APPLICATIONS

SMALL, PRECISE AND POWERFUL: MACHINA, THE ACCELERATOR FOR THE CULTURAL HERITAGE, IS HERE

A next-generation accelerator resulting from the collaboration between INFN and CERN, entirely dedicated to the cultural heritage. This is the identity card of the MACHINA (Movable Accelerator for Cultural Heritage In-situ Non-destructive Analysis) project for the construction, at the laboratories of the Opificio delle Pietre Dure (OPD) in Florence, of a compact, transportable accelerator to be dedicated full-time to non-invasive diagnostic studies for the restoration and study of materials of historical finds and works of art. In recent years, diagnostic techniques for the study of the cultural heritage have undergone significant development that has led to an increase in the demand for scientific support by art historians, archaeologists, restorers, curators and other cultural heritage experts. In parallel, the national INFN-CHNet (Cultural Heritage Network) has been established at INFN which brings together over 15 research teams specialised in this field. Among these, the Laboratory for Nuclear Techniques for the Cultural Heritage and the Environment (LABEC) in Florence where, since 2004, a particle accelerator has been used also for analysis of the cultural heritage, with which, thanks to the collaboration with OPD, many works of art and finds have been studied, including masterpieces by Leonardo, Mantegna, Antonello da Messina and many more. MACHINA will be implemented with technology developed at CERN for biomedical applications, called radio frequency quadrupole technology (HF-RFQ), that will allow a high precision and small size (approx. 2 metres long and weighing 300 kg) accelerator to be built, thus allowing it to be transported in places large or immovable works, as frescoes, or works which cannot be transported due to their fragile preservation conditions are preserved. ■