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Aula Voci – Dept. of Physics and Astronomy “G. Galilei”

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Light Responsive Polymeric Architectures: novel effects and applications

Some opportunities of using light-responsive polymeric architectures in optics-related applications will be presented, including the biological domain. Several strategies will be shown, aiming at advancing the synthesis and fabrication technology for 2D/3D patterning of functional light-responsive polymers in the form of biocompatible resins, and elastomers exhibiting reversible mechanical variations (e.g. in morphology) when properly irradiated. In the context of biological applications, light-responsive smart substrates are introduced to perturb growth and migration of living cells. It is known that cell-substrate interactions modulate cell behaviour and can induce significant phenotypic changes. Here, an operative platform for implementing a light-driven, real-time perturbation of small to medium sized cancer cell colonies seeded on light-responsive substrates is presented.

On a larger scale, a new type of light-responsive nanocomposite is presented, whose mechanical deformation is fully driven by the polarization of an incident radiation. A millimeter-sized membrane actuator made of this amorphous material is demonstrated to be actuatable in any arbitrary direction, as ruled by the polarization state of the illumination.



Emiliano Descrovi is Associate Professor in Physics at the Department of Applied Science and Technology, Politecnico di Torino, Italy. He obtained his master degree in Physics from the University of Torino in 1999 and the PhD in Microtechnique from the Université de Neuchâtel, Switzerland, in 2005. In 2020-2021 he has been Professor of Photonic Technologies at the Norwegian University of Science and Technology (NTNU), Trondheim.

His research interests falls in the domain of dielectric nanophotonics and light-responsive polymer photonics, targeting novel tunable devices controlled by light. In the past years, he focused on optical phenomena involving surface modes on planar dielectric multilayers. In 2020 he joined the European Optical Society (EOS) board and presently serves as President since September 2024.

Condensed Matter Seminars