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Grimoire of the MAGIC telescopes

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MAGIC (Major Atmospheric Gamma-ray Imaging Cherenkov telescopes) is a system of two Cherenkov telescopes located on the Canary island of La Palma (Spain), at the Roque de Los Muchachos Observatory, and operating in stereo mode since 2009. their design and dedicated trigger system allows to reach an energy threshold of 50 GeV, which can be lowered to 15 GeV when using the Sum-Trigger-II. This made it possible to observe sources at the limit of detection for Imaging Atmospheric Cherenkov telescopes ($z \sim 1$) and to deeply study the Geminga pulsar tail emission. A strategy of alert follow-ups from other facilities and the fast reposition of the telescopes made possible the detection of the first neutrino associated with a blazar and of gamma-ray bursts in the very-high-energy (VHE) gamma-ray band, respectively. Moreover, the discovery of GRB190114C allowed a test of general relativity through the study of the Lorentz Invariant Violation. Recently MAGIC observed the first VHE gamma-ray nova, RS Ophiuchi, revealing that protons are accelerated to hundreds of gigaelectronvolts in the nova shock. In this talk we will go through the MAGIC recent highlights in the study of galactic and extragalactic sources, spanning from multimessenger astronomy to astroparticle and fundamental physics.

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