CALL FOR PAPERS - SPECIAL SESSION

"OptiQ – from (nonlinear) optics to quantum computing, simulation, visualization and image processing: on Earth and in space"

for CODIT 2025

July 15-18, 2025 ▪ Split, Croatia

Session Co-Chairs:

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Session description:

This special session deals with the problem of harnessing (non-linear) optical phenomena and quantum technologies to address challenges in advanced data processing, image recognition, and secure communication, both on Earth and in space. At its core, it explores the generation and utilization of entangled photons as pivotal resources for quantum computing and communication, emphasizing their role in achieving beyond-state-of-the-art solutions in image processing and optimization on quantum systems.

The session delves into innovative methodologies for representing and processing images within quantum frameworks, focusing on hybrid quantum-classical approaches. These approaches hold particular promise for satellite imaging and space communication, enabling advancements in areas such as quantum-enhanced data transmission, quantum-secure networks, and space-based sensing technologies.

Additionally, the integration of augmented reality tools for the design and simulation of quantum optical systems is highlighted, aiming to accelerate the visualization and implementation of complex quantum experiments. The overarching goal is to address the interplay between theoretical advancements and their practical applications, fostering a collaborative dialogue between academia, industry, and the space technology sector.

The goal is to create a platform for interdisciplinary collaboration that explores the application of non-linear optics and quantum technologies in solving complex challenges in data processing, image recognition, and secure communication. This session aims to foster dialogue among researchers and practitioners from academia, industry, and the space sector, bridging the gap between theoretical advancements in quantum optics and their practical implementations.

By focusing on cutting-edge topics such as entangled photon generation, quantum image processing, hybrid quantum-classical algorithms, and advanced space technologies, the session seeks to address key challenges in nanosatellite applications, orbital image processing, and the

development of satellite constellations for quantum communication and distributed quantum computing. These efforts aim to leverage quantum systems to enhance space communication networks, improve data acquisition and analysis from orbit, and establish new frameworks for global quantum-secure infrastructures.

Ultimately, the session aspires to stimulate knowledge exchange, promote innovation, and build partnerships that drive the development of groundbreaking quantum solutions for global challenges in science, technology, and industry.

The topics of interest include, but are not limited to:

- Non-linear optics for entangled photon generation.
- Photonic quantum computing for Earth and space applications.
- Quantum image processing, including applications for orbital data analysis.
- Hybrid quantum-classical algorithms including space applications.
- Quantum computation applications in gasification and other chemical processes.
- Nanosatellite technologies, with applications extending to quantum communication.
- Simulation of optical quantum systems and circuits.
- Augmented reality for designing, visualizing and simulating quantum experiments.
- Algorithms for processing data from satellite constellations.

SUBMISSION

Papers must be submitted electronically for peer review through PaperCept by **February 07, 2025:** **http://controls.papercept.net/conferences/scripts/start.pl**. In PaperCept, click on the **CoDIT 2025 link "Submit a Contribution to CoDIT 2025" and follow the steps.**

IMPORTANT: All papers must be written in English and should describe original work. The length of the paper is limited to a maximum of 6 pages (in the standard IEEE conference double column format).

DEADLINES

February 07, 2025: deadline for paper submission

April 27, 2025: notification of acceptance/reject

May 17, 2025: deadline for final paper and registration