



Deliverable

WP5 – Dissemination and exploitation

D5.9 Project literature and posters (1)

Project Information

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Lucia Petti	Coordinator	CNR	26/11/2020	Ok
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Table of content

Document status	1
Table of content	2
Executive summary	3
Deliverable report	3
1 Publication in scientific journals, conferences and workshops	3
1.1. Scientific journals	3
1.2. Scientific conferences	3
1.3. Scientific workshops	3
2 Press releases.....	4
3 Posters	4

Executive summary

The Project literature and posters (1) deliverable is related to Task 5.2 of PULSE-COM project and in particular to dissemination activities conducted up to month 12:

- Publications in scientific journals and conferences and workshops;
- Press releases;
- Posters display at conferences, workshops and seminars.

Deliverable report

This year has been highlighted by the Covid-19 pandemic and its associated constraints through Europe to struggle its spreading. By consequence, lots of events have been cancelled or postponed and the technical work has been delayed due to facilities access restrictions. It resulted in lighter dissemination activities than expected.

1 Publication in scientific journals, conferences and workshops

1.1. Scientific journals

At the moment, only one article has been accepted. It is called “[Plasmonic Photomobile Polymer Films](#)”. It has been submitted to the *Crystals* journal and written by Riccardo Castagna, Massimo Rippa, Fulvia Villani, Giuseppe Nenna, Lucia Petti and Francesco Simoni (*Crystals* 2020, 10, 660; doi:10.3390/cryst10080660).

Another article has been submitted by UGA but not yet accepted. It has been submitted to *Nano Energy*. Its title is “[Dimensional Roadmap for Maximizing the Output Piezoresponse of ZnO Nanowire-Based Piezoelectric Transducers: Impact of Growth Method](#)”. It implies the contribution of Andrés Jenaro Lopez Garcia, Mireille Mouis, Vincent Consonni and Gustavo Ardila.

1.2. Scientific conferences

It has been possible for the consortium to attend some conferences such as:

- [The World Conference on Laser, Optic Science & Photonics](#) (LSP) in, April 2020, ENEA has presented the “Photomobile materials and photonic nanostructures: a way to manipulate light by light”. It has involved Riccardo Castagna, Massimo Rippa and Lucia Petti from CNR and Giuseppe Nenna, Anna De Girolamo Del Mauro, Fausta Loffredo and Carla Minarini from ENEA.

- [CMSE2020 conference](#). INFLPR has recently attended this conference from 20th to 23rd of November in an online event. They have presented a work called: “Very thin silver films on PET and optical glass; obtaining and properties”. This work results from the collaboration of Bogdan Alexandru Sava, Rares Victor Medianu, Lucica Boroica, Marius Catalin Dinca, Ana Violeta Filip, Rovenia Pascu, Antoniu Moldovan, Mihai Oane and Mihai Eftimie; all from INFLPR.

1.3. Scientific workshops

Only one workshop has been remotely attended by Lucia Petti (CNR) in September 2020: the Future Tech Week 2020: Celebrating Future and Emerging Technologies with an eye

to EIC Pathfinder's Future (21st-25th of September 2020). <http://www.fetfx.eu/event/future-tech-week-2020/>. The presentation has been given through a video, now stored on the PULSE-COM YouTube channel and accessible here:



<https://youtu.be/uomppguFXjw>

2 Press releases

At the moment, no press release has been scheduled.

3 Posters

A general promotional poster has been created. It is introduced as the Figure 1.

Based on it, a template has been made and used by Massimo Rippa (CNR) for a Summer School 2020 on "Computational Photonics" in Karlsruhe (Germany) from 21st to 25th of September 2020. The poster is entitled "Nanostructures and Photo-Mobile Materials to manipulate light by light" and introduced in Figure 2.



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PULSE-COM

PHOTO-PIEZO-ACTUATORS BASED ON LIGHT SENSITIVE COMPOSITE

The present project seeks to create a novel paradigmatic class of **photo-deformable polymer composites** coupled with a **piezoelectric layer** for **photo-induced piezo-electric devices** devoted to sensing and/or actuating applications.

THE CONSORTIUM



PROTOTYPES STRUCTURES OF THE PULSE-COM PROJECT

The main objective of this project is to **realize components and devices with different industrial goals**. The project targets a novel and ambitious science and technological breakthrough as a first proof of concept in the new field of photo-activated piezoelectricity.

/ Opto-switch and Opto-valve Systems

The Opto-switch would be used to open and close an electric circuit when light is switched from on to off (or inversely).

The Opto-valve would be able to open and close a fluid circuit when light is switched from on to off (or inversely) without embedded electric power.

/ Reconfigurable Optics Systems

Reconfigurable optics would be used to accomplish completely new tunable and switchable functionalities by means of optical control.

We could be able to realize a sort of photonic device with several functions like wavelength selector, de-multiplexer or even a spectrometer.

/ Photoenergy Harvesting Systems

To take advantage of light energy harvesting based on PMP-PZL devices, a dedicated generator topology has to be proposed. This last part is a completely new paradigm and the most challenging with respect to the state of the art.

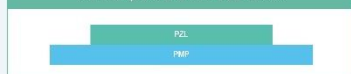
THE EU BUDGET

The financial resources mobilised by the 8 partners of the PULSE-COM project represent a total budget and requested EU funding of **2 980 015.00 €**.

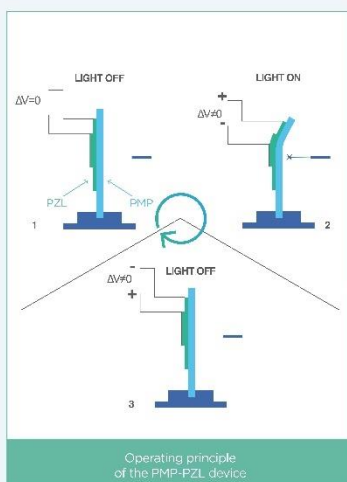
THE PULSE-COM AIM

The aim of the PULSE-COM project is to **realize a new type of piezoelectric devices (PZL) controlled by light using low-cost photo-mobile films (PMP) whose movement is induced and controlled by sunlight and/or artificial light**. **PULSE-COM aims to create a new class of photoactuable devices** that could potentially change the current paradigms in the field of optoelectronic and piezoelectric devices by creating **innovative devices for a wide range of applications**.

An example of the PMP-PZL device



In particular, we intend to develop **optical switches and innovative mechanisms**, whose deformation can be easily controlled by the intensity of an incident light.



Operating principle of the PMP-PZL device

- 1 The device is made of two parts: the substrate (PMP) which is a material sensitive to the light, leading to Micro-Actuation functions, and a piezoelectric composite layer (PZL), leading to Sensing functions.
- 2 Light induces movement to the photomobile substrate and the piezoelectric layer generates an electrical signal because of the mechanical induced strain with the appearance of electrical potential difference between the device electrodes.
- 3 A reverse electrical signal is generated by the PZL layer when the light is off and the substrate returns to its initial position.

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Figure 1: Promotional PULSE-COM poster.

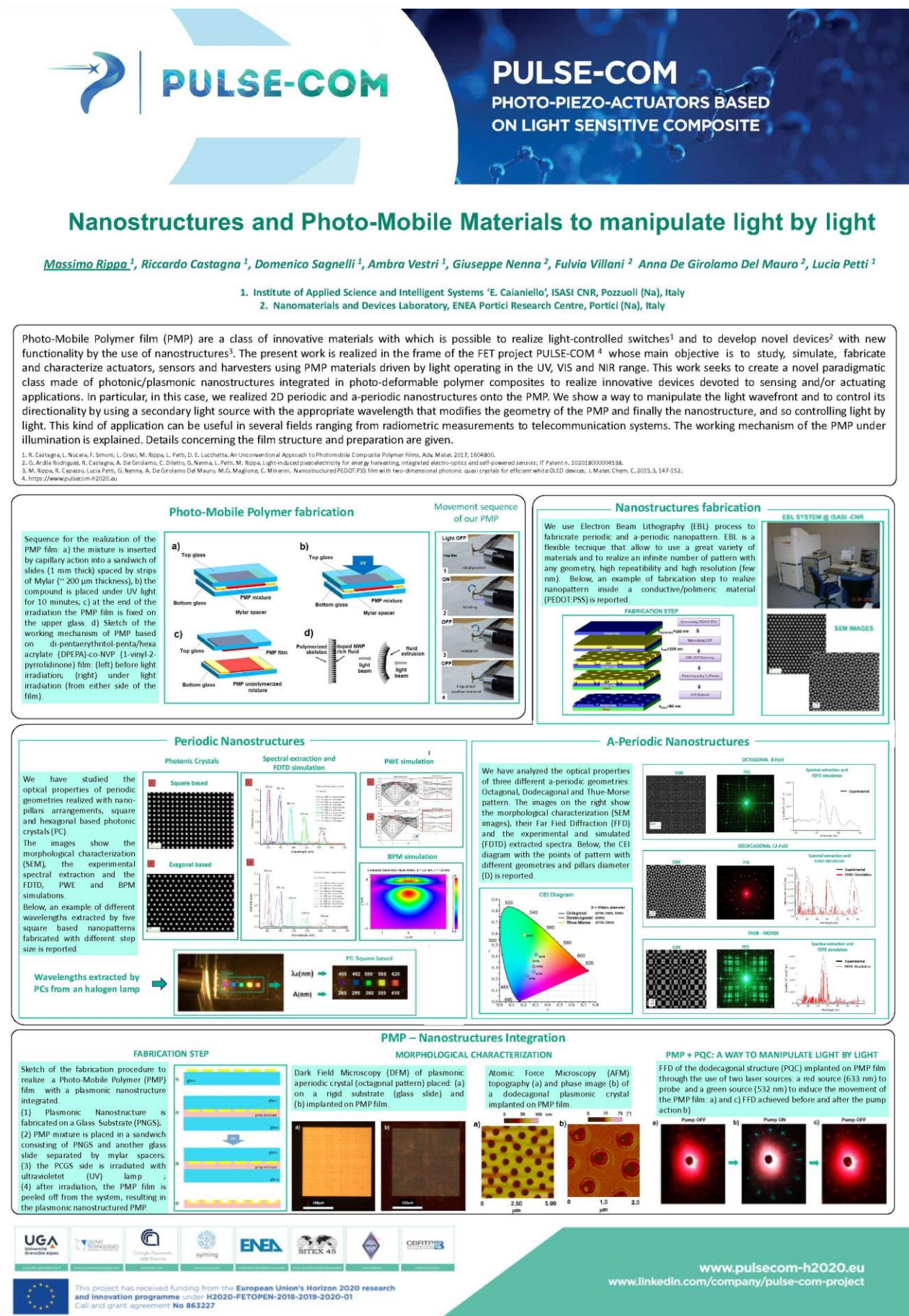


Figure 2: Nanostructures and Photo-Mobile Materials to manipulate light by light, M. Rippa, 2020.