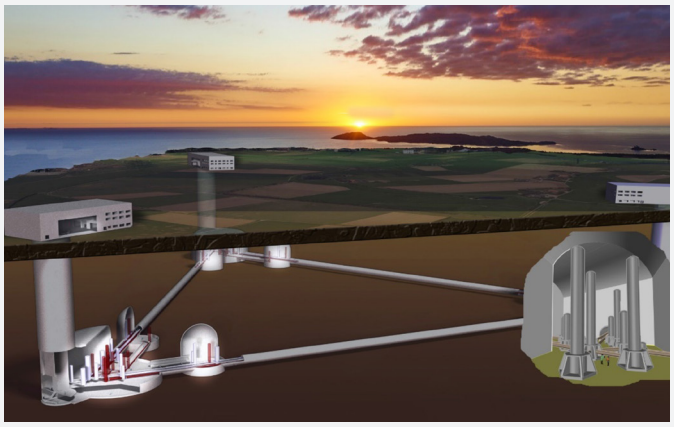
» FOCUS



THE EINSTEIN TELESCOPE

Gravitational waves and the Einstein Telescope (ET) project for the implementation of a gigantic third generation underground interferometer in Europe were one of the topics of the conference *EU research and innovation in our daily life*, which was held in Brussels at the European Parliament in early December. The conference addressed the topic of the impact of scientific research on daily life and represented an important moment to support this project at the highest European institutional level. At the opening, Michele Punturo, INFN researcher and international coordinator of the ET project, illustrated the objective of the future research infrastructure, which could be built in Sardinia, in Lula, in the former Sos Enattos mine. For the implementation site the decision is still open. There are three candidate sites: one in Hungary, one on the border between the Netherlands, Belgium and Germany, and the Italian one. The application of the Sos Enattos mine is coordinated by INFN with the support of the Ministry of Education, University and Research (MIUR), the Sardinia Region and the University of Sassari.

Dedicated to Albert Einstein, ET is a very ambitious engineering, technological and scientific challenge and involves the implementation of a third-generation gravitational wave detector, with a triangular layout, consisting of three 10 km long arms, for a total perimeter of approximately 30 km. The detector will be placed at a depth of between 100 and 300 metres, to isolate it from seismic wave movements. It is therefore an underground infrastructure, comparable in size to LHC, with very low levels of environmental noise.

The technological leap brought by ET will improve sensitivity by a factor of 10, equal to an observable volume 1000 times greater than second generation detectors. Designed to be sensitive especially at low frequencies, ET will allow the gravitational waves produced by the coalescence of compact bodies, such as black holes and neutron stars at cosmological distances, to be observed with regularity and great detail, thus inaugurating precision gravitational astronomy. To build the Einstein telescope, the technologies developed in the high

» FOCUS

energy world, such as cryogenics, technologies for ultra-high-vacuum systems of gigantic dimensions, control systems, high-performance electronics, data acquisition systems and computing, will be crucial.
ET is a pan-European project costing approximately one billion euros. The countries that support it are Italy, thanks to the direct contribution of INFN, the support of Sardinian universities, above all Sassari, and the interest of the National Institute of Astrophysics (INAF); France, through the collaboration of the Center National de la Recherche Scientifique (CNRS) with INFN in the European Gravitational Observatory (EGO); the Netherlands, which with the Nikhef institute, is pushing strongly for the North-European site, together with some Belgian universities, Germany with the Max Planck Institute for Gravitational Physics (MPG) and the University of Hanover and Hungary which sponsors the local/Hungarian site through the Wigner Institute. In the United Kingdom, the Scottish and English universities of Glasgow, Birmingham and Cardiff are strongly supporting the project. ■