

Detection of early (prompt) very-high-energy gamma-ray emission from compact mergers

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The production of VHE early emission of gamma-ray bursts (GRBs) is still highly debated. Nowadays, we mostly rely on observations in the range of 10 keV-10 MeV while at higher energies (above 100 GeV), the current instruments have difficulties due to time spent repositioning the telescope. I will discuss the multi-messenger observational strategies to detect the early emission of short GRBs at very-high-energies (VHE; $E > 30$ GeV) in the era of the third-generation gravitational wave detectors Einstein Telescope (ET) and Cosmic Explorer (CE) in association with Cherenkov Telescope Array (CTA). I will describe the capabilities to detect 0.1-100 GeV by using gravitational-wave early warning alerts and the localization pre-merger estimated by the next generation of gravitational-wave detectors. I will discuss possible VHE components from the synchrotron self Compton components in the leptonic GRB model, the high energy tail of the hadronic GRB model as well as external inverse Compton emission as viable candidates in the energy band of 10 GeV - 10 TeV and their detection limits by CTA.

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