

## VHE emission from GRBs: does it require a peculiar host environment?

*Thursday, 15 April 2021 07:45 (15 minutes)*

GRB 190114C was the first gamma-ray burst (GRB) for which a secure detection of very high-energy (VHE) photons by MAGIC has been announced. By now, at least another two GRBs have confirmed VHE detections. One of the still unsolved questions is whether all GRBs show VHE emission (and we were just lucky to observe it) or whether they actually require special conditions for this VHE emission to occur at sufficient strength to be observable. In the case of GRB 190114C, optical spectroscopy from X-shooter a few hours after the burst hints at a peculiar environment: We detect excited lines of Titanium never seen before in any GRB (nor in any other astrophysical object!) and we have further evidence for a very dense environment in the data. At least one of the other VHE detected GRBs, 190829A, share some of these properties. Both GRBs furthermore show a high extinction in their sightline. The location of GRB 190114C in its host was also peculiar: It occurred in the central region of its host, which itself shows a high molecular gas content, as seen in ALMA CO imaging, and is part of an closely interacting galaxy pair. All these observations support our claim of a particularly dense environment, not commonly observed in GRBs. We therefore believe that a dense environment is key to produce the VHE emission, similar to the dense central star clusters where VHE emission in low redshift starburst galaxies has been observed (without hosting a GRB).

**Primary author:** THÖNE, Christina

**Presenter:** THÖNE, Christina

**Session Classification:** Exploring the Cosmos: GRB-2

**Track Classification:** Gamma-ray Bursts