

# Summer Course in Nanoscience and Nanotechnology

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### ABSTRACT

## Curiosities in the universe of the very small

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The world of the very small is certainly disconcerting, and there are phenomena that escape what, at a macroscopic level, should be intuitive. Indeed, as Richard P. Feynman points out, nobody understands the Physics of the very small... however we are immersed in it and, even if we do not understand it, with imagination, knowledge and method, we can obtain wonderful results.

Interestingly, the same thing happens with the world of the very large... Do you know who, according to Einstein, gravity is nothing more than a singularity in the geometry of space-time due to the presence of massive bodies? And yet, Physics has to be independent of the size of the system we are considering. This statement leads us directly to even stranger phenomena. For example: the necessary existence of antimatter, pulsating universes, or the fact that the expansion of the universe depends on the mass of the neutrino.

In this presentation we will approach, from an informal but rigorous perspective, some of the previously mentioned phenomena. I am aware that the task is difficult, but – surely – I will have the opportunity to do some experiment, and that the organization of this original and educational event, as well as those attending this presentation, collaborate with me to consolidate something that, despite from being convolutedly difficult, it is also enjoyable and even fun.