

Esploratori della Fotonica | Photonics Explorers

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The project designed to bring students closer to the scientific world of light has been completed

“In the beginning I was a bit skeptical about the idea of joining an afternoon program after school, on top of all the effort required by studying, but then I changed my mind”. **Vittoria Giordani**, 18, a student at the Rosmini High School in Rovereto who, with another 100 students, participated in the project “**Photonics Explorers**” describes her experience with enthusiasm. “I loved visiting Fondazione Bruno Kessler and the Institute of Photonics and Nanotechnology of the CNR in Povo, seeing how laboratories work and then doing experiments at school. I knew the theory, but, for me, doing the experiment was like magic! I have always loved physics, but now I love it even more and I think this was a really important experience”.





The project, coordinated by the **Institute of**

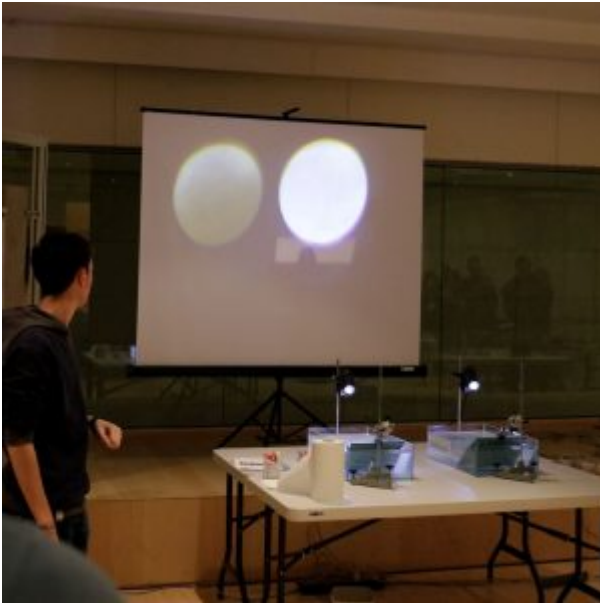
Photonics and Nanotechnologies of CNR (IFN-CNR, Trento) with the collaboration of **Fondazione Bruno Kessler**, had started on November 9, 2017 with the launch at the Galilei High School in Trento and ended on Thursday, October 11 with the presentation of the work carried out and the awarding of the best experiment at MUSE in Trento. Attendees included organizers, teachers and students from the **Da Vinci and Galilei High Schools of Trento, the Rosmini High School of Rovereto and the Degasperini High School of Borgo Valsugana**.

“The goal of this project”, coordinator **Andrea Chiappini** (IFN-CNR) explains, “was to make sure that students approached Photonics, light, not so much through traditional lessons but by experimenting physical phenomena from practical point of view instead. During this experience, the students and their teachers have experimented with a new methodology based on the Photonics Explorer educational kit. Fondazione Caritro contributed to the financing of the project”.

“Fondazione Bruno Kessler”, **Alessandra Potrich** (“Research and Innovation for the School” Unit – FBK) told us, “participated by organizing visits to the IRIS laboratories and a seminar on sensors. Some students have also spent an internship period at the research units of the Foundation and at IFN-CNR. IPRASE, which sponsored the project, also helped organize the initial introduction module for teachers, who put themselves in the students’ shoes during the training workshops on how to use the teaching kit “.

“The activity”, **Paolo Caresia**, teacher of Mathematics and Physics at the Da Vinci High School noted, “has allowed us to work in a different way compared to what is usually done at school. Often, some partly ready-to-use materials are used. Here, instead, we had to design an experiment from scratch. It was a highly educational experience for everyone “.

“The idea of a contest that rewarded the best experiment”, **Chiappini** added, “has certainly stimulated competitiveness among the students and the final event at MUSE, with the participation of the director of the IFN-CNR, Trento section, **Maurizio Ferrari**, was an opportunity for the boys to proudly present their work”.



In particular, the **winner of the contest was the experiment “The world of light and light in the world” designed by the students of the Degaseperi High School of Borgo Valsugana**, a work dedicated to the phenomenon of light refraction that kept fifth-year



or ancient sources and doing experiments in the ties and science.

Special mentions were also awarded: for scientific rigor

to the Rosmini High School of Rovereto and the Galilei High School of Trento, for the unprecedented approach to the students of the Da Vinci High School in Trento, for the teaching value of the Humanities High School (Borgo

Valsugana).

For all the “Photonics explorers”, the initiative represented the opportunity to meet the research world in its various facets more closely. “It’s not something that you get to do every day in school”, ponits out

Alessandro La Rosa, 18, a student of the Da Vinci High School, “I hope I can repeat this experience!”.

Experiments carried out:

Green Rim & Flash Da Vinci High School

The green ray (green flash) is an optical effect consisting of a beam of dim green light that can be observed for a few seconds at sunrise or sunset. This phenomenon is due to the refraction at different angles of the various wavelengths contained in the sunlight by the atmosphere and by the diffusion of the small wavelength radiation (violet and blue) by the molecules of the air. The experiment aims to reproduce the natural phenomenon of the green ray.

“Seeing the light” – “G. Galilei” Science High School

The goal is to visualize, using a sort of fog chamber, the path of light and various phenomena that characterize the physical behavior of glass, lenses and mirrors (the so-called geometric optics) but also phenomena of interference from lattices and cracks.

These activities were all organized in reasoned steps designed by students for students.

Experiment title: The world of light and light in the world

“The world of light and light in the world” – “A. Degasperi” Science High School

Exploring the theme of light through an integrated path between literature and physics with a focus on refraction. The discovery of refraction in ancient texts, in the verses of Dante up to the laws of geometric optics and experimentation in the laboratory. The light that propagates in a straight line... Or maybe not: it bends... or maybe not: it curves. A work that involved the fifth-year students of the Science High School for several months looking for ancient sources, to carry out experiments in the laboratory: a contamination of humanities and science. The summary of the work can be found in an e-book, in some videos and in the laboratory experience.

“Discovering Light” – “A. Degasperi” Humanities High School

Because children are still amazed by the rainbow: the project was developed precisely by focusing the teaching elements. The presentation and study of the properties of light, with some simple experiments in the laboratory that were then borrowed and experimented with elementary school children during the Combining School and Work Program. The analysis of the experience and of the work produced has been summarized in a video that excites, amazes and makes the observation of the physical phenomena that nature gives us magical, and in two texts; the first one has a more didactic approach, is addressed to young physicists and collects the proposed experiences and stimulates observation through games; the second one is a report describing the activity carried out and the didactic-pedagogical-scientific reflections emerged.

“Interferences” – “A. Rosmini” Science High School

Light interference is not only generated by two slits, but, using a Fresnel biprism, we can visualize the interference figure of two virtual coherent sources, obtained from a single point source.

Furthermore, the phenomenon of interference between two slits with a much greater width and

radiation in the field of microwaves can be analyzed.

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