

Very-high-energy gamma-ray emission from GRB 201216C detected by MAGIC

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Gamma-ray bursts (GRBs) are the most energetic phenomena in the universe. Many aspects of GRB physics are still under debate, such as the origin of their gamma-ray emission above the GeV energy range. In 2019, MAGIC detected TeV gamma rays from the long GRB 190114C, whose emission can be well explained by synchrotron-self Compton emission by relativistic electrons. However, it is still unclear whether such a process is common in GRBs, given the reduced number of GRBs detected until now at the very high energies (VHE).

GRB 201216C is a long GRB and is the second one detected by MAGIC in this energy range. After receiving the alert provided by Swift-BAT, MAGIC automatically slewed to the GRB position, starting observations 56 seconds after the GRB onset. In the offline analyses of the collected data, we confirmed the detection of gamma-ray emission with a significance above 5 sigma.

Following measurements from optical facilities, the redshift of this GRB was estimated to be $z=1.1$. This makes GRB 201216C the most distant object ever detected by ground-based gamma-ray telescopes.

In this contribution we will show the analysis results of the MAGIC data, also in comparison with past detected GRBs in the same energy range. Finally, accounting for available multi-wavelength observations, we will comment on the possible origin of the VHE emission detected by MAGIC.

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