

Quantum physics for everyone in CosmoCaixa

ICFO's Outreach team as well as a number of ICFO researchers have collaborated with the science museum in Barcelona to bring quantum physics to the general public.

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Fifteen years ago, CosmoCaixa opened its doors to the public with a highly interactive permanent exhibit that allowed visitors of all ages to learn and discover science in a hands-on and entertaining way.

On Monday, 11 July, in honor of this Barcelona Science Museum's 15th anniversary, a new permanent exhibit was unveiled- the Sala Univers (Universe Exhibit). The 3500 square meter room has been completely renovated to house the most innovative interactive setups that try to explain the latest advances in science. The new exhibit takes visitors on a trip through time, traveling from the origins of the known Universe - the Big Bang - to the current frontiers of knowledge, dividing the trip into 3 segments- Cosmos, Evolution and Frontiers.

This new exhibition incorporates audiovisuals and new technologies. Leading international scientific institutes, including ICFO, have played an important role in ensuring scientific rigor. Among the different modules inaugurated in this new space, CosmoCaixa has included a quantum physics interactive experiment made by ICFO. Various ICFOians, including mainly the participation of Dr. Jordi Andilla, Dr. Federica Beduini, Dr. Marta Garcia-Matos and ICREA Prof. at ICFO Morgan W. Mitchell, have contributed to creating, designing and technically implementing this novel piece that aims to bring quantum physics alive for the first time in a museum.

Contented with the outcome of the setup, Federica Beduini, from ICFO's outreach team argues that bringing quantum physics to a science museum has been a real challenge, because quantum effects appear only at very precise conditions, not easy to reproduce outside a controlled environment of a lab.

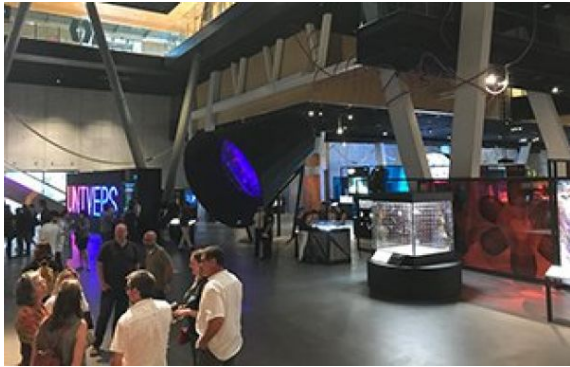
The result of a two year-long collaboration between ICFO and CosmoCaixa conceived by Mr Jordi Portabella, at that time CosmoCaixa Director, and ICFO's Director Prof. Lluís Torner, has ushered the creation of an interactive piece that allows visitors of the science museum to explore concepts of quantum physics, in particular quantum superposition, which was defined by Richard P. Feynman as the only mystery in quantum mechanics. By playing around with filters and obstacles, those curious minds that visit the setup can interact with a real optical setup, changing the behavior of light from a classical state to a quantum state, being able to observe in real time the behavior of photons thanks to the help of an ultra-sensitive camera.

As researcher Jordi Andilla comments, setting up a research instrument for a non-scientific public has been a very interesting challenge of synthesis, understanding and simplification. We had to provide a clear demonstration of a quite difficult concept in few steps. Nice challenges like this one, that approaches science to general public, is one of the reasons for doing science.

Finally, ICREA Prof and Group Leader at ICFO Morgan Mitchell highlights that we want to make wave-particle duality, the heart of quantum physics, accessible to a non-expert public. This is a really hard challenge. It requires a precision experiment, precise enough to make visible the interference of single photons. The museum visitor must be able to see very quickly what is going on. And it has to survive in an environment much more chaotic than a research laboratory.

The main objective of the museum's renovation has been to incorporate more innovative interactive, awe-inspiring and emotion-oriented setups accessible to all audiences, to raise

awareness about the importance of science and the latest of science innovation as well as to awaken scientific vocations amongst young people.



General view of the new exhibition space