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The ASTRI Mini-Array follow-up of transient events in TeV band

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The LHAASO detection of the very high-energy (VHE) emission component from gamma-ray bursts (GRBs) up to the multi-TeV regime proved the importance of ground-based gamma-ray facilities in exploring the physics of these enigmatic objects up to the extreme energies. In recent years, significant efforts in improving the strategies for follow-up of transient events have been performed within the VHE community, particularly in the current era of multi-messenger triggers. The association of high-energy neutrinos and gravitational waves with transient astrophysical sources will indeed provide insights into the physics of extreme cosmic accelerators. The ASTRI Mini-Array experiment, composed of nine imaging atmospheric Cherenkov telescopes in dual-mirror configuration, will play an important role in studying the TeV emission in transient events. The array is being completed at the Teide Observatory site, where the first telescopes are already acquiring data. The ASTRI Mini-Array will be equipped with a dedicated transient handler that will allow us to perform specific follow-up campaigns on a wide range of astrophysical sources like GRBs, galactic transients, and the possible VHE electromagnetic counterpart of neutrinos and gravitational waves. The presence of multiple observing facilities at the Teide Observatory and the closeness to the Northern site of the Cherenkov Telescope Array Observatory will guarantee the unique opportunity to perform simultaneous follow-up in a wide energy range and in a multi-band context. We studied the performance of the ASTRI Mini-Array in detecting the possible TeV signatures from nearby on- and off-axis GRBs. The implementation and optimization of a possible ASTRI Mini-Array observational strategy based on specific science cases will also be discussed.

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