

## International Day of Light

Webinar, 18 maggio 2021

### Abstract

#### **Solid-state sources and lasers for photonics applications**

**Prof. Stefano Taccheo**, Politecnico di Torino

This talk will review solid-state sources and lasers for photonics applications, ranging from environmental sensing to manufacturing and from medicine to space applications and basic sciences.

The talk will provide the basic concepts of solid-state lasers, light-matter interaction and examples of applications. Focus will be on fibre laser sources offering compact and rugged solutions for real world applications.

A special part of the talk will discuss use of laser sources and light sources against Covid-19 pandemia, in particular mid-infrared lasers for label-free diagnostic, ultrafast laser systems for scientific investigation and LED light sources for ambient and surface sterilization.

#### **Photoluminescent semiconductor quantum dots synthesized by direct laser patterning**

**Dr.ssa Francesca Limosani**, ENEA C.R. Frascati

Photoluminescent semiconductor nanocrystals, quantum dots (QDs), have received considerable interest both from the point of view of the study of the materials and in terms of industrial needs, especially in photonic applications. The tunable optoelectronic properties of the QDs and the material composition make such nanostructures the ideal candidates to produce advanced light emitting diodes (LEDs). This presentation focuses on the study of the formation of QDs starting from metallo-organic precursors directly within a polymeric matrix using the direct laser patterning (DLP) processes. Moreover, the proper combination between the modulation of the laser beam parameters and the chemical formulation of the mixture adopted to produce QDs allows to synthesize nanocrystals with tunable emission properties, making the DLP methodology particularly suitable in a wide range of industrial fields.

#### **Fiber Bragg Gratings for medical and biomedical applications**

**Dr.ssa Daniela Lo Presti**, Campus Biomedico di Roma

The Smart Healthcare (SH) is an innovative way to provide care by allowing higher empowerment of patients and facing fragmentations in the health system. This approach relies on the use of a new generation of information technologies to transform the traditional medical system in an all-round way, making healthcare more efficient and personalized. Among several smart technologies, wearables have evolved to become one of the biggest industries in the world: their market is expected to grow by 89 million by 2022. This presentation focuses on an innovative approach in the development of wearables for SH applications involving fiber Bragg gratings (FBGs) due to their intrinsic advantages as the immunity to electromagnetic interferences, the inherent electric safety, the high metrological properties, and the multiplexing ability.