SPACE

FIRST OBSERVATIONS OF THE MINI-EUSO SPACE EXPERIMENT, ACTIVATED BY THE ESA ASTRONAUT LUCA PARMITANO

The Mini-EUSO space experiment, an ultraviolet telescope launched in August 2019 and activated aboard the International Space Station by the ESA astronaut Luca Parmitano at the beginning of October, has collected its first data. Among them, the observation of several ELVES, (Emission of Light and Very low-frequency perturbations due to Electromagnetic pulse Sources) stands out. ELVES are a class of ring-shaped lightning strikes produced in the high atmosphere, due to a thunderstorm discharge at an altitude of approximately 20 km. In addition to the large size, the event is extremely fast and lasts less than a millisecond: the various rings produced can be generated almost at the same time and give rise to an expansion up to several hundred kilometres, which, only apparently, occurs at a speed higher than the speed of light. Mini-EUSO managed to observe various ELVES, measuring their expansion with a resolution of 6 km. From the detailed study of their characteristics, scientists hope to shed light on the phenomena that produce these elusive events.
In addition to the observation of ELVES, Mini-EUSO has observed dozens of meteorites, searching for the presence of interstellar objects among them, and is making the first night-time map of the Earth in ultraviolet, studying both anthropogenic and bioluminescence emissions. The device is also looking for signs of very high energy cosmic rays, particles whose exact origin is still debated and which are presumed to come from other galaxies.
Mini-EUSO is an ultraviolet telescope developed by an international collaboration led by INFN and the Physics Department of the University of Rome Tor Vergata. The collaboration involves various INFN divisions as well as other national and international institutions. The experiment is one of six selected by the Italian Space Agency for the Beyond mission of the European Space Agency onboard the International Space Station. ■