

New messengers

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The Magic telescope
credit: ASPERA / credit : R. Wagner, MPI for Physics, Munich

In the beginning of the 20th century,
Victor Hess discovers the existence of cosmic rays ionising the atmosphere and
that it should not be just light that is being studied. Grains of
matter, particles coming from the sky - protons and other atomic nuclei, electrons
- all cross the cosmos and bombard the Earth, offering as many new sources of
information about the universe.

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Panorama
of the sky in gamma rays / credit : NASA/DOE/Fermi LAT Collaboration

Gamma rays are the "last grains of light" of the electromagnetic spectrum and thus the most energetic ones. Their emission is often linked to violent events: supernovae, pulsars, active galactic nuclei" here mapped by the Fermi space telescope in 2008. The diffuse emission along the galactic plane comes from the interaction of very energetic particles with the interstellar environment of our galaxy. The atmosphere stops most of the gamma rays. Nonetheless, the most powerful such rays interact with its upper layers, producing showers of particles which are sometimes faster than light in air. Then, they emit a bluish Cherenkov light which can be detected on the ground by specialised observatories such as here, the Magic telescope in the Canary Islands, or H.E.S.S in Namibia.