Contribution ID: **270** Type: **Talk**

Shedding light on the highest energy emission from GRBs with MAGIC observations

Wednesday 21 July 2021 12:00 (12 minutes)

On 14th January 2019, the MAGIC collaboration achieved the first significant detection at TeV energies of a gamma-ray burst (GRB), namely GRB 190114C. This observation sets the first experimental proof of very high energy (VHE, >~100 GeV) gamma-ray emission in GRBs, after more than 50 years from the first GRB detection and many searches with Cherenkov telescopes in the last decades. The data collected by MAGIC and by more than 20 other ground-based and space-borne instruments, spanning 17 orders of magnitude in energy, revealed a new GeV-TeV emission component in the GRB afterglow. This unprecedented multi-wavelength dataset, including VHE data for the first time, allowed a detailed study of the broadband emission. A one-zone synchrotron-self Compton scenario with internal γ-γ absorption could be used to describe the broadband emission, using parameters compatible with those found in previous studies of GRB afterglows below the GeV energy range. This detection opened a new era in the studies of GRBs, leading to new questions such as the universality of TeV emission in different types of GRBs. In this contribution we will present the GRB follow-up program performed by the MAGIC collaboration, which started more than 15 years ago. We will highlight the results on GRB 190114C, discuss the implications for GRB physics, and report the latest developments and the prospects for future observations of GRBs with the MAGIC telescopes.

Keywords

GRB; TeV GRB; very high energy gamma rays; SSC; IACT

Collaboration

MAGIC

other Collaboration

Subcategory

Experimental Results

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Session Classification: Discussion

Track Classification: Scientific Field: GAI | Gamma Ray Indirect