

TeV Transients with the ASTRI Mini-Array: a case study with GRB 190114C

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The recent discovery of a teraelectronvolt (TeV) component in a few long GRBs and possibly in the short GRB 160821B, deepened the insight on GRB physics and opened the new TeV window in their observation, and in the study of the multi-messenger counterparts, e.g. gravitational waves. The exact nature of the TeV component and the details on the implications on the emission region need to be confirmed with successive detections. The planned ASTRI Mini-Array, composed of nine imaging atmospheric Cherenkov telescopes at the Teide Observatory site, will play a crucial role in the study of the new TeV component, by further extending the explored range to energies greater than few TeV.

We have studied the capabilities of the ASTRI Mini-Array to detect transients using the observed and modelled TeV light curve and spectrum of GRB190114C as a template to simulate the emission from GRBs, rescaled for shorter cosmological distances. The proper amount of absorption due to the extragalactic background light (EBL) has been included. The simulations show the feasibility of the detection of TeV emission by the ASTRI Mini-Array from GRB 190114C, and the ability to confirm the afterglow emission from nearby GRBs, at redshift between about 0.1 and 0.4. The spectrum can be measured at energies between 1 and 10 TeV, up to few minutes from the onset of the burst. In case of detection, for the closest and bright bursts, the ASTRI Mini-Array can reveal the presence of a >1 TeV spectral cutoff, either originated by the EBL absorption or intrinsic.

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Collaboration

other (fill field below)

other Collaboration

ASTRI project

Subcategory

Future projects

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