



# Summer Course on Quantum Technologies



**09.Sep - 11.Sep 2024**

**Cod. Z23-24**

**Mod.:**

Streaming Face-to-face

**Edition**

2024

**Activity type**

Summer course

**Date**

09.Sep - 11.Sep 2024

**Location**

Miramar Palace

**Languages**

English Spanish

**Academic Validity**

30 hours

**Organising Committee**



## Description

The program is designed to provide a comprehensive immersion in the field of Quantum Technologies, specifically addressing its main areas of development: Quantum Computing and Simulation, Quantum Communications, and Quantum Sensing and Metrology.

Through various didactic and participatory sessions, experts in each development field will share their knowledge to provide a comprehensive and rigorous overview of the current state of development of Quantum Technologies and their transformative potential across various sectors.

Throughout the Summer Course, participants will gain a solid understanding of the underlying principles of Quantum Technologies, while examining potential practical applications that could drive significant innovations across multiple domains. From algorithm optimization to applications in information security, the various opportunities offered by these disruptive technologies will be explored.

Additionally, from a more practical perspective, participants will also be introduced to IBM's development kit, Qiskit, an essential tool for creating, manipulating, and executing programs on quantum devices or simulators. This hands-on experience will allow participants to integrate their theoretical knowledge with the skills necessary to address real challenges in the field of Quantum Technologies.

## Objectives

Introducing Quantum Technologies as a new scientific-technological paradigm and presenting its relationship with other emerging technologies.

Present lines of action and general concepts around the main areas of development within Quantum Technologies: Quantum Computing, Quantum Communications, and Quantum Sensing and Metrology.

Presenting IBM's own development kit (Qiskit) with which to design, program, and implement applications for use on quantum computers.

## Organised by



## In collaboration with



# Program

## 09-09-2024

09:00 - 09:15	Registration
09:15 - 09:25	Presentation by the Director of the activity <b>Javier Aizpurua</b>   BasQ - Director
09:30 - 10:45	“Computación y simulación cuántica: visión general y estado del arte” <b>Yassine Hamoudi</b>   Université de Bordeaux - CNRS Researcher in the Quantum Information & Computation group at LaBRI (Université de Bordeaux)
10:45 - 11:15	Pausa-café
11:15 - 12:30	“Computación y simulación cuántica: visión general y estado del arte” <b>Roman Orús</b>   Donostia International Physics Center (DIPC) - Ikerbasque Research Professor
12:30 - 13:45	“Computación y simulación cuántica: visión general y estado del arte” <b>Nicolás Lorente Palacios</b>   Centro de Física de Materiales (CFM) - Research Scientist

## 10-09-2024

08:45 - 08:50	Bienvenida
08:50 - 10:05	“Computación y simulación cuántica: introducción a Qiskit, kit de desarrollo de software para computadores cuánticos de IBM” <b>Voica Radescu</b>   IBM Quantum - IBM Quantum Innovation Centers EMEA Lead
10:05 - 11:20	“Comunicaciones cuánticas: visión general y tecnologías existentes” <b>Eduardo Jacob Taquet</b>   Escuela Ingeniería Bilbao - Professor
11:20 - 11:35	Pausa-café
11:35 - 12:50	“Comunicaciones cuánticas: visión general y tecnologías existentes” <b>Johanna Sepúlveda</b>   Airbus - Senior Expert on Quantum Secured Communications
12:50 - 14:05	“Comunicaciones cuánticas: visión general y tecnologías existentes” <b>Verónica Fernández</b>   Consejo Superior de Investigaciones Científicas (CSIC) - Tenured Scientist

## 11-09-2024

09:00 - 09:05 Bienvenida

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09:05 - 10:35 “Metrología y Sensórica Cuántica”

**Gabriel Molina Terriza** | Centro de Física de Materiales (CFM) - Research Professor

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10:35 - 10:55 Pausa-café

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10:55 - 12:25 “Metrología y Sensórica Cuántica”

**Brahim Lounis** | LP2N - Institut d'Optique - Professor

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12:25 - 13:55 “Metrología y Sensórica Cuántica”

**Daniel Ramos** | Instituto de Ciencia de Materiales de Madrid (ICMM) - Senior Scientist

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13:55 - 14:05 Synthesis

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## Directed by



### **Javier Aizpurua**

Ikerbasque, Profesor

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Ikerbasque Research Professor at Donostia International Physics Center, DIPC, and distinguished researcher at the University of the Basque Country, where he leads the Nanophotonics Theory Group. Javier Aizpurua gained his doctorate in Physics at the University of the Basque Country (UPV/EHU) in 1998 for work on the interaction of rapid electrons and nanostructures. After his pre-doctoral stage, he spent two periods as a post-doctoral researcher, one at Chalmers Technology University in Gothenburg, Sweden, and the other at the US National Institute of Standards and Technology (NIST). In 2004, Aizpurua joined DIPC, the Donostia International Physics Center, as a research fellow, starting to train a nanophotonics group. In 2008 he was awarded a permanent scientific place at the CSIC, taking responsibility for the photonics line of research at CFM, the Materials Physics Centre in San Sebastián, where he worked until 2023. From this year on, he joined Ikerbasque.



### **Igor Campillo ---**

Euskampus Fundazioa, Director

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He is director of Euskampus Fundazioa, founded in 2011 by the University of the Basque Country (UPV-EHU), Tecnalia Corporation and the Donostia International Physics Center (DIPC). He worked as assistant professor in the Faculty of Sciences of the UPV/EHU, international projects manager in Gamesa Energy, researcher and project manager at LABEIN- Tecnalia, project and outreach manager in the Nanoscience Cooperative Research Center- nanoGUNE, manager of the nanoBasque Strategy in the Basque Business Development Agency- SPRI, and director of DeustoTech. He holds a PhD in Physics from UPV/EHU, and a master degree in journalism and science communication from the Spanish Open University. He is the author of more than 70 international scientific publications indexed in the Web of knowledge, and author of 3 international patents. He has been awarded as one of the word-leading “Boundary Spanners” for University Business Cooperation by the University Industry Innovation Network.

## Teachers



**Verónica Fernández**

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**Yassine Hamoudi**

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**Eduardo Jacob Taquet**

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**Nicolás Lorente Palacios**

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**Brahim Lounis**

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**Gabriel Molina Terriza**

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**Roman Orús**

Donostia International Physics Center

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**Voica Radescu**

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**Daniel Ramos**

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**Johanna Sepúlveda**

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# Registration fees

<b>FACE-TO-FACE</b>	<b>UNTIL 31-05-2024</b>	<b>UNTIL 09-09-2024</b>
<a href="#">jounq fee</a>	25,00 EUR	81,00 EUR
General	-	116,00 EUR
<a href="#">Reduced fee regular</a>	-	98,00 EUR
<a href="#">Registration exemptions</a>	-	81,00 EUR

<b>LIVE ONLINE</b>	<b>UNTIL 31-05-2024</b>	<b>UNTIL 09-09-2024</b>
<a href="#">jounq fee</a>	25,00 EUR	81,00 EUR
General	-	116,00 EUR
<a href="#">Reduced fee regular</a>	-	98,00 EUR
<a href="#">Registration exemptions</a>	-	81,00 EUR



## **Place**

### **Miramar Palace**

Pº de Miraconcha nº 48. Donostia / San Sebastián

Gipuzkoa