

## COMPUTING AND PHYSICS OF NEUTRINOS: TWO NEW ITALY-USA AGREEMENTS SIGNED



As part of the mission to the United States, in Washington, of the Minister of University and Research Anna Maria Bernini, which took place between 8 and 10 April in the presence of an INFN delegation led by the president Antonio Zoccoli, two agreements were signed between the Department of Energy of the United States of America (DOE) and the Ministry of University and Research (MUR). These concern advanced computing and quantum information

technologies for high-energy and astroparticle physics and the research programme Deep Underground Neutrino Experiment (DUNE), a big international scientific experiment on the physics of neutrinos being built in the United States. The two agreements were signed last 9 April by Minister Bernini and Harriet Kung, Acting Director of the Office of Science in the DOE, and concern the collaboration between the American laboratory Fermilab and the Italian National Institute for Nuclear Physics. In particular, the agreement for cooperation in the field of advanced computing and quantum technologies provides for the research, development, and application of new High Performance Computing techniques and new technologies for quantum information. This involves developing and optimising new machine learning and new technology algorithms, tools, and infrastructure, as well as quantum computing architecture for simulations and computing in the high-energy and astroparticle physics fields. In addition, the agreement also provides for an exchange in training young scientists and the scientific and technical review of the work of the two Institutes in these fields. The collaboration agreement on DUNE also involves strengthening the collaboration between INFN and Fermilab in the area of neutrino physics research. Specifically, INFN will contribute to building the experiment, consisting of two underground detectors placed at 1300 kilometres apart from each other – at Fermilab, close to Chicago, and at the SURF (Sanford Underground Research Facilities) laboratory, in South Dakota. Among other things, INFN will provide in-kind contributions for building the detectors, like the magnet and calorimeter system used in the KLOE experiment (operating at INFN Frascati National Laboratories until 2018), which will constitute an essential element of the DUNE detector at Fermilab.

The INFN delegation's visit to the United States was also the opportunity to hold two bilateral meetings with representatives of the DOE and the American National Science Foundation to review projects on which Italy and the United States collaborate in the field of high-energy physics.