

# Foton

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Photonics  
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On the Track of Modern Physics



## On the track of Modern Physics

*Grzegorz Karwasz*

*Pomeranian Pedagogical Academy in Słupsk*

At one of the airports I got into a recent special issue of “Scientific American” entitled “The frontiers of Physics”. One glance and I fell into serious doubts: the theory of strings still has not been confirmed experimentally, the relativity theory can be erroneous, Higg’s particles are probably five, but before putting into operation the hadron accelerator in CERN we will not know this. How should I tell it to students, not being funny?

I was coming back from a congress in Japan on plasma technologies. 400 young Japanese were listening to the lectures, mainly by Europeans and Americans. The majority of students hardly speak English, just enough to be understood, but were eagerly learning new techniques of silicon deposition in cheap electrical discharges under atmospheric pressure. Silicon, grown in the form of nanocrystals, containing not more than a few thousand atoms, has surprising features. As far as normal silicon, that for producing transistors, is metallicly grey, the new form is shining in all colours. In detail: it shows photoluminescence in a visible range. A full surprise, if not a revolution. A cheap photovoltaic cell will absorb light in the whole solar spectral range. Bye-bye petrol!

Trento is famous for skiing, beautiful mountains and apple trees. The latter grow on highlands, mature late but are wonderful. My colleagues from Trento put small apples into glass containers with nitrogen and then study their smell with lasers. Yes, their smell! In this way scientists check which apples are to be removed in order for the remaining to mature splendidly. The technique is called “photo-acoustic spectroscopy”. Why does “Scientific American” not write about such subjects?

These questions are at the basis of the projects “Physics is Fun”, founded by the European Union. School physics is difficult and for this becomes dull, if not understood properly. Speaking on 11 dimensions of space, possible but not verifiable, does not attract interest. Let’s try to find problems interesting, but “touchable”, with some possible applications.

The exhibition which travels between Paris and Słupsk describes open, complex problems of Modern Physics and it even allows one to touch quarks. Because what can not be touched by the senses, Aristoteles called “meta-physics”.

The programme “Physics is Fun” is run by (in order of tasks):

- Pomeranian Pedagogical Academy in Słupsk
- Trento University, Italy
- Jagellonian University (*Foton*)
- Ecole Centrale in Paris
- Music editor “Soliton”, Sopot
- Multimedia editor “Ambernet”, Warsaw
- Editor “Dudka-Design”, Milan

The tasks include go-around exhibitions “Toys and Physics” and “On the track of Modern Physics” and two CDs on these subjects. The exhibitions were shown in September 2005 at GIREP conference in Ljubljana, at XXXVIII Polish Physicists Convention, in October at the congress “Multimedia Tools of Teaching Physics” in Berlin, in December during open days in “Ecole Centrale”, in February 2006 in Trento and are planned in May 2006 in Gdańsk.

The form is to make modern physics possibly simple, which does not mean simple.

We try rather to stimulate the imagination of visitors, unexpected connections and analogies. We show quarks not only as small balls but also as small wolves, proton and neutron as grey steel cubes and as colourful Brazilian parrots from balsa, and to show the curvature of time-space we use kitchen funnels.

The contents of exhibitions are new aspects, open questions, serious doubts and not only “standard” truths. The didactical aim is to show the methodology of scientific discovery: we can learn more from Einstein’s errors than from his true statements.

Temporary internet versions of exhibition are at the addresses:

<http://modern.pap.edu.pl>

<http://www.karwasz.it/modern/index-pl>

<http://lab.pap.edu.pl/%7Ez/wystawy/droga>

<http://www.science.unitn.it/~karwasz>

and also

<http://zabawki.pap.edu.pl>



We invite all visitors!

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