

# 2023 ICTP Winter College on Optics: Terahertz Optics and Photonics



**6 - 17 February 2023**  
**An ICTP Meeting**  
**Trieste, Italy**

Further information:  
<http://indico.ictp.it/event/10058/>  
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Terahertz technology deals with the radiation that belongs to the spectral range confined between the millimeter wave and far-infrared parts of the electromagnetic spectrum. Here, material properties can be exploited for use over a broad range of important technologies and applications.

## Directors:

M. JARRAHI, UCLA, USA  
C. SARACENO, Ruhr University Bochum, Germany

## Description:

Terahertz time-resolved spectroscopy, utilizing ultra-short pulsed lasers, can provide both amplitude and phase information about the material under investigation, as opposed to the standard Fourier-based spectroscopy which is limited to amplitude information. Imaging resolution available with THz is not as good as for x-rays, but it is significantly better than other parts of the spectrum and importantly THz radiation does not cause damage to living tissues. This presents many opportunities in medical imaging alone. THz wavelengths can also connect to the behavior of many organic and/or biological molecules. An important application is in security screening for plastic explosives, particularly at airports. Additionally, the relatively wide bandwidths at these frequencies can aid very high data-rate communications. All of these applications and more will strongly contribute to the UN Sustainable Development Goals.

## Topics:

- Terahertz generation and detection methods, including with Free Electron Lasers
- Passive terahertz components and metamaterials
- Fundamentals of Terahertz Imaging and Spectroscopy
- Material characterization
- Chemical detection
- Non-destructive medical imaging
- High-data-rate and secure communications
- Atmospheric and astrophysics studies
- Security screening
- Non-destructive industrial evaluation

## Local Organisers:

H. CABRERA, ICTP, Italy  
J. NIEMELA, ICTP, Italy

## How to apply:

Online application:  
<http://indico.ictp.it/event/10058/>

Female scientists are encouraged to apply.

## Grants:

A limited number of grants are available to support the attendance of selected participants, with priority given to participants from developing countries. There is no registration fee.

## Deadline:

**11 November 2022**



The Abdus Salam  
International Centre  
for Theoretical Physics  
[www.ictp.it](http://www.ictp.it)  
Trieste, Italy

