

» TECHNOLOGY TRANSFER**PHYSICS FOR THE CULTURAL HERITAGE:
THE FAKE LEGER**

The Guggenheim Museum in Venice asked a team of INFN scientists, who for years have been working on the applications of physics to the field of cultural heritage, to analyse a painting attributed to Fernand Léger, the authenticity of which has always given rise to doubts. In February 2014, researchers from the Laboratory for the Environment and Cultural Heritage (LABEC) of Florence finally unravelled the mystery: it is a fake.

The canvas on which the painting was made was found to unequivocally date back to after the death of the French painter. The analysis was carried out with a particle accelerator using a non-destructive technique and extreme precision, able to date organic material, such as the canvas of a painting, by measuring the radiocarbon concentration: Accelerator Mass Spectrometry (AMS).

In this particular case, moreover, the results of the analysis were compared with the "bomb peak", or peak in the increase in carbon levels in the Earth's atmosphere, as one of the secondary effects of nuclear tests carried out during the cold war. Using particle accelerators it is possible to date organic material such as wood, bones or tissues up to approx. 50,000 years old. At the LABEC, the AMS technique has been used, for example, to date the remains of Saint Francis, the Cross of Rosano and the Papyrus of Artemidorus.

Among other techniques developed for basic research which have found application in the cultural heritage field are IBA (Ion Beam Analyses) that use accelerators to investigate the composition of the pigments used in paintings, ancient inks and metallic alloys. The most powerful IBA technique is the PIXE technique, which uses the emission of X-rays induced by accelerated proton beams. IBAs have been used, for example, to analyse the manuscripts of Galileo, the Madonna dei Fusi of Leonardo and the Trivulzio portrait of Antonello da Messina.