

## POSTER N°6

### EINSTEIN'S TOYS

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A wide exhibition to celebrate the World Year of Physics has been organized in Trento, Italy, by the Department of Physics and the Science Museum of that town.

The idea of the exhibition is to follow the narration written by Einstein in his "Scientific autobiography" in which he describes how he succeeded in discovering new physics.

Classic physics and modern physics are presented thanks to many fascinating and amusing hands-on exhibits and to computer simulations.

Thousands of students (and common people) have already visited with satisfaction the exhibition, guided by helpers. The organization of the visit for the schools has been deeply prepared. We focused on three types of visit: for primary, junior high and high school students. For each type a different narration of the exhibition has been prepared. Afterwards, a course for helpers of about 30 hours has been held. In addition, we offered a presentation to teachers of all kind of schools, in order to let them know what is the exhibition about.

Since it is impossible to describe a whole exhibition in a written short text, only the main topic will be presented; in parentheses a glimpse of some exhibits regarding each subject can be found.

MARVEL and CURIOSITY (home made compasses)

*"I felt fascinated by this thing, at the age of four or five, when my father showed me a compass. That the needle could behave in that particular way absolutely did not agree with the nature of phenomena that fit in my concept of the world at that time, all based directly on the experience of 'touch'." (Einstein, "Scientific Autobiography", 1949)*

MATHEMATICS (soap films; Pythagoras theorem; spherical geometry)

*"When I was 12 felt a new marvel of a completely different nature; it happened while reading a book on Euclidean geometry..."*  
(*"Scientific Autobiography", 1949*)

THE PROBLEM OF LIGHT (prisms; Fresnel's lenses; mirages, diffraction)

*"If light were to be interpreted as a wave motion in an elastic body (ether), the ether should be a medium that permeates everything... This ether would have a ghostly existence with respect to the rest of matter because it seems to offer no resistance to the motion of 'imaginable' bodies. » (Einstein, Scientific Autobiography, 1949)*

UNIFICATION POWER OF A THEORY: NEWTON AND MAXWELL (mechanical toys; electrical toys)

*“What the XIX century has done (..with Newton’s laws..) had to be admired by any clever person...” “When I was a student, Maxwell theory was the most fascinating topic...the incorporation of optics in the electromagnetism ...all that was a revelation.” (Einstein, Scientific Autobiography, 1949)*

THE REVOLUTION OF THE ATOMIC WORLD (Brownian motion; photoelectric effect; Rutherford’s atom; Bohr’s atom; electrons diffraction; atomic spectra; atomic orbitals)

*“At the end of the century ...a new crisis of a fundamental significance began, whose gravity was immediately understood thanks to the researches of Max Planck on thermal radiation...” (Einstein, Scientific Autobiography, 1949)*

THE REVOLUTION OF SPECIAL AND GENERAL RELATIVITY (classic relativity (train; rotating platform); dilatation of time; relativistic bus; gravitational funnel: inflatable universe)

*“Special relativity introduces a change to Newton’s Laws in the motion of a point. This change consists in considering the speed of light in a vacuum as the maximum speed.” (Einstein, “Ideas and Problems of Relativity”, 1923)*