Consiglio Nazionale delle Ricerche
Istituto di Scienze Applicate e Sistemi Intelligenti "Eduardo Caianiello"
Sede Secondaria di Napoli

Optics and photonics: from basic to applications

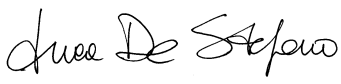
Abstract
Light plays a central role in our everyday lives. On the most fundamental level, through photosynthesis, light can be thought at the origin of the life itself. The study of light properties has led to promising alternative energy sources, lifesaving medical advances in diagnostics technology and treatments, extremely speed internet communications and many other discoveries that have changed the society and shaped our understanding of the universe. These technologies were developed since Newton and Laplace fundamental researches on the properties of light and are now generally codified in the terms of Optics and Photonics. The European Commission recently defined Optics and Photonics as parts of the six Key Enabling Technologies (KETs) of Europe. Indeed, Optics and Photonics have a substantial leverage effect on the European economy and workforce: 20-30 % of the economy and 10 % of the workforce depend on Optics and Photonics. The course will provide a brief excurtion on light from the beginnings to the most recent applications.

Syllabus
- The nature of light: why is the sky blue? (3 hours);
- Light-matter interaction(s) (3 hours);
- Optical resonant structures (3hours);
- Transducing and (bio)sensing (3 hours);
- Final remarks and test (2 hours+1 hour).

Credits: 15 hours, 5 credits

L. De Stefano short CV
Luca De Stefano heads a research team in the fields of biophotonics and optical microsystems for biochemical and optoelectronic sensing. Main topics are the fabrication and characterization of porous silicon based photonic devices; the design and realization of hybrid devices based on bio/non-bio interfaces between polymeric and plasmonic nanoparticles for sensing applications in medical and environmental fields. He presented his work to more than 270 national and international conferences, many of which (>30) he has been invited to. He is author or co-author of more than 190 scientific articles published on peer reviewed journals, more than 90 conference proceedings, and 20 between books and book chapters. He currently has a H-index of 44 and more than 5900 citations indexed by Google Scholar (Hi=39, 4300 citations by SCOPUS). He holds one European patent, three international patents and ten Italian patents. He is coordinator of the Workgroup on Optical Biosensors and Biophotonics and vice-president of The Optical and Photonic Italian Society (SIOF), and member of the European Optical Society (EOS). He is reviewer for many high impact factors scientific journals: Nature Communications, Scientific Reports, Applied Physics Letters, Optics Letters, Optics Express, Small, Advanced Functional Materials, ACS Nano, Biosensors and Bioelectronics. He tutored six PhD thesis and more than thirty master thesis.

Luca De Stefano, PhD



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