



RESEARCH

NEW TECHNIQUE PAVES THE WAY TO A FUTURE MUON ACCELERATOR

The MICE (Muon Ionization Cooling Experiment) international collaboration has published a study in Nature in which it announced that it has for the first time studied a crucial process for the construction of future muon accelerators called "muon cooling by ionisation". The result was obtained at the Rutherford Appleton Laboratory (RAL, UK), by the MICE experiment, in which Italy is participating with the INFN divisions of Milan Bicocca, Naples, Pavia, Rome Tre and in the initial phase Genoa and Trieste. The MICE experiment has shown that it is possible to use a completely new technique to transform a disordered ("hot") muon beam into an ordered ("cold") one, and therefore less "voluminous": a technique useful for implementing a very compact particle accelerator (muon collider), for fundamental research at high energies with the use of conventional accelerators. The Italian contribution consisted of the initial design of the superconducting solenoid magnets for the muon trackers, construction of the sophisticated detectors needed to identify the muons used in the experiment and subsequent data analysis. The experiment is extremely interdisciplinary and involves experts in the fields of detectors, accelerators, computer science and cryogenics in a broad international context. The researchers of the MICE collaboration hope that this new technique can help to produce good quality muon beams for other applications, such as the study of the atomic structure of materials, the use of muons as catalysts for nuclear fusion and for the investigation of very dense materials that cannot be explored with X-rays. ■