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The important messages from VHE gamma rays

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I would argue that very high energy (VHE) gamma rays play a key role in the multimessenger exploration of the universe. On the cosmic-ray side, they allow us to study the emission mechanisms of Galactic accelerators with an unprecedented level of detail. On the neutrino side, we have now a handful of potential Galactic Pevatrons, and also VHE gamma rays were observed from a flaring active galaxy possibly in association with a high energy muon neutrino. Finally, it has been demonstrated that gamma-ray bursts (GRBs) are capable of emitting VHE gamma rays. GRBs are an important component of the multimessenger exploration. Not only GRBs are one of the long-standing candidate sources of ultrahigh energy cosmic rays, but also a short-duration GRB was detected in coincidence with gravitational waves originated from the coalescence of a binary neutron star system. While no VHE gamma rays were observed from this merger, the extracted upper limits provide important constraints to the VHE emission models for such events. In this talk, I will briefly describe the main features and characteristics of the current VHE gamma-ray detectors, and present a selected number of results from them that are most relevant to the multimessenger perspective.

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