

SEPTEMBER 2020



RESEARCH

AUGER MEASURES THE ENERGY SPECTRUM OF ULTRA-HIGH ENERGY COSMIC RAYS

The international collaboration of the Pierre Auger Observatory, located in Pampa Amarilla, Argentina, has measured the energy spectrum of ultra-high energy cosmic rays with unprecedented

accuracy. Cosmic rays of this type consist of atomic nuclei produced in extragalactic sources and can reach extreme energies, equal to 100 billion billion electron volts. Thanks to the very high accuracy of the measurement, the Auger Collaboration has reported the first observation of a sudden change in gradient at approximately 13 billion billion electron volts in the curve describing the-spectrum development according to energy. This result is particularly important and provides further evidence that the chemical composition of cosmic rays can vary with energy.

The result, which led to the publication of two articles in the scientific journals Physical Review Letters and Physical Review D, selected in the Highlights of the American Physical Society (APS), was obtained thanks to the detection of more than 215,000 high-energy atmospheric cosmic ray showers observed in approximately 15 years of data acquisition.

The Observatory is managed by an international collaboration of more than 400 scientists from 17 different countries, in which Italy is making a decisive contribution with different groups of universities and INFN divisions, the INFN Gran Sasso National Laboratories, the GSSI and the INAF Turin Astrophysical Observatory. In the near future, also thanks to the INFN contribution, detector performance will be further improved as a result of the upgrade of the surface detectors currently in progress.