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The Cherenkov Telescope Array transient and multi-messenger program

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The Cherenkov Telescope Array (CTA) is a next generation ground-based very-high-energy gamma-ray observatory that will allow for observations in the >10 GeV range with unprecedented photon statistics and sensitivity. This will enable the investigation of the yet-marginally explored physics of short-time-scale transient events. CTA will thus become an invaluable instrument for the study of the physics of the most extreme and violent objects and their interactions with the surrounding environment. The CTA Transient program includes follow-up observations of a wide range of multi-wavelength and multi-messenger alerts, ranging from compact galactic binary systems to extragalactic events such as gamma-ray bursts (GRBs), core collapse supernovae and bright AGN flares. In recent years, the first firm detection of GRBs by current Cherenkov telescope collaborations, the proven connection between gravitational waves and short GRBs, as well as the possible neutrino-blazar association with TXS 0506+056 have shown the importance of coordinated follow-up observations triggered by these different cosmic signals in the framework of the birth of multi-messenger astrophysics. In the next years, CTA will play a major role in these types of observations by taking advantage of its fast slewing (especially for the CTA Large Size Telescopes), large effective area and good sensitivity, opening new opportunities for time-domain astrophysics in an energy range not affected by selective absorption processes typical of other wavelengths. In this contribution we highlight the common approach adopted by the CTA Transients physics working group to perform the study of transient sources in the very-high-energy regime.

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