir Tuz**

New Design of All-Dielectric Planar Metamaterial for Sensor Applications

**28. Andres Udal**

Resonant Tunneling Devices as the Promising Sources in THz Gap Bottom for the Security Imaging and Detection

**29. Ilker Umit Uzun-Kaymak**

Investigating of Glow Discharge Detectors (GDDs) as a  $\mu$ m-wave/THz Radiation Detection Tool

**30. Markku Vainio**

Infrared Laser Frequency Combs for Multispecies Gas Detection

**31. Anna Wojcik-Jedlinska**

New Concept of Monolithic Surface Emitting Lasers for MIR Application

**32. J-J Zondy**

CW Optical Parametric Oscillators as Versatile MIR Tunable Source for High-Resolution Molecular Spectroscopy and Sensing