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MAGIC view of gamma-ray bursts at very high energies

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The detection of gamma-ray bursts (GRBs) is one of the main scientific targets pursued by the MAGIC collaboration since almost 20 years. The MAGIC telescopes were specifically designed for this purpose: the main figures of merit are the fast slewing speed (7deg/s), the low energy threshold (~ 50 GeV at zenith) and the high sensitivity in the low energy regime. These features make MAGIC one of the most suitable instrument for the follow-up and detection of GRBs. After more than 15 years of dedicated searches, finally the first detection at teraelectronvolt energies of a GRB, namely GRB 190114C, was achieved by the MAGIC collaboration, revealing a new emission component in the afterglow phase. This discovery opened up a new era in field of GRB studies, which is now witnessing other detections, as demonstrated with the case of GRB 201216C. Furthermore, a hint of detection by MAGIC from the short and nearby GRB 160821B gives precious hints on the possible very high energy emission from this class of bursts, also in relation to searches of gravitation wave counterparts. Therefore, MAGIC is giving a crucial contribution to GRB physics, leading to a better understanding of the mechanisms underlying these peculiar objects. In this contribution I will introduce the MAGIC follow-up program, focusing on the aspects which led to the successful detection of GRBs and highlighting some key results. Finally, I will present the future challenges in these observations, discussing how MAGIC can contribute even more to the field.

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