

# International school conference “New trends in modern quantum science: from new functional materials to quantum technologies”

From 22 to 30 September 2023, Turin Polytechnic University in Tashkent, in cooperation with the International Centre for Theoretical Physics in Trieste, Italy, the Physics Society of Uzbekistan and the Bukhara State University, organizes an international conference «New trends in modern quantum science: from new functional materials to quantum technology»



The focus of this Summer School is on cutting-edge ideas, new results, current challenges and future perspectives in the field of modern quantum science, with a special focus on

quantum materials and their application in quantum technologies. It is a new and advanced field of research in physics and technology, aimed at using such phenomena of quantum mechanics as confusing states, quantum superpositions, tunneling and quantum interference, which are used in quantum computing, quantum sensing, quantum cryptography, high-precision quantum metrology. and quantum visualization.



This event presents a series of lectures addressed to a wide audience of young researchers (including undergraduates and graduate students, young researchers), as well as scientists from developing countries working on various aspects of the physics of condensed media, materials and technologies. Science as well as statistical and chemical physics. Invited lecturers are world-renowned experts in research. The lectures will be complemented by short presentations by younger participants from developing countries in Central and South-East Asia, the Caucasus and the Middle East.



The event can be seen as part of our efforts to attract advanced topics of modern physics and technology to developing countries with a focus on regions such as Central Asia, the

Caucasus, South-East Asia and the Middle East. Advanced scientific topics, such as quantum science and technology, quantum information, and nano-physics, have not yet taken root in the region. On the other hand, the economies of these countries need people who work and are familiar with materials science, energy conversion and nanotechnology. We believe that the establishment of such a School will help to attract young researchers to these new areas of research. The event will also help strengthen the cooperation of researchers from the above regions with the international academic community of Europe, the USA, Japan and other developed countries.

# Summer School on New Trends in Modern Quantum Science: from Novel Functional Materials to Quantum Technologies



**22 - 30 September 2023**  
**Bukhara, Uzbekistan**

Further information:  
<http://indico.ictp.it/event/10211/>  
smr3877@ictp.it

The focus of this Summer School is on advanced ideas, novel results, current problems, and future prospects in the area of modern quantum science, with a special focus on quantum materials and their applications in quantum technology. This constitutes a new and advanced research area of physics and engineering, aiming at exploiting phenomena of quantum mechanics such as entanglement, quantum superpositions, tunneling, and quantum interference for practical applications: in quantum computing, quantum sensing, quantum cryptography, high precision quantum metrology, and quantum imaging. The lectures will be presented by leading experts on different issues of modern condensed matter physics, quantum science and technology.

## Topics:

- Graphene: Two-dimensional materials and their heterostructures
- Topological insulators
- Quantum Hall effects
- Novel superconducting materials
- Quantum computation and information
- Majorana fermions and topological quantum computation
- Quantum metrology and sensing
- Quantum imaging
- Physics Informed Machine learning for material design and simulation
- Non-Hermitian and PT-symmetric physics in quantum materials
- Non-Equilibrium Quantum Matter
- Quantum networks

Applicants are encouraged to submit an abstract for a poster presentation and/or contributed talk.

## How to apply:

Online application:  
<http://indico.ictp.it/event/10211/>

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.

## Directors:

C.W.J. BEENAKKER, University of Leiden Instituut-Lorentz, Netherlands  
Y. GEFEN, The Weizmann Institute of Science, Israel  
D. MATRASULOV, Turin Polytechnic University in Tashkent, Uzbekistan

## Scientific Contact:

M. KISELEV, ICTP, Italy

## Speakers:

A. AHARONY, Tel-Aviv University, Israel  
S. BANERJEE, Indian Institute of Science, Bangalore, India  
Y. BLANTER, TU Delft, The Netherlands  
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## Deadlines:

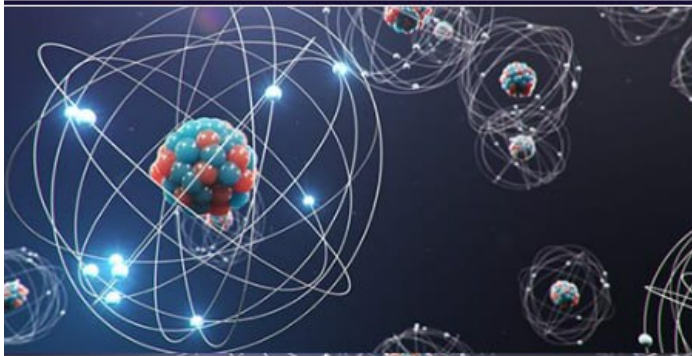
For applicants requesting financial and/or visa support:

**15 July 2023**

For all other applicants:

**1 August 2023**





ICTP Summer School  
on  
New Trends in Modern Quantum Science:  
from Novel Functional Materials to Quantum  
Technologies

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CONTACT

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- **Yuval Gefen**, Weizmann Institute of Science, Israel
- **Mikhail Kiselev**, ICTP, Italy
- **Davron Matrasulov**, Turin polytechnic university in Tashkent, Uzbekistan

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