

A POWERFUL GAMMA RAY BURST DISTURBED THE UPPER IONOSPHERE



On 9 October 2022, at 3:21 p.m. Italian time, many satellites in orbit around Earth and in the interplanetary space recorded the strongest gamma-ray burst (GRB) ever observed. Among these, the INTEGRAL (INTErnational Gamma-Ray Astrophysics Laboratory) satellite of the European Space Agency (ESA) also detected an extremely intense and long-lasting flow of gamma rays. At the same time, the CSES-01 (China Seismo-Electromagnetic Satellite), a collaboration between the Italian Space Agency (ASI)

and the Chinese Space Agency (CNSA), recorded a macroscopic disturbance of the electrical field in the upper part of the ionosphere, the highest and thinnest layer of the Earth's atmosphere, due to a sudden, strong current. A similar effect had never been observed before in this layer of the atmosphere. Similar disturbances in the ionosphere are usually connected to energy events linked to the Sun's activity. However, in this case, the coincidence with the arrival of the gamma ray burst indicates that the origin is to be sought much further away, in the explosion of a star almost two billion light years away. The results of the analysis, conducted by an Italian-led, multidisciplinary group that managed to synthesise the data from two very different disciplines - gamma ray astronomy and research into interactions between the Sun, Earth, and the cosmos - were published on *Nature Communications*.