

Quantum Electromagnetics for Antennas and Propagation

Abstract

There is currently an explosive advancement in quantum information processing technology that has the potential to revolutionize society through the use of quantum computers, quantum communication systems, and quantum sensors that can outperform the best classical technologies. Antenna and propagation technologies are no exception, with many longstanding challenges potentially becoming addressable using these new quantum technologies. Further, because these emerging devices significantly involve electromagnetic effects there is an important role that classically-trained electromagnetic engineers can play in making these quantum technologies a reality. This workshop aims at looking at both sides of this emerging technology space. Starting from a talk presenting the fundamentals of quantum theory, so building a description of the quantization of electromagnetic fields, the following talks will present recent contributions on quantum array antennas, quantum radar, up to the use of different types of quantum computers to solve electromagnetic optimization problems for antennas and propagation.

Workshop outline:

- The workshop will include 6 talks over two time slots of 1hr 40mins each. Each part will include a first talk of 40mins followed by two talks of 30mins. The first talk of each part will be characterized by more basic/tutorial contents.
- More specifically, the proposed workshop will be organized as follows:

Slot #1

- Prof. Weng C. CHEW (40mins): "Quantum Electromagnetics"
- Prof. Amir BOAG (30mins): "Quantum Array Antennas"
- Prof. Luis Enrique GARCIA MUÑOZ (30mins): "Quantum Radar"

Slot #2

- Prof. Paolo ROCCA (40mins): "From Qubits to Quantum Algorithms for Antennas and Propagation"
- Prof. Gabriele GRADONI (30mins): "Quantum Annealing for Reconfigurable Intelligent Surfaces"
- Prof. Thomas ROTH (30mins): "Electromagnetic Fields for Superconducting Qubits Control"



The 17th European Conference on
Antennas and Propagation
(EuCAP)

26 - 31 March 2023



The short CVs of people speaking is available at the following links:

- Prof. Weng C. CHEW: <https://ieeexplore.ieee.org/author/37087144573>
- Prof. Amir BOAG: <https://ieeexplore.ieee.org/author/37280150700>
- Prof. Luis Enrique GARCIA MUÑOZ: <https://ieeexplore.ieee.org/author/38318566100>
- Prof. Paolo ROCCA: <https://ieeexplore.ieee.org/author/37312597400>
- Prof. Gabriele GRADONI: <https://ieeexplore.ieee.org/author/37565685400>
- Prof. Thomas ROTH: <https://ieeexplore.ieee.org/author/37086574297>