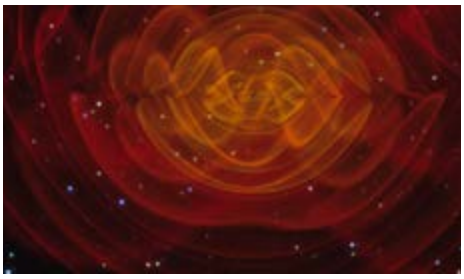

RESEARCH

GRAVITATIONAL WAVES: THE ROADMAP FOR THE NEXT 20 YEARS PUBLISHED ON NATURE

The scientific journal Nature recently published a review dedicated to the near future of gravitational waves research: one of the most exciting research areas in recent years. This research field was characterised by epochal discoveries, such as the first observation of gravitational waves announced by the LIGO-Virgo collaborations in February 2016, and the detection of the merging of two neutron stars observed, for the first time, both with gravitational waves by the LIGO and Virgo interferometers and with electromagnetic radiation by telescopes on Earth and in space, in 2017. The work is focussed on the next 20 years and it discusses the most important projects for physics and gravitational astronomy according to the Gravitational Wave International Committee (GWIC), a body created in 1997 to facilitate international collaboration and cooperation in the construction and operation of the principal infrastructure dedicated to gravitational wave research. Two flagship projects, in particular, involve a significant contribution from Italy and INFN: the European observatory ET (Einstein Telescope)*, for which our country has proposed Sardinia as host site, and the LISA (Laser Interferometer Space Antenna) space detector, whose launch into orbit is expected around the mid-2030s. Together with the interferometry detectors, the Pulsar Timing Arrays (PTA) telescopes will continue to grow with networks of new antennae, more sensitive wide-band receivers providing unique information on the dynamics of the largest galaxies in the universe. ■

* The Einstein Telescope was submitted to the European Strategy Forum on Research Infrastructure (ESFRI) Roadmap 2021. In light of these developments, the scientific institutions that coordinate the project, INFN and Nikhef, recently expanded the ET organisational structure, establishing a new project's management, to which Prof. Fernando Ferroni (INFN and GSSI) and Prof. Jo van den Brand (Nikhef) have been designated. ■