

Physics for Society: Grand Challenges in the Horizon 2050

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There are many images of science. Some would imply that science would eventually reach the limits of knowledge while others generate an expectation of unending horizons. One would argue that our desire for knowledge and nature understanding is boundless although the execution of our desires and dreams is limited.

Leonardo da Vinci [1452-1519] was a true Renaissance man. His artistic talent is comparable to his genius to dream the future. Leonardo da Vinci's greatest ambition was to fly. Flying has been the gate in the realm of creativity and fantasy to go where no man has gone before, to overcome human limits, to fulfil high and demanding goals. It took more than 500 years to build a flying machine that would allow humans to get a unique view of our planet. A photograph, snapped from the Voyager 1 in 1990 at a distance of about 6 thousand million kilometres, showing our planet as a lonely pale blue dot in the great enveloping cosmic dark. A unique image taken by scientists to illustrate what we (humanity) are at a global scale and the power of the scientific method. An image that exceeded Leonardo's dreams a few centuries latter.

Historically scientific breakthroughs have been steady but slow, occurring over a span of centuries. Today the pace of innovation has been accelerated drastically. Over the last decades, the European Physical Society [EPS] community has been promoting and examining some of the biggest problems humankind faces right now and the role physics to address them. But, what about the big challenges in physics that are brewing for the future?. In the Horizon 2050, what might be on the world's physics agenda to solve?.

It's difficult to predict, but we can get clues from how current trends in science and technology may play out where physics has a key role to play. This is the target of the EPS *Grand Challenges in the Horizon 2050* project, exploring our ability to imagine and shape the future by making use of the scientific method.

The project is designed to address the social dimension of science and the grand challenges in physics with two pillars: physics as global human enterprise for understanding nature and physics developments to tackling major issues affecting the lives of citizens. A fascinating journey from the smallest things that we have ever explored until reaching the largest things we have ever measured – the greater breadth of the universe. A project highlighting the key role of interdisciplinary to address some of the grand scientific and social challenges that lay ahead us, such as the climate change or understanding life.