



# QUANTUM ELECTROMAGNETICS

## Modeling the Nanoscale in the Real World

Quantum science and technology have been steadily growing in relevance and impact in the last two decades and they have already brought significant developments in several areas such as quantum communications, sensing, imaging, and computing (QC). Starting from a brief introduction to the theoretical foundations of the quantum electromagnetics (QEM), the lectures of this course will deal with the study of the quantized EM field and radiation, their description through quantum Maxwell's equation, and the modeling at the nano-scale through quantum numerical methods. In addition, selected examples of quantum technology as applied to real-world topical examples (e.g., quantum radar/lidar, quantum key distribution, and quantum computing for imaging and antenna design) will be overviewed.

- Day 1: QEM: Introduction and Theoretical Basis
- Day 2: QC Methodologies for EM Engineering
- Day 3: QEM: Principles and Modeling
- Day 4: QEM: Applications to Sensing and Communications
- Day 5: QEM: Advanced Topics

### Who Should Attend?

The course is targeted to PhD students, Researchers, Scientists, and Engineers who are willing to (a) learn about the basics of QEM; (b) enhance their background on the modeling of the QEM sources and effects; (c) know about the more recent advances on the use of QC as applied to antennas and EM problems; (d) take an overview on the recent applications QEM in academic and industrial frameworks.

### Lecturers

- **Prof. BOAG Amir**, Tel Aviv University, Israel
- **Prof. CHEW Weng Cho**, Purdue University, USA
- **Prof. GARCÍA MUÑOZ Luis Enrique**, University Carlos III of Madrid, Spain
- **Prof. GRADONI Gabriele**, University of Nottingham, UK
- **Dr. MATTEI Federico**, IBM, Italy
- **Prof. PAVESI Lorenzo**, Quantum Science and Technology Joint Lab. - University of Trento, Italy
- **Prof. ROCCA Paolo**, ELEDIA - University of Trento, Italy & Xidian University, Xi'an, China
- **Dr. TAFURI Francesco**, Keysight Technologies, Italy

### Date and Location

**November 21-25, 2022**

The course will be held in hybrid format both in presence and online, with video recordings made available for each lecture

### Course Coordinators

- **Prof. Amir BOAG**  
Tel Aviv University, Israel
- **Prof. Paolo ROCCA**  
ELEDIA - University of Trento, Italy  
ELEDIA - Xidian University, Xi'an, China

### Registration Types and Fees

- Academic (On-Site): 440 €
- Academic (On-Line): 220 €
- Industrial & Profit institutions: 880 €

### REGISTER @

<https://edu.eledia.org/courses/esoa-2022-madonna-di-campiglio/>

### INFO @

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### Local Organizer

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