

MAGIC TELESCOPES OBSERVE A RARE GAMMA EVENT IN THE SKY



A new study conducted by the European collaboration MAGIC, published on 14 April in the journal *Nature Astronomy*, revealed the observation of a flow of high-energy gamma rays coming from a recurrent nova in the Milky Way. The event, the first of its kind to be detected at similar energies, sheds light on a class of astrophysical phenomena considered responsible for the periodic explosions that take place on the surface of novae - stellar

bodies belonging to the family of white dwarves - and for the emission of a part of the photons that constitute the gamma radiation background that permeates our whole galaxy. The result was obtained thanks to detections made by the two Cherenkov telescopes located on the island of La Palma (Canary Islands, Spain), which compose the MAGIC system. Italy is engaged in MAGIC with a prominent role through the contributions of the Italian National Institute for Astrophysics (INAF) and INFN.

The event was identified on 8 August 2021 by NASA's Fermi satellite and by the HESS telescopes in Namibia and quickly alerted MAGIC that was, thus, able to orient its twin telescopes in the direction in which the gamma ray flow was arriving. The origin of the flow was attributed to the activity of the RS Ophiuchi system, 8,000 light years from Earth. The analysis conducted by the MAGIC collaboration thus made it possible to identify the novae as a new type of gamma ray source, opening a new line of research in very high-energy astronomy, and confirming one of the astrophysical models proposed to explain the presence of highly energetic cosmic rays that permeate the Milky Way. Despite their being inert objects, white dwarves may be responsible for violent explosions when, for example, in the presence of a nearby star in its Red Giant phase, the hydrogen produced by the latter is captured by the gravitational field of the white dwarf, accumulating on its surface. Once the right temperatures and pressures are reached, the transfer of the material from one star that is still active to a dead one may trigger nuclear fusion reactions and provoke recurrent explosions on the surface of the nova. Although the gamma-ray emission from RS Ophiuchi provided the first convincing proof of the acceleration of protons in novae, it is still not clear what the nature of the second stellar body is. Additional observations of novae with the Cherenkov telescopes will answer this question.